

Agency : BPS-Statistics Indonesia
Theme : Ocean/thematic accounting
Title :

Advancing Indonesia's Sustainable Ocean Governance through Ocean Accounts

Summary

Indonesia's ocean governance faces increasing pressure from resource use, ecosystem degradation, and fragmented data systems, creating a need for integrated evidence to balance economic development with ecological sustainability. This paper examines the development of Indonesia's Ocean Accounts under the bilateral Ocean for Development (OfD) partnership between the Governments of Indonesia and Norway and its role in advancing ocean governance in Indonesia. OfD focuses on three components: Ecosystem Services Accounts, Ocean Satellite Accounts, and the fundamental statistical information system supporting ocean accounting. The program has produced ecosystem accounts for ten marine protected areas, including physical and monetary accounts for ocean assets and ocean flows, and has initiated experimental Ocean Satellite Accounts linked to national economic classifications. The results from Ocean Accounts have shown to be used as an important evidence base for marine resource valuation, spatial planning, non-tax revenue policy, and science- and economy-based marine resource management. This commitment is strengthened through national standards SNI 9257 and SNI 9258, the 2025–2045 Ocean Accounts Roadmap, and recognition in Indonesia's Second NDC as a tool for measuring the role of coastal ecosystems, such as mangroves and seagrasses, in climate action. These show how Ocean Accounts can translate ecological and economic data into policy-relevant indicators, supporting marine spatial planning, ecosystem-based licensing, and Indonesia's broader commitment to sustainable ocean governance.

Introduction

Oceans are a vital source of income, a refuge for rich biodiversity, and an important arena for international cooperation and policy. For archipelagic nations such as Indonesia, marine and coastal ecosystems support livelihoods, food security, trade, transport, tourism, and climate resilience. Indonesian waters also hold global environmental and economic significance because they connect major ports and lie along some of the world's busiest shipping routes.

At the same time, marine resources, coastal ecosystems, and maritime activities are facing increasing pressure from economic use, pollution, habitat degradation, and competing spatial demands. These pressures highlight the need for ocean governance that can align economic development with long-term ecological integrity. Sustainable ocean governance is therefore essential to ensure that ocean-related decisions are inclusive, evidence-based, and environmentally sound, while protecting marine and coastal resources for present and future generations.

Background

Indonesia's national development agenda provides an institutional and legal basis for strengthening sustainable ocean management. The National Medium-Term Development Plan (RPJMN) 2025–2029 and the National Long-Term Development Plan (RPJPN) 2025–2045 set strategic goals for achieving an inclusive, sustainable, and advanced economy (Bappenas, 2024, 2025). In addition, Environmental Protection and Management Law No. 32/2009 establishes the legal foundation for environmentally sustainable development through environmental planning, rational resource use, conservation, restoration, supervision, and environmental control.

Within this policy context, Indonesia's marine and coastal governance still faces significant environmental and institutional challenges. Key issues include widespread plastic pollution, ongoing illegal, unreported, and unregulated fishing (IUUF), and insufficiently effective governance and regulation of marine spatial use (Bappenas, 2024). Policy initiatives are also constrained by gaps in spatial data, incomplete information on environmental assets, and the absence of comprehensive environmental-economic assessments. As a result, available economic loss estimates often fail to capture the full extent of ecological damage, creating a gap between policy development and actual environmental conditions.

To address these challenges, Indonesia has sought to strengthen data-driven policy frameworks and improve the capacity of government institutions and relevant stakeholders to manage coastal and marine areas more effectively, sustainably, and equitably. One key initiative is the development of an ocean accounting framework that integrates comprehensive data on marine and coastal ecosystems (Indonesia, 2025).

Since 2020, under the Decree of the Minister of Marine Affairs and Fisheries on the Ocean Accounts Task Force, the Indonesian Ministry of Marine Affairs and Fisheries (KKP), Statistics Indonesia (BPS), the Geospatial Information Agency (BIG), the Ministry of Finance (Kemenkeu), and Bappenas have collaborated to compile Indonesian Ocean Accounts. Efforts to advance Ocean Accounts have also expanded international cooperation, including the bilateral Ocean for Development (OfD) partnership between the Governments of Indonesia and Norway, which has been ongoing since 2022.

Scope

This paper examines the development of Indonesia's Ocean Accounts under the bilateral Ocean for Development (OfD) partnership between the Governments of Indonesia and Norway and its role in advancing ocean governance in Indonesia. OfD program aims to provide a robust statistical framework that measures the intricate linkages between the economy, the marine environment, and resource management to support evidence-based policymaking. OfD is structured into three fundamental components: (1) Ecosystem Services Accounts, (2) Ocean Satellite Accounts, and (3) Fundamental Components of An Effective Ocean Statistical Information System.

Component 1 – Ecosystem Services Accounts

This component focuses on developing ocean ecosystem asset accounts for mangrove, seagrass and coral to support the management of marine protected areas and marine spatial planning.

- Developing pilot Ocean assets accounts and ocean flow accounts for marine protected areas (MPAs)
- Developing methodologies for the valuation of marine ecosystems
- Strengthening human resource capacity through training and workshops
- Integrating Ocean Accounts with Blue Economy, Marine Spatial Planning (MSP), and MPA policies

Component 2 – Ocean Satellite Accounts

This component focuses on developing ocean economy accounts that are integrated into the System of National Accounts.

- Identifying ocean-related economic activities within industry classifications and ocean-related economic products within product classifications
- Developing an extended Supply and Use Table (SUT) for Ocean Satellite Accounts
- Developing ocean economy indicators

Component 3 – Fundamental Components Of an Effective Ocean Statistical Information System

This component focuses on strengthening data and information systems to support Ocean Accounts through the following key activities:

- Developing an Ocean Accounts data management system
- Standardizing data and metadata
- Visualizing data through an Ocean Accounts dashboard

Component 1 has been implemented in 10 locations in Indonesia, most of which are in MPAs including Gili Matra, Banda, Padaido, Raja Ampat, Waigeo Barat, Anambas, Pieh, Aru, Sawu, and Kapoposang Island. Because most Ocean Accounts pilots were conducted in MPAs where ecosystems are relatively well preserved and have clear administrative and spatial boundaries, in 2026, component 1 was tested outside the MPA area, namely in Banten Bay. Banten Bay is characterized by intensive and diverse coastal economic activities. MMAF aims to

examine how the ocean accounts capture the contribution of coastal ecosystems to industrial-scale economic activities, as well as the resulting environmental pressures.

Component 2 covers the compilation of national ocean satellite accounts, while Component 3 helps ensure that all data and information produced by Components 1 and 2 are FAIR (Findable, Accessible, Interoperable, and Reusable).

While Ocean Accounts reports are available for the ten MPAs, this paper presents only one example of Ocean Accounts products: the Savu Sea MPA, which include ecosystem asset accounts, ecosystem condition accounts, and valuation of ecosystem services accounts of Savu Sea MPA(KKP, 2025).

Ocean Accounts Framework

Indonesia uses the Ocean Accounts framework as outlined in the Technical Guidance on Ocean Accounting for Sustainable Development published by the Global Ocean Accounts Partnership (GOAP) to compile ocean accounts (Figure 1). This framework adapts two international statistical standards: the System of National Accounts (SNA) and the System of Environmental-Economic Accounting (SEEA) (GOAP, 2025), thereby is designed to ensure coherence with both national accounts and environmental-economic accounting standards.

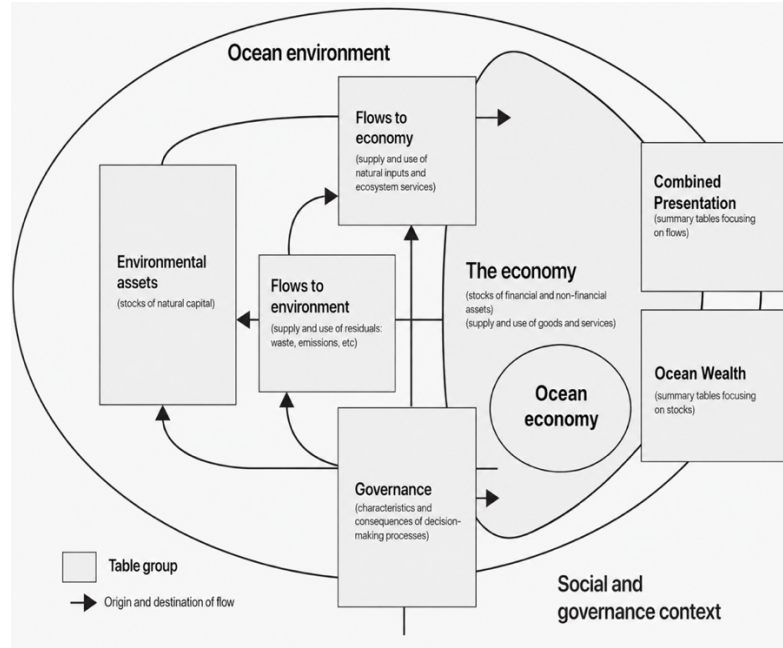


Figure 1. General structure of the Ocean Accounts Framework (GOAP, 2025)

Ocean Accounts framework consists of seven modules:

1. Ocean assets: Record the physical status and condition, and monetary value, of marine and coastal environmental assets
2. Flow to economy: Record inputs from marine and coastal environmental assets to the economy, either in physical or monetary units.
3. Flows to environment: Record outputs from the economy to the ocean environment, in the form of waste, emissions, and impacts on ecosystems.
4. The ocean economy as a contribution to the national economy: Record the contribution of ocean-related economic activities to the national economy, including production, consumption, accumulation, imports, and exports.
5. Governance: Record information related to ocean governance, including the institutional arrangements, decisions, and policies through which marine and coastal-related management is undertaken.

6. Combined presentation: Compare and integrate information from the same or different modules to derive relevant indicators.
7. National wealth: recording summary information (in terms of physical quantities, and/or monetary value) concerning a country's (or other region's) stock of ocean wealth

For the OfD program, four Ocean Accounts modules have been prioritized for development: ocean assets, flows to the economy, flows to the environment, and ocean governance. Each module is coordinated by designated agencies according to their respective mandates and technical expertise (Figure 2).

Ocean Asset	Flow to Economy, Flow to Environment, The Ocean Economy	Ocean Governance	Combined Presentation and Ocean Wealth
•BIG <i>National Marine Conservation Area Loka (LKKPN)</i>	•BPS •Kemenkeu	•KKP	•BPS •Kemenkeu •KKP

Figure 2. Inter-agency Responsibilities within the Indonesian Ocean Accounts Task Force

Methodology

In general, the ocean accounts data collection in the ten MPAs comes through various ways including field surveys, government-released secondary data, expert judgment, and literature reviews.

The ocean asset account is led by the BIG with support from the National Marine Conservation Area Offices (LKKPN) located in each MPA. It consists of accounts of ecosystem extent and condition. The compilation of ocean extent relies primarily on secondary data derived from multi-temporal satellite imagery for mangroves, seagrass, and coral reefs. These data are then combined with field validation, including ground-truthing and accuracy assessment to ensure the reliability of the resulting accounts. The compilation of ecosystem asset conditions and biophysical parameters primarily relies on monitoring data from each LKKPN and is supplemented by satellite image analysis.

The flow-to-economy and flow-to-environment accounts are coordinated by BPS and Kemenkeu. Here, KKP and NGOs are involved as collaborating partners in the data collection process. To compile these accounts, BPS and Kemenkeu prepare questionnaires commonly referred to as the Ocean Accounts socio-economic survey, targeting business actors and visitors in selected MPAs. The collected data are subsequently analyzed and validated through a series of quality gates.

When the physical ocean asset accounts have been compiled, it is then possible to further compile the monetary value for ocean asset accounts or ecosystem services provided by the MPAs. For this, Kemenkeu, specifically from the Directorate General of State Assets is assigned, while BPS supervises its compilation process to ensure it aligns with the SEEA valuation concept. In Savu Sea MPA, for example, the valuation focuses on the ecosystem services, not on the ecosystem asset.

To value the ecosystem services of the Savu Sea MPA, first, ecosystem services are identified and mapped. Key selection criteria included: (1) relevance to the Savu Sea and Surroundings MPA; and (2) availability of adequate data. The relevance of ecosystem services to the Savu Sea and Surroundings MPA was evaluated, particularly in terms of potential economic and social benefits. After selecting ecosystem services, the economic valuation of ecosystem services is then conducted by Kemenkeu using field surveys supplemented by secondary data collection. The assessment followed PMK No. 173/PMK.06/2020, DJKN guidelines, KEP-453/KN/2020, and applying market-based, non-market, resource rent, and benefit transfer methods to estimate environmental service values.

The ocean economy module is represented by BPS-led efforts to compile Ocean Satellite Accounts. Compared with the other modules, this component is more conceptually complex as it does not produce a single final output at once but instead requires a gradual and iterative process of classification, compilation, and refinement. In 2025, BPS completed the identification of ocean-related economic activities within the industrial classification and ocean-related products within the product classification. Building on this foundation, the current work aims to refine the ocean Supply and Use Table (SUT) to develop experimental Ocean Satellite Accounts this year.

Finally, the ocean governance module is managed by KKP. This module systematically compiles policies, regulations, and institutional structures related to ocean management, offering a clear framework for assessing how ocean governance is planned, executed, and monitored.

Results

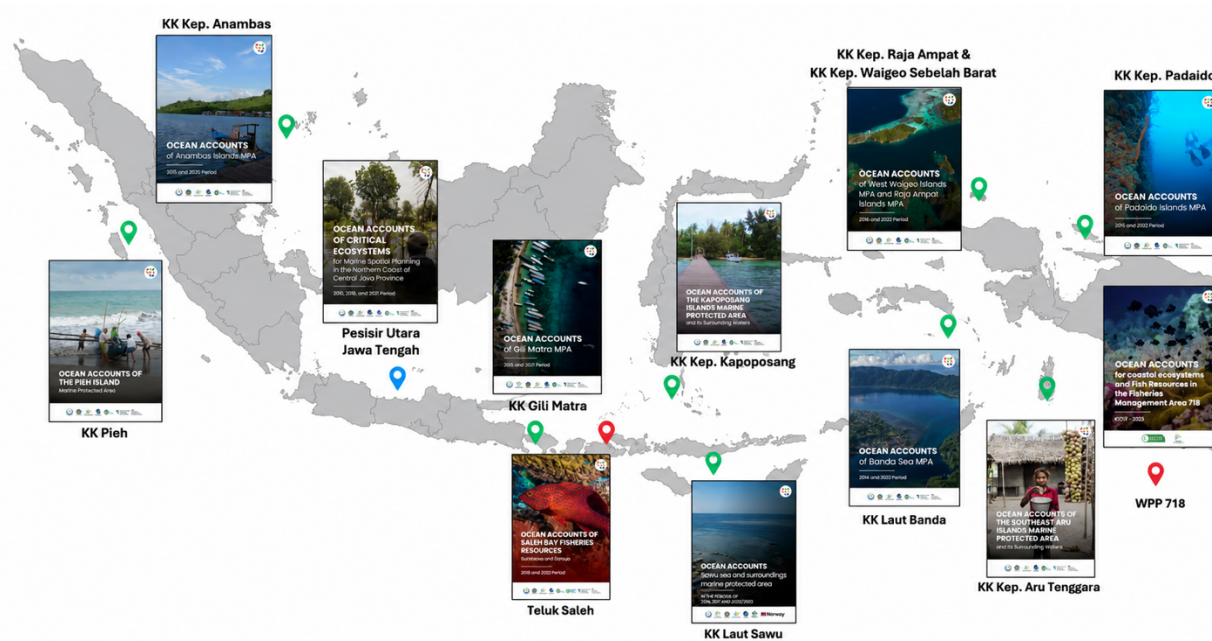


Figure 3. Pilot Ocean Accounts in publications for component 1 and 2 (KKP, 2026a)¹

Figure 3 shows the map and report on the activities of the pilot ocean accounts in Indonesia. Overall, the development of Ocean Accounts is carried out gradually, both in terms of expanding locations and adding module coverage. Note that the Ocean Economy, Combined Presentation, and National Wealth modules have not yet been included in the development at all locations shown on the map.

By 2024, the ocean asset account is the most compiled module; all locations have finished compiling it. Several locations have also developed the flow-to-economy and flow-to-environment accounts, namely Gili Matra KKN, Raja Ampat Islands MPA, Waigeo Islands MPA, Anambas Islands MPA, Kapoposang MPA, Sawu Sea MPA, and Saleh Bay. Meanwhile, Banda Sea MPA, Aru Islands MPA, Padaido Islands MPA, and North Coast of Central Java are still focused on developing the flow-to-economy and flow-to-environment accounts. Gili Matra MPA has a relatively more complete scope because in addition to these three accounts, it also includes the Governance module. In the next section, there will be a brief explanation on the ocean accounts of Savu Sea.

In addition to reports, the Indonesian Ocean Accounts Task Team has also launched the Ocean Accounts Dashboard in 2024 as one of the outputs for component 3 (Figure 4). The

¹ Teluk Saleh and the North Coast of Central Java are not part of the Ocean Accounts pilot areas under the OfD program.

dashboard displays the ocean accounts by MPA for ocean assets, as well as the flow-to-economy and flow-to-environment accounts. It also displays the previous national maritime GDP, while component 2 continues to focus on refining the composition of the updated ocean satellite accounts.

The data available through the Ocean Accounts Dashboard can be used to improve ocean management by taking five key steps (KKP, 2026b). It can assist in the assessment of permits by helping to decide whether they should be maintained, modified, or cancelled in light of ecosystem conditions and the level of environmental pressure. It also aids in enforcing mandatory restoration duties in regions experiencing environmental degradation. The information regarding environmental impacts can be used to revise fees so that the licensing fees accurately reflect the real ecological costs of using resources. Furthermore, the spatial and ecological data provided by the dashboard can be employed to make changes to zoning arrangements in order that marine spatial plans correspond with the present needs of the ecosystem. Lastly, the dashboard can be used to set up new protected areas in order to achieve the long-term conservation of important and vulnerable marine ecosystems.

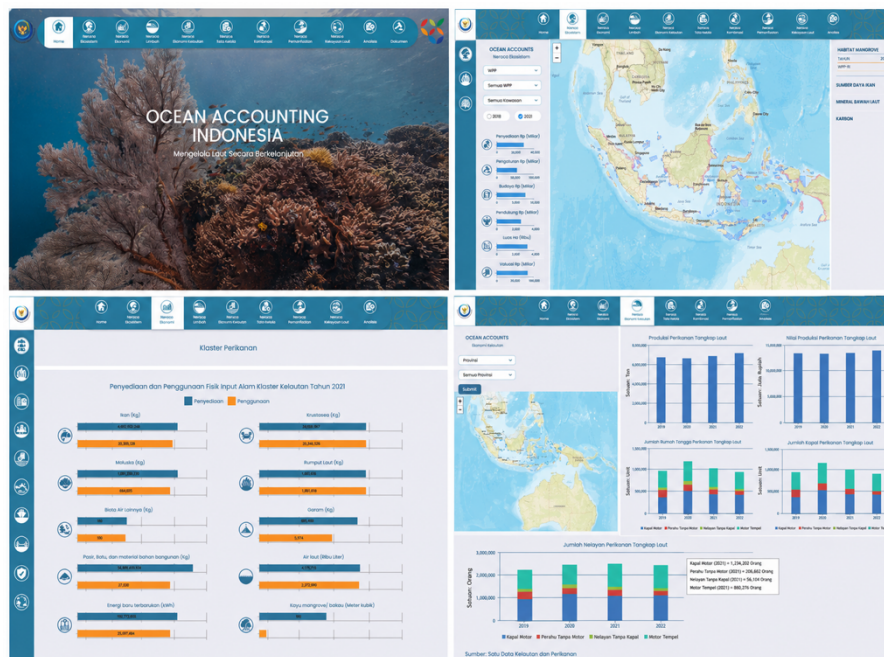


Figure 4. Ocean accounts dashboard (KKP, 2026b)

Ocean Accounts of Savu Sea MPA

While Ocean Accounts reports are available for the ten MPAs, this paper presents only one example of Ocean Accounts products: the Savu Sea MPA. Savu Sea MPA is one of the largest MPAs in Indonesia and in the Coral Triangle. Its economic and marine interactions are highly significant because the community depends on fisheries, seaweed farming, salt production, and marine tourism, making it a good location for demonstrating how Ocean Accounts connect ecosystem assets, ecosystem services, and economic activities. Maps of the ecosystem assets in the Savu Sea and Surroundings MPA for 2016/2017 and 2022/2023 are shown in Figure 5.

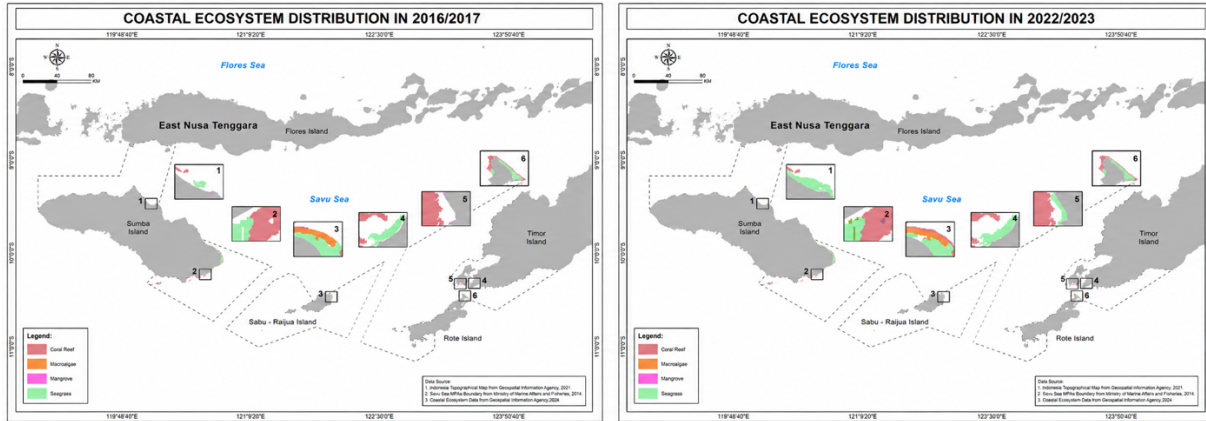


Figure 5. Map of ecosystem assets of the Savu Sea and Surroundings MPA in 2016/2017 and 2022/2023 (KKP, 2025)

Comparison of the opening (2016/2017) and closing (2022/2023) physical asset condition accounts (Table 1 and Table 2) shows that the overall area of the Savu Sea and Surroundings MPA remained virtually unchanged at around 3.36 million hectares, although the composition of coastal ecosystems shifted slightly. Coral reef area declined from 18,020.69 ha to 17,958.07 ha, while seagrass increased from 14,623.37 ha to 14,968.95 ha and macroalgae from 674.94 ha to 762.66 ha; mangrove area remained almost stable. In terms of ecosystem condition, the average chlorophyll-a concentration decreased slightly from 0.180 to 0.179 mg/m³, average sea surface temperature declined from 29.337°C to 28.045°C, and average total suspended solids (TSS) remained relatively stable, decreasing marginally from 16.910 to 16.889 mg/L. Overall, the accounts indicate relatively stable environmental conditions, accompanied by modest changes in the spatial distribution of coastal ecosystem assets.

Table 1. Physical Asset Condition Accounts in the Savu Sea and Surroundings MPA for 2016/2017 (Opening)

2016/2017 (opening)	Variable	Quality Standard	Ecosystem Asset				
			Coral Reef	Seagrass	Mangrove	Macro- algae	Other Substrate
Area	Ha	-	18,020.69	14,623.37	325.99	674.94	3,321,707.83
Eutrophication	Chlorophyll-a (mg/m ³)	-	0.1847 – 0.1848	0.187 – 0.189	0.1902 – 0.1903	0.1878 – 0.1879	0.179 – 0.181
Sea Surface Temperature	Celcius (°C)	28-32*	29.178 – 30.066	29.874 – 30.424	30.301 – 30.403	29.278 – 30.172	29.044 – 29.723
Total Suspended Solids (TSS)	mg/L	20-80*	15.415 – 15.622	15.686 – 15.815	17.468 – 17.648	15.388 – 15.624	16.897 – 16.952

Source: Ocean Accounts of Savu Sea and Surrounding Marine Protected Area. (KKP, 2025)

Table 2. Physical Asset Condition Accounts in the Savu Sea and Surroundings MPA for 2022/2023 (Closing)

2022/2023 (closing)	Variable	Quality Standard	Ecosystem Asset				
			Coral Reef	Seagrass	Mangrove	Macro- algae	Other Substrate
Area	ha	-	17,958.07	14,968.95	325.94	762.66	3,321,337.19

Eutrophication	Klorofil-a (mg/m ³)	-	0.1842 – 0.1844	0.1881 – 0.1887	0.1883 – 0.1893	0.188 – 0.190	0.179 – 0.181
Sea Surface Temperature	Celcius (°C)	28-32*	25.793 - 27.009	27.236 – 30.197	29.166 – 31.685	27.112 – 30.178	27.653 – 29.083
Total Suspended Solids (TSS)	mg/L	20-80*	15.707 – 19.456	15.891 – 16.104	16.566 – 17.895	15.557 – 16.450	16.880 – 16.896

Source: Ocean Accounts of Savu Sea and Surrounding Marine Protected Area.(KKP, 2025)

From the flow-to-economy accounts analysis, it is found that in 2023, natural inputs from the sea and coastal areas of the Savu Sea and Surroundings MPA are dominated by fish (379,587.77 tons), seaweed (60,892.01 tons), mollusks (8,346.99 tons), and crustaceans (1,040.55 tons), with nearly all of the 449,867.33 tons of extracted natural materials ultimately used for food consumption. The marine fisheries and aquaculture cluster is the largest user of these inputs, reflecting the strong dependence of coastal communities on fishing and related activities for their livelihoods.

From the flow-to-environment accounts analysis, it is found that solid waste generation in the Savu Sea and Surroundings MPA in 2023 was dominated by the fishing and maritime aquaculture cluster (58.16%), followed by marine tourism (33.93%), while other marine clusters contributed only small shares. In terms of waste management, 39.40% of solid waste was sent to final disposal sites, 38.31% was disposed directly into the environment, and only 22.29% was recycled or reused by other parties, indicating that a substantial portion of waste was still not managed through recovery or recycling.

The ocean accounts compilation in Savu Sea MPA also produce the The valuation of coral reef ecosystem services in the Savu Sea and Surroundings MPA includes provisioning services such as fish supply; regulating services in the form of biodiversity; cultural services such as tourism and research; and coastal protection services. Seagrass ecosystem services in the MPA include fish biomass and raw materials; supporting services such as biodiversity, heritage, nursery and spawning grounds, and coastal protection; as well as cultural services for research purposes. Meanwhile, mangrove ecosystem services in the Savu Sea MPA and Surrounding Areas include fish biomass and raw materials; cultural services for tourism; and regulating services as carbon sinks and wave breakers.

Based on the identification of ecosystem service valuation conducted in the Savu Sea and Surroundings MPA by the assessment team from the Directorate of Valuation, Directorate General of State Assets, Kemenkeu, it is found that the total economic value provided by the coral reef, seagrass, and mangrove ecosystems in the Savu Sea and Surroundings MPA reaches Rp1,185,971,017,000 annually.

Ocean Accounts in Driving Evidence-Based Policymaking

Ocean Accounts Pilots of Indonesia has been one of the data sources used in the Indonesian Marine Resource Value Analysis (Andalusia). Andalusia provides a basis for economic assessment in spatial planning, fiscal planning (non-tax state revenue), and marine resource management. It has further been translated into the KKP's policy through the issuance of the Decree of the Minister of Marine Affairs and Fisheries No. 3 of 2026 concerning the Amount of the E-Factor Value (ecosystem compensation value (Rp/ha)) in the Calculation of Tariffs for Types of Non-Tax State Revenue.

Within the KKP, especially in the Ecosystem Conservation Directorate, the ocean accounts framework has been an official tool to support science- and economy-based marine resource management.

Furthermore, the KKP is committed to utilizing ocean accounts in policymaking at all levels. In 2024, led by KKP, the Indonesian Ocean Accounts Task Force collaborated with the National Standardization Agency (BSN) to publish SNI HPBLD 9257 (Indonesian National Standard: Harmonization of Mapping, Databases, and Data Reporting) – as a standard for consistently

compiling ocean data across agencies, as well as the issuance of SNI NSDL 9258, the Indonesian National Standard regarding Ocean Accounts – Coastal and Small Islands Ecosystems – as a technical reference for preparing the Ocean Accounts at both national and regional levels. KKP hopes that there will be no barriers for all stakeholders and KKP units in the regions to contribute better ocean data through the development of ocean accounts.

In 2025, the Indonesian Ocean Accounts Roadmap for 2025-2045 was created, highlighting three core strategic objectives and emphasizing the importance of ocean accounts in Indonesia's ocean policy (KKP, 2026a). First, by 2026, Indonesia plans to implement an operational national Ocean Accounts system, supported by relevant regulations, standards, data infrastructures, and international cooperation, which will include decision-relevant indicators. Second, by 2029, in accordance with Indonesia's RPJMN and the 2030 Sustainable Development Goals, this system will function as a decision-support tool for both national and subnational entities engaged in sustainable ocean development. Third, by 2045, in line with Indonesia's Centennial Vision, the Ocean Accounts system is expected to facilitate transformative progress toward sustainable ocean management.

Finally, the Ocean Accounts framework is officially mentioned in Indonesia's Second NDC as a key tool for measuring the ocean's role in climate change efforts (Indonesia, 2025), particularly for blue carbon ecosystems such as mangroves and seagrasses. For this, KKP will use the ocean asset data of mangrove and lamun ecosystem assets that have been published in the KKP's SIDAKO ocean dashboard,

Conclusion

The development of ocean accounts in Indonesia is a joint effort of the Indonesian Ocean Accounts Task Force led by the KKP. It represents an important step toward strengthening evidence-based and integrated ocean governance. This activity is then further strengthened through a bilateral partnership between the Indonesian and Norwegian Governments under the OfD program.

The development of ocean accounts in ten MPAs in Indonesia, with an expansion to eleven MPAs anticipated this year represents a significant accomplishment. It has actively supported the Ministry of Marine Affairs and Fisheries (KKP) in policy formulation, the establishment of national standards, and the enactment of legislation that advances more sustainable ocean governance.

Despite progress, Indonesian Ocean Accounts currently face several limitations. Most pilot projects are concentrated within MPAs with limited coverage beyond protected areas. Additionally, monetary accounts are incomplete for many locations particularly concerning ecosystem assets and services across MPAs.

Going forward, Indonesia should aim to expand Ocean Accounts to encompass all marine areas, beyond MPAs. Furthermore, developing monetary accounts for ecosystem assets and services in other MPAs will help create a more comprehensive framework supporting sustainable ocean governance, climate initiatives, and marine resource management. To enhance blue carbon assessments, future efforts should focus on finalizing asset accounts by prioritizing variables that are crucial for evaluating the blue carbon potential of seagrass and mangrove ecosystems.

Acknowledgements

The development of Indonesia's ocean accounts is a collaborative effort involving the Minister of Marine Affairs and Fisheries (KKP), BPS-Statistics Indonesia, the Geospatial Information Agency (BIG), the Ministry of Finance (Kemenkeu), and the Ministry of National Development Planning (Bappenas). This paper also acknowledges financial support from the NORAD Ocean for Development program which has facilitated Indonesia in compiling Indonesian Ocean Accounts.

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