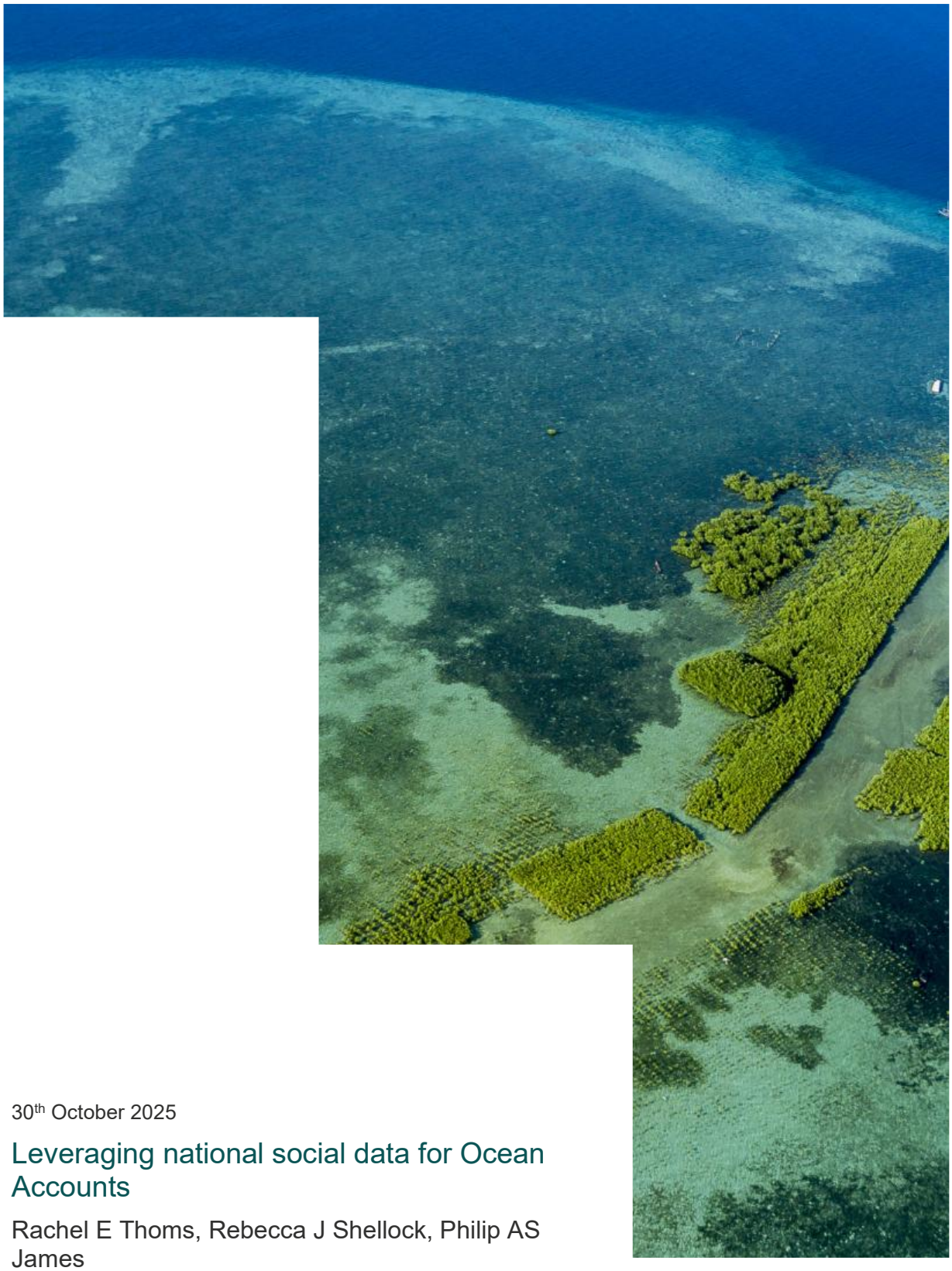
Global Ocean Accounts Partnership

Centre for Sustainable Development Reform
Law Building
The University of New South Wales
Sydney, NSW 2052, Australia



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Leveraging national social data for Ocean Accounts

Rachel E Thoms, Rebecca J Shellock, Philip AS James

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Executive summary

What's in this report?

This report outlines a social data audit methodology which can be used as a first step in compiling social data within the ocean accounting framework. The approach serves as a practical tool that statistical agencies, researchers, and government departments can adapt and apply to evaluate social data availability in their own national contexts. Rather than requiring expensive primary data collection in the first instance, this approach demonstrates how to systematically identify, assess, and operationalize existing data sources for Ocean Accounts.

The report applies this social data audit methodology to examine the data available in eight countries to understand how well existing national data systems can support the integration of social data into Ocean Accounts. Through analysis of government datasets from the eight countries at different stages of Ocean accounting development (Mozambique, Belize, Vanuatu, Costa Rica, Fiji, Madagascar, Sri Lanka, and the Maldives), we assess the availability and suitability of social data for integrating the human dimension into ocean accounting frameworks.

Why does this matter?

Ocean Accounts represent a critical evolution in how nations measure and manage their marine resources, moving beyond traditional economic indicators to capture the full value of ocean ecosystems. This approach is gaining momentum globally, with 19 countries having signed a pledge to advance Ocean Accounts for ocean sustainable development by 2030. However, most existing Ocean Accounts have focused primarily on economic and environmental data, systematically overlooking the human dimension. This is significant for the 3 billion people who rely on seafood for protein and the 600 million sustained by fishing and aquaculture.[1] The absence of social data means their experiences, needs, knowledge and contributions to ocean health and the ocean economy remain invisible in decision-making processes.

By demonstrating that adequate social data already exists within national statistical systems, this report addresses a major barrier to implementing comprehensive Ocean Accounts. The findings partially counter the common assumption that incorporating social data requires costly new data collection programs that could delay or prevent implementation.

Who should use this report?

This report is designed for:

- **Statistical agencies and national statistics offices** who: (i) own existing data and seek new ways to use it to meet their priorities and (ii) are interested in progressing Ocean Accounts compilation.
- **Government departments** responsible for marine resource management, coastal development, ocean and similar policies.

[1] FAO. 2024. *The State of World Fisheries and Aquaculture 2024 – Blue Transformation in action*

- **Researchers and analysts working on Ocean accounting, social-ecological systems, and/or sustainable development indicators.**
- **International organizations and development agencies** supporting countries in developing Ocean Accounts, inclusive and equitable marine management practices and sustainable ocean plans.
- **Civil Society Organizations** advocating for inclusive ocean governance that reflects coastal community needs and delivering community led conservation and management projects.

What are the headline findings?

The assessment reveals that countries possess substantial existing datasets that can be immediately leveraged to integrate social data into Ocean Accounts frameworks. This data richness stems from well-established national survey infrastructures, particularly Household Income and Expenditure Surveys (HIES), which reduces, and with some adjustments could substantially resolve the need for costly and time-intensive primary data collection phases that might otherwise delay implementation.

Across 880 identified indicators spanning 17 categories of social data, the analysis demonstrates robust data availability for critical areas including employment patterns, income distribution, poverty metrics, and livelihood dependencies. Coverage is moderate but workable for human health outcomes, food security, and educational access indicators. This existing foundation enables countries to rapidly initiate pilot social accounting programs within their ocean management frameworks.

However, the research also identifies important limitations. Coastal populations are often poorly represented in national survey designs, with most data collection using broad administrative stratifications that may undercount or miss coastal communities entirely. Additionally, standard survey instruments frequently lack the granularity needed to distinguish marine from freshwater activities and often capture only formal employment while missing the informal, seasonal, and subsistence activities that characterize many coastal livelihoods.

What are the next steps for Social Accounts?

The report demonstrates that while data exists to build pilot Social Accounts, strategic improvements can significantly enhance their quality and relevance. Key recommendations include deliberate sampling of coastal communities, recording both formal and informal ocean-related activities, applying classification systems at more granular levels to separate marine from freshwater activities, ensuring spatial linkages between data and coastal habitats, and strengthening data disaggregation to include marginalized groups.

Importantly, most of these improvements represent adaptations of existing survey approaches rather than entirely new data collection systems. This finding positions Social Accounts as achievable using current institutional capacities, making them accessible to countries regardless of their statistical development level. The methodology and findings presented here provide a practical foundation for statistical agencies to begin integrating the human dimension into their ocean accounting efforts, ensuring that Ocean Accounts truly reflect the complex interdependencies between coastal populations and marine ecosystems.

1. Introduction

The Ocean Accounts framework offers a powerful tool for informing decisions about marine and coastal environments by integrating environmental, economic, and social information to create a comprehensive picture of the human-ocean relationship.[2] However, the development of the social domain within Ocean Accounts lags significantly behind its economic and environmental counterparts, creating a critical knowledge gap in our understanding of ocean sustainability.[3]

While previous ocean accounting work has focused on defining what could theoretically be included in social accounts (e.g. developing conceptual frameworks and identifying potential indicators), there has been limited focus on the practical question of whether countries have the data they need to implement these frameworks. This study bridges the gap between theory and practice by introducing the first systematic data audit specifically designed to identify and assess secondary social data within national statistical systems. Unlike ad-hoc assessments or purely conceptual studies, this research develops a clear, replicable methodology that provides a practical template for any country wishing to evaluate their social data readiness for ocean accounting.

This work provides knowledge to address the following critical questions:

- What social data relevant to ocean accounting already exists within national statistical systems, and how comprehensive is this coverage across the different categories of social data?
- Can existing datasets be disaggregated by socio-demographic characteristics to support ocean accounting?
- Are existing datasets spatially connected to marine environments and ocean-based activities in ways that support ocean accounting frameworks?
- To what extent can countries begin developing Social Accounts immediately using existing data, versus requiring new primary data collection efforts?

This analysis examines national social, cultural, and equity-related data from eight strategically selected coastal countries: (i) Mozambique, (ii) Belize, (iii) Vanuatu, (iv) Costa Rica, (v) Fiji, (vi) Madagascar, (vii) Sri Lanka, and (viii) the Maldives. These countries represent different stages of Ocean Accounts development and diverse socio-economic contexts, providing robust insights into global patterns of data availability and implementation challenges.

The report: (i) examines how existing statistical systems can support the incorporation of social data in ocean accounting, (ii) identifies major gaps that limit current implementation capacity, and (iii) provides actionable recommendations for strengthening national data systems to make ocean-dependent communities and their relationships with marine resources more visible in national decision-making processes.

[2] Global Ocean Accounts Partnership. (2021). Technical Guidance on Ocean Accounting for Sustainable Development. V1.0 March 2021.

[3] James, P. Shellock, R. (2024) “The importance of Social Accounts on the pathway towards Ocean Equity.” Global Ocean Accounts Partnership. https://www.oceanaccounts.org/the-importance-of-social-accounts-for-ocean-equity/

2. Methods

2.1. Country selection

We conducted a comprehensive audit of national data systems to evaluate the availability of national secondary data which is relevant for integrating social data into Ocean Accounts. The audit was carried out across five countries: Mozambique, Belize, Vanuatu, Costa Rica, and Fiji. To further test the robustness of the findings, the audit was expanded to include three additional countries, Madagascar, Sri Lanka, and the Maldives, through a targeted review of key, high-priority data sources. These countries were strategically selected to represent different stages of Ocean Accounts development, providing a diverse perspective on data availability and implementation challenges.

2.2. Data audit

For each country, the data audit consisted of seven steps which are outlined in Figure 1 and overviewed below. A detailed description of each step can be found in the Supplementary Materials (SM) Section 6.1.

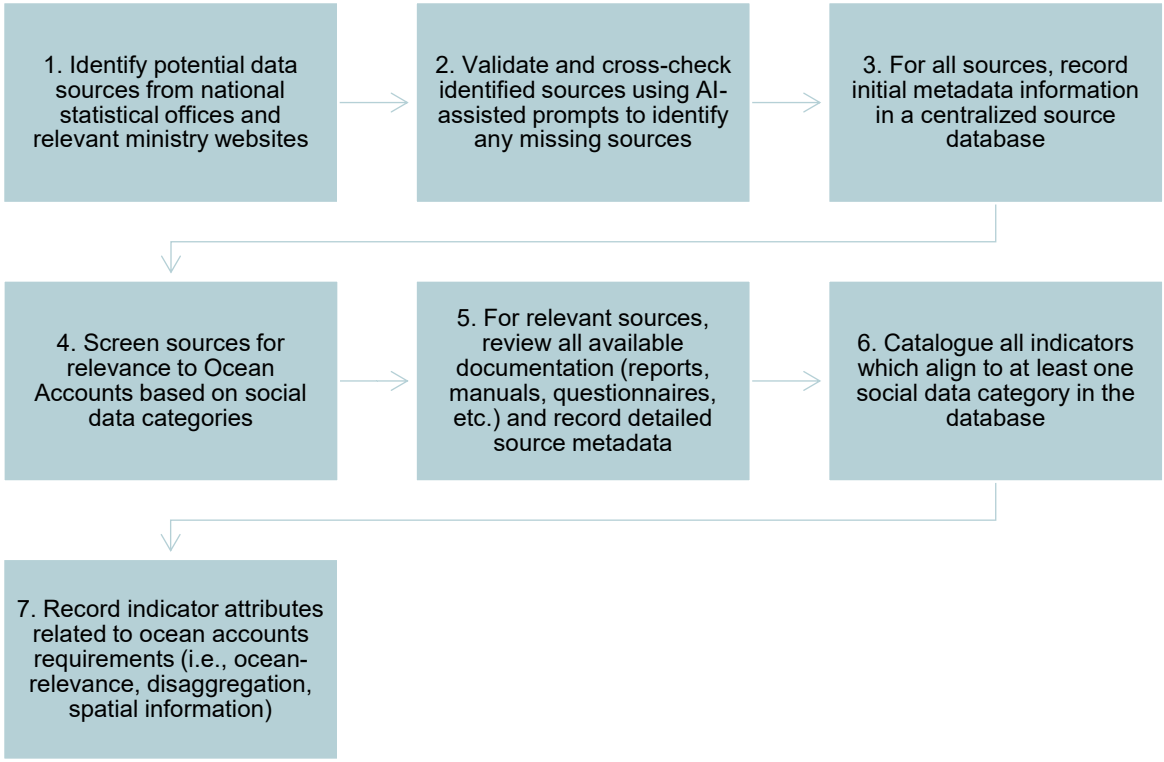

Figure 1: *Workflow for the data audit, described in seven steps.*

2.2.1. Identification of data sources

To identify relevant data sources (Figure 1, Step 1), we conducted systematic web searches of national statistical offices (NSOs) and ministries most likely to produce datasets aligned with the proposed categories of social data that can be input into Ocean Accounts (SM Table 2). These included ministries overseeing tourism, agriculture, fisheries, and natural resources. Publicly available datasets produced within the past 10 years were catalogued.

For five countries (Mozambique, Belize, Vanuatu, Costa Rica, and Fiji), the audit prioritized the following data sources (SM Table 1): (i) General Population and Housing Censuses (GPHC), (ii) Household Income and Expenditure Surveys (HIES), (iii) Labour Force Surveys (LFS), (iv) Tourism Surveys, (v) Agricultural and Fisheries Censuses, (vi) Fisheries statistics, and (vii) Rural or Informal Sector Surveys (note: naming conventions might vary per country). For Madagascar, Sri Lanka, and the Maldives, the focus was on a subset of key datasets, particularly the GPHC, HIES, and Agriculture and Fisheries Censuses.

While Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS) were not included in this initial review due to their broader health and development focus, they may still hold relevant indicators and should be considered in future analyses. In addition to searching NSO and ministry websites, potential sources were validated using AI-assisted queries (Figure 1, Step 2; SM Section 7.3), to help ensure comprehensive coverage against the proposed social data categories (SM Table 2)

2.2.2. Cataloguing and screening sources

All identified sources were logged into a centralized database with preliminary metadata, including the dataset title, latest available year, and responsible agency (Figure 1, Step 3). Each source then went through a preliminary screening (Figure 1, Step 4) against a predefined set of 16 social data categories proposed for Ocean Accounts (from Shellock, Thoms, et al., 2025)[4]:

1. Gender equity and social inclusion
2. Jobs, income and ocean-based labour
3. Access and rights to marine resources and services
4. Human security, safety and disaster preparedness
5. Marine-dependent livelihoods & resource use
6. Food and nutrition security
7. Access to basic needs and welfare
8. Human health
9. Knowledge and skills
10. Indigenous, traditional, and local knowledge and stewardship
11. Blue economy and sustainable trade
12. Social structures and demographic trends
13. Vulnerability and resilience to environmental change
14. Social cohesion and engagement
15. Cultural, sacred, and personal connections to the ocean
16. Nature-based leisure, recreation and tourism

This review also built on this framework by including local governance and participation as a 17th data category for Social Accounts.

Screening was based on available summaries, introductory text, and the contents of reports or tables. Sources were retained if they provided individual- or household-level data relevant to one or more of the social data categories. Exclusions were applied to sources reporting only macroeconomic aggregates, enterprise-level information, or purely administrative records without household or individual-level detail.

[4] Shellock, R. J., Thoms, R. E., James, P. A. S., Loureiro, T. G., Rosado, C., Swaleh, M., Kurniati, E., Lecuyer, O., Contreras, C., Arinda, R., Oleson, K. L. L., Buchary, E. A., Rosdiana, A., Grimsrud, K. M., Chen, W., Finau, G., Chambo, J. J., Granada Alarcon Blazquez, M., de Wolf, N., … Cappabianca, R. (2025). Social Accounts for the ocean: A path to inclusive and equitable ocean decision-making. *Environmental Science & Policy*, *173*, 104221. https://doi.org/10.1016/j.envsci.2025.104221

2.2.3. Detailed source review

A total of 33 data sources were identified as relevant across the eight countries. When a source was deemed relevant and within scope of the country-level assessment, all available documentation, including reports, questionnaires, technical manuals, and summary tables, were reviewed in full (Figure 1, Step 5). The quantity and quality of documentation varied widely by source, from a few summary tables to extensive analytical reports, accompanied by detailed technical information and comprehensive annexures of tables. In the majority of cases, we did not have access to the raw data from surveys.

For each relevant source, detailed metadata was extracted to characterize aspects such as sampling methods, sample design, geographic representativeness, and data accessibility. (Figure 1, Step 5). For a full list of metadata extracted for each source, see SM Table 3.

2.2.4. Indicator extraction

Following source cataloging, all indicators relating to one or more of the proposed social data categories were logged in a separate centralized database (Figure 1, Step 6). Information was recorded linking the indicator to its source in the source-specific database. Each indicator was mapped to one or more of the 17 social data categories using coding labels. Due to the complex and dynamic nature of the human-ocean relationship, there was considerable thematic overlap between the proposed social data categories. For example, several of the social data categories, such as Gender equity and social inclusion, Access to basic needs and welfare, and Vulnerability and resilience to environmental change, are particularly cross cutting. As such, indicators were assigned to multiple data categories where relevant.

In addition to the relevant data category, detailed metadata was recorded for each indicator, including the available disaggregation (e.g. sex, age), available spatial attributes, or thematic linkages to ocean systems were also recorded (Figure 1, Step 7). For a full list of metadata extracted for each indicator, see SM Table 4.

2.3. Analysis

The resulting database was analyzed to understand the availability of information for each social data category. We considered availability of information both within and across national data systems. To assess availability, we considered the number of indicators (count) and the number of countries with information available (coverage). Quantitative analysis was conducted using Python (pandas package), with results visualized through standard plotting tools (matplotlib package).

2.3.1. Assessing availability across social data categories

For each of the 17 social data categories, we assessed two measures of availability – count and coverage -- to capture both the depth of information within countries and the breadth of information across countries. Together, these measures help identify whether social data categories are richly measured, widely measured, or both.

Count refers to the average number of indicators for each social data category, calculated only among countries that measure that social data category at all. In other words, it is a conditional average: if a country does not report any indicators for a given category, it is excluded from the count calculation. This measure highlights the depth of information available in countries where a data category is represented. A high count indicates that, when a data category is measured, countries tend to collect substantial detail, whereas a low count suggests that only minimal information is captured, even in countries that track it. To allow comparison across the categories, numerical counts were classified into categories defined by the observed distribution of indicator counts for each data category across countries:

- High count: average of 15 or more indicators per country (top quartile),

- Moderate count: average of 6 to 14 indicators per country (middle quartiles),
- Low count: average of fewer than 6 indicators per country (bottom quartile).

Coverage refers to the number of countries that report at least one indicator for a given social data category. In this context, coverage indicates whether a data category is commonly measured across national systems or restricted to only a few. Unlike count, which looks at depth where measurement exists, coverage reflects the *breadth of adoption* across national systems. High coverage indicates that a social data category is commonly measured across countries, increasing international comparability, while categories with narrow coverage may by currently limited in their applicability within global frameworks like Ocean Accounts. Coverage was classified as:

- High coverage: indicators present in all eight countries (n=8)
- Moderate coverage: indicators present in 4 to 7 countries ($4 \leq n < 8$),
- Low coverage: indicators present in fewer than 4 countries ($n < 4$).

To synthesize these two perspectives, we developed a composite availability scale that combines count and coverage. This composite captures whether a social data category has both sufficient depth within countries and adequate breadth across them. Data categories were classified as:

- High availability: both high count and high coverage,
- Moderate availability: any combination in which one metric is high and the other is moderate, or both are moderate (i.e., high count and moderate coverage, moderate count and high coverage, or moderate count and coverage),
- Low availability: any combination where either count or coverage is low.

This combined measure addresses the limitations of using count or coverage alone. For example, a category with many indicators in only a handful of countries lacks comparability, while a social data category measured in all countries with only one or two indicators may be broadly represented but lacks detail. By requiring both depth and breadth, the composite measure highlights which social data categories likely have a larger body of information readily available for operationalization in ocean accounting frameworks.

2.3.2. Evaluating the suitability of indicators for integrating social data categories into Ocean Accounts

To evaluate the extent to which existing secondary data could support the incorporation of social data categories into Ocean Accounts, indicators were evaluated for suitability for ocean and coastal -related analysis to within ocean accounting frameworks. To be fit-for-purpose, these indicators should capture one or both of the following conditions:

- Ocean activities: Ocean-specific activities and conditions (e.g., the proportion of households engaged in coral reef fishing) or/and
- Coastal populations: Activities and conditions of the general population (e.g., employment, poverty, health, food security) that can be analyzed or compared across coastal and inland populations.

The latter coastal population condition requires that indicators are both (i) associated with location information and (ii) sufficiently represent coastal populations. Location information (e.g. coordinates, census blocks, enumeration areas) is essential to differentiate coastal and inland populations, while

representation of coastal populations is necessary to ensure observations and estimates drawn from coastal areas are unbiased (Box 1).

Box 1: Note on coverage, representativeness, and power:

In survey design, **coverage** refers to how completely the sampling frame includes all elements of the target population. Good coverage means every *unit of interest* (e.g., household, person, vessel, or enterprise; including those in coastal areas) has a known, non-zero chance of selection. Poor coverage happens when parts of the population are missing from the frame. This could happen if, for example, remote coastal villages are excluded from enumeration areas or subsistence practices are excluded from fisheries monitoring surveys.

A survey is **representative** if, given good coverage, the sample selection and weighting yield estimates that accurately reflects the characteristics of the population, within defined confidence limits. Representativeness concerns the *unbiasedness* of estimates. To achieve it, survey designers typically use probability sampling, stratification, and survey weights to ensure different population groups are proportionally included.

Statistical **power** refers to the *precision* of those estimates, or the ability to detect a true difference or pattern given the sample size, design (e.g. cluster, stratification, weighting), and variability in the data. Even if a survey is representative, too few coastal observations can produce large standard errors and wide confidence intervals, limiting the ability to distinguish coastal from inland or marine patterns. In such cases, oversampling is required to obtain more precise estimates.

Evaluating whether survey data has enough statistical power to precisely represent coastal populations would require detailed design and sample-based analysis beyond the scope of this report. Instead, we assess survey representativeness. Because few national surveys are explicitly designed to represent coastal populations (e.g., through a coastal stratum), **we use the level of geographic detail** (i.e., the smallest administrative unit for which the survey is statistically representative) **as an operational proxy for coastal representativeness**. At finer geographic resolutions, coastal populations or activities are more likely to be included in the sampling frame in sufficient numbers for meaningful analysis, even if not explicitly stratified by coastal location.

However, administrative boundaries do not always correspond neatly with coastal zones and even at smaller scales, survey design may under-sample narrow or sparsely populated coastal areas. Therefore, throughout this report, **"coastally representative"** refers to surveys that are spatially detailed enough to *likely* capture coastal populations or activities, rather than surveys that are statistically representative of the coastal population itself.

Representation is a key consideration when evaluating indicators from national surveys. Survey designers typically structure samples to align with the administrative units used by governments for decision-making and resource allocation (e.g., states, provinces, or districts). These units are organized hierarchically into different "levels" or "orders." For example, a country's first-level administrative unit might be provinces, which are subdivided into second-level units such as districts, and further into third-level units such as municipalities or localities.

National survey samples are generally designed to ensure that the selected administrative unit has enough observations to generate statistically representative estimates (Box 1) for policymakers and planners. The decision to design surveys around smaller versus larger administrative units often involves a trade-off between precision, cost, and policy relevance.

Surveys designed to be representative at larger administrative units (e.g., states or provinces—often called *higher-level* administrative units) are generally cheaper and faster to implement because fewer interviews are required, while still yielding results relevant for broad policy decisions. However, this approach can mask local variation and overlook diverse conditions within the unit. For example, a state may include both inland and coastal areas. If the survey is only representative at the state level, the coastal population may form a small or uneven part of the total sample, leading to large standard errors and reduced precision in coastal estimates.

In contrast, surveys designed to be representative at smaller, or *lower-level,* administrative units, such as second or third level divisions (e.g., districts, counties, municipalities, neighbourhoods, villages, or census blocks), generate more spatially detailed data that are far more useful for analysing coastal or other localized conditions. However, they require much larger sample sizes to achieve statistically reliable estimates. Censuses, which enumerate the entire population, are by definition the most representative source of data, and they are also the most resource intensive.

Because sampling at smaller units is costly, many surveys use stratified sampling, where the population is divided into subgroups (strata) such as urban and rural households and sampled separately. Dividing the population into administrative units before drawing samples, as described earlier, is another example of stratification. Establishing a specific stratum for coastal and inland areas, for example, helps ensure adequate representation of coastal populations. When subpopulations are very small, surveys may also use oversampling, meaning those groups are selected at a higher rate than their population share. For coastal populations, oversampling increases the number of coastal observations and improves the statistical power and reliability of coastal estimates.

Considering these differences in relevance, scale, and representativeness, indicators were evaluated for suitability for analysis within ocean accounting frameworks based on three criteria:

- **Ocean-related data**: indicators that are naturally about marine or coastal topics. For example, these indicators may measure ocean-related activities (marine fishing, marine aquaculture), marine resources (fish, shellfish), or coastal events (flooding, cyclones). General aquatic indicators like "fishing" were excluded as they may include freshwater components.

- **Spatially explicit data**: Indicators that include location information, allowing us to focus on coastal areas specifically. Location data can take the form of georeferenced observations or fine-scale administrative boundaries (e.g., census blocks, postal code areas).

- **Coastally representative data**: Indicators that are derived from surveys that either (i) is designed to be representative at smaller (lower order) administrative units, or (ii) include an explicit coastal stratification (see Box 1 for justification).

For this analysis, any indicators that do not meet these criteria are referred to as general population indicators. These are indicators from surveys designed to represent only larger administrative units (e.g., national or first-order divisions) and are not designed with a specific coastal stratum. Table 1 outlines the types of indicators classified as suitable for Social Accounts within an ocean accounting framework, based on these criteria.

Table 1: *Type of indicators which were classified as suitable for Social Accounts within the ocean accounting framework.*

Indicator-type	Description	Criteria met	Justification	Indicator-type
1. Ocean-related indicators	Indicators that are naturally about marine and coastal topics. If indicators are about general aquatic topics, they must explicitly distinguish or disaggregate between marine and inland/freshwater environments	Ocean-related data	Provide indicators that can be specifically linked to the marine environment, rather than general aquatic systems.	Ocean-related indicators
2. Census-based indicators	Indicators derived from national censuses with location data (usually census blocks)	Spatially explicit & coastally representative data	Censuses consist of a total enumeration of the population (full population coverage) instead of a sample of the population, ensuring coastal populations are fully represented	Census-based indicators
3. Survey-based indicators derived from a coastal stratum	Indicators derived from surveys that a) explicitly stratify the sample to represent coastal vs inland populations and b) have location data .	Spatially explicit & coastally representative data	Stratification by coastal vs inland populations ensures that a random sample is taken from the coastal population to ensure better representation and more accurate estimates.	Survey-based indicators derived from a coastal stratum
4. Survey-based indicators derived from small administrative units	Indicators from surveys with a) a sample designed to be representative at smaller administrative units (2^{nd} order or lower) and b) location data.	Spatially explicit & coastally representative data	Random, stratified, or other probabilistic sampling within smaller administrative units ensures that data is representative at a finer geographic scale. These lower-order units can be used more reliably to differentiate between coastal and inland areas, making them more relevant for coastal analysis.	Survey-based indicators derived from small administrative units

3. Results

The review of 33 national data sources across eight countries identified 880 indicators relevant to the social domain of ocean accounting.

3.1. Sources and sample design

Indicators were derived from a wide range of data sources with varying sampling designs (Table 2). The largest share came from first-level administrative surveys (n = 372) and censuses based on total enumeration (n = 307). Together, these two designs accounted for more than three-quarters of all indicators, reflecting the central role of national census programs and broad regional surveys in generating social statistics.

Fewer indicators were identified for surveys designed to represent smaller administrative levels, such as second-level administrative surveys (n = 162). No indicators originated from surveys designed for third-level administrative units. Only a small number of indicators (n = 47) came from surveys that explicitly stratified coastal populations, all from Mozambique. Very few indicators came from general national surveys without stratification (n = 12) and other sources, such as those using non-probabilistic designs like key informant interviews or those where no sample design was specified (n = 27).

Table 2: *Number of indicators by the sample design of the indicator's source. Indicators can be categorized across multiple sample designs (e.g. a survey designed to represent the first administrative level and with a coastal stratum).*

Source sample design	Description	Number of Indicators*	Source sample design	Description
Census	Complete enumeration of all households and individuals, providing full population coverage.	307	Census	Complete enumeration of all households and individuals, providing full population coverage.
Survey with coastal stratum	Sample-based survey designed to include a specific coastal population segment.	47	Survey with coastal stratum	Sample-based survey designed to include a specific coastal population segment.
National survey	Sample-based survey representative at the national level.	12	National survey	Sample-based survey representative at the national level.
Admin level 1 survey	Sample-based survey representative at the first administrative	372	Admin level 1 survey	Sample-based survey representative at the first administrative

	level (e.g., state or province).			level (e.g., state or province).
Admin level 2 survey	Sample-based survey representative at the second administrative level (e.g., district or county).	162	Admin level 2 survey	Sample-based survey representative at the second administrative level (e.g., district or county).
Admin level 3 survey	Sample-based survey representative at the third administrative level (e.g., municipality or locality).	0	Admin level 3 survey	Sample-based survey representative at the third administrative level (e.g., municipality or locality).
Other	Data sources using non-probabilistic designs (e.g. key informant interviews) or those where no sample design was specified	27	Other	Data sources using non-probabilistic designs (e.g. key informant interviews) or those where no sample design was specified

**Note: the columns do not sum to totals.*

3.2. Availability of indicators across the social data categories

Across the 17 social data categories assessed, we found substantial variation in both the breadth (coverage across countries) and depth (conditional count of indicators within countries) of available indicators (Figure 2, SM Table 5). Four categories, namely *Access to basic needs and welfare*; *Jobs and income*; *Marine-dependent livelihoods*; and *Vulnerability and resilience to environmental change*, were classified as having high availability, with all eight countries represented and high conditional averages per country (19–24). For all these categories, a large number of indicators (≥ 151) were identified (Figure 2).

Indicators suitable for integration into ocean accounting framework
General population indicators (i.e., not coastally representative and/or lacking location data)

Social data category	Number of indicators	Availability	Suitability
Jobs, income & ocean-based labour	194	High	97 / 97
Access to basic needs and welfare	186	High	86 / 100
Vulnerability & resilience to environmental change	169	High	92 / 77
Marine-dependent livelihoods & resource use	151	High	114 / 37
Social structures & demographic trends	111	Moderate	80 / 31
Human health	86	Moderate	42 / 44
Food and nutrition security	61	Moderate	30 / 31
Gender equity and social inclusion	56	Moderate	23 / 33
Knowledge and skills	55	Moderate	28 / 27
Blue economy and sustainable trade	43	Moderate	20 / 23
Access and rights to marine resources & services	44	Low	25 / 19
Local governance and participation	17	Low	3 / 14
Indigenous, traditional, & local knowledge and stewardship	16	Low	2 / 14
Social cohesion & engagement	16	Low	2 / 14
Cultural, sacred, and personal connections to the ocean	15	Low	15
Human security, safety and disaster preparedness	14	Low	6 / 8
Nature-based leisure, recreation & tourism	14	Low	6 / 8

Figure 2: *Availability and suitability of national indicators by social data category.* ***Note: Availability reflects the extent to which each social data category has sufficient depth within countries and breadth across countries. Suitability refers to the proportion of indicators that meet the criteria for integration into Social Accounts within the ocean accounting framework), specifically, those that are (i) ocean-relevant or (ii) coastally representative and spatially explicit. Indicators that do not meet these criteria, but are otherwise relevant to the socio-economic dimensions, are classified as general population indicators. See the Methods section for details on how availability and suitability were assessed.***

A second group of six data categories demonstrated moderate availability, including *Human health*; *Food and nutrition security*; *Gender equity and social inclusion*; *Knowledge and skills*; *Social structures and demographic trends*; *Blue economy and sustainable trade*. Most of these data categories were consistently measured across most or all countries (high coverage) but contained fewer indicators per country (7–14 on average; SM Table 5). *Blue economy and sustainable* trade was measured in only five countries.

Finally, seven data categories were classified as having low availability, either because they were measured in only a small subset of countries (e.g., *Cultural, sacred, and personal connections to the ocean*; *Indigenous, traditional, and local knowledge*; *Local governance and participation*; *Nature-based leisure, recreation & tourism*) or because the number of indicators was very limited even when coverage was moderate or high (e.g., *Access and rights to marine resources and services*; *Human security, safety, and disaster preparedness; Social cohesion and engagement;* SM Table 5). This unevenness suggests that for these categories, only a small body of information exists, often confined to a few countries, which restricts their current readiness for integration into ocean accounting frameworks.

3.3. Indicators suitable for integration within ocean accounting frameworks

Comparing the total pool of indicators against their suitability for integration into ocean accounting frameworks, a little over half (n=476, SM Table 6) are currently suitable for integration into ocean accounting frameworks. Most of these indicators are population indicators which are both spatially explicit and representative of coastal populations (n = 462), while only a small portion (n =49) are directly related to the ocean systems (SM Table 6). This highlights a critical distinction between data abundance and coastal relevance.

Social data categories with higher numbers of suitable indicators *include Marine-dependent livelihoods and resource use* (n = 114 suitable indicators); *Jobs, income & ocean-based labour* (n=97); *Vulnerability and resilience to environmental change* (n=92); *Access to basic needs and welfare* (n = 86); and *Social structures & demographic trends* (n = 80, SM Table 6).

The majority of suitable indicators are population indicators which are coastally representative (see Box 1 for definition) and spatially explicit. In contrast, specific-ocean related indicators were much less common. Categories with more of these ocean-related indicators included *Marine-dependent livelihoods and resource use* (n= 27 coastally representative indicators); *Vulnerability and resilience to environmental change* (n = 10), and *Food and nutrition security* (n = 12, SM Table 6).

Furthermore, these specific ocean-related indicators were only measured in a subset of countries, including Mozambique, Fiji, Vanuatu and Sri Lanka. Notably, indicators more generally related to aquatic systems, which do not differentiate between marine and inland waters (e.g., employment in fishing and aquaculture, consumption of fish and other seafood), were more common (n=175 indicators) and more widely covered (n = 8 countries). This pattern reflects the fact that many national statistical systems are designed to capture social conditions as they relate to general sectors, rather than to capture the distinct contributions of marine and coastal systems.

3.4. Sociodemographic disaggregation of indicators

We also reviewed how indicators were disaggregated across sociodemographic categories (Table 3). Disaggregation was most common by urban or rural status (44% of indicators), sex (30%), and age (16%), reflecting widely adopted practices in national surveys. Socio-economic status (14%) and education level (8%) were also relatively well represented.

By contrast, characteristics highly relevant to coastal populations and groups experiencing marginalization were infrequently reported. Only 2% of indicators were disaggregated by ethnicity, disability, or employment status (related to unemployment and informal employment). Furthermore, only 1% disaggregated by Indigenous status and less than 1% for country of birth (related to migrant status). Similarly, categories such as household involvement in fishing activities or food insecurity appeared in fewer than 1% of cases. Other characteristics such as LGBTQI+ or households in low-lying or remote/isolated coastal areas are missing all together.

Table 3: *Analysis of available disaggregation variables for available indicators relevant to the social data categories of Ocean Accounts. Disaggregation variables are reported as published in reports, summary tables, and other documentation reviewed. Other variables may be present in raw microdata. Note that indicators can have multiple disaggregation variables and rows do not sum to totals.*

Disaggregation Category	Count
Urban/Rural	385
Sex	268
Age	139
Socio-economic status	119
Education level	72
Sex of household head	64
Marital status	33
Age of household head	32
Education level of household head	27
Disability	19
Employment status	18
Ethnicity	16
Indigenous status	13
Main activity	7
Country of birth	6
Household involvement in fishing activities	4
Food insecure households	4

Other	9
None	65
Indiscernible	107

3.5. Summary of indicators by social data category

3.5.1 Jobs, income & ocean-based labour

Among the various categories assessed*, Jobs, income & ocean-based labour* was the most consistently covered across the reviewed national data sources (n=194, Figure 2). Examples include the share of total employment in primary and secondary fisheries occupations, and the share of total household income derived from fisheries (SM Table 7). strong coverage is largely due to the widespread implementation of Household Income and Expenditure Surveys (HIES). Through these surveys, employment, consumption, and expenditure-related data are collected and classified, usually using international standards. Common standards employed in HIES surveys include:

- ISIC (International Standard Industrial Classification): Used to classify economic activities (e.g., agriculture, manufacturing, fisheries, services). Its structure begins with broad sections (e.g., “A. Agriculture, forestry and fishing”) and narrowing into more specific divisions, groups, and classes (e.g., “03.1 Marine fishing”).
- ISCO (International Standard Classification of Occupations): Used to classify jobs according to the tasks and duties performed. At the top level are major groups (e.g., “6. Skilled agricultural, forestry and fishery workers”), which are divided into sub-major groups, minor groups, and unit groups (e.g., “6222 Aquaculture workers”).
- COICOP (Classification of Individual Consumption According to Purpose): Used to classify household expenditure by function or purpose (e.g., food, housing, transport). COICOP starts with broad divisions (e.g., “01. Food and non-alcoholic beverages”), which are broken into groups, classes, and subclasses (e.g., “01.1.3 Fish and seafood”).

HIES surveys can therefore offer rich insight into sectors, job types, and sources of income and dietary consumption. However, only roughly half (n = 96) were suitable for integration into Ocean Accounts (Figure 2). Most reporting remained at a broad sectoral level, limiting identification of employment in ocean related industries. This analysis may still be feasible if microdata contains coding at lower levels. HIES data also track income related to jobs and employment (e.g. wages and salaries, business profits, sale of goods from home production) and can similarly be used to measure income derived from ocean-related activities and commodities, if responses are record and coded with sufficient detail.

3.5.2 Access to basic needs and welfare

Access to basic needs and welfare was similarly well-documented (n=186, Figure 2), often through both monetary and multidimensional measures. Monetary indicators include the population share whose income falls below the poverty line. In contrast, the population share living in multidimensional poverty measure the share living in households experiencing multiple deprivations in dimensions and Multidimensional Poverty Indices (MPIs) include indicators such as access to education, health, and infrastructure. Therefore, MPI indicators overlap with several other proposed social data categories for ocean accounting.

Many countries have developed national MPIs that reflect context-specific priorities, such as the ability to afford to meet social and traditional obligations or maintain emergency savings, as seen in Fiji.[5] The individual indicators within MPIs, such as access to education, housing quality, healthcare, and electricity, also intersect with other categories like *Human health*, *Knowledge and skills*, and *Vulnerability and resilience to environmental change*.

3.5.3 Vulnerability and resilience to environmental change

The reviewed sources also contained substantial information on the cross-cutting category of *Social vulnerability and resilience* (n=169, Figure 2). Following a social-ecological framework for vulnerability, data are available across all three components: exposure (e.g., housings experiencing natural disasters), sensitivity (e.g., insecure housing materials), and adaptive capacity (e.g., access to savings, bank accounts, education, and information technologies). Several surveys, include information on household exposure to ocean related shocks such as cyclones and flooding from sea surge. Madagascar's and Mozambique's HIES stand out for their inclusion of direct questions on how households respond to natural disasters (e.g. increase consumption of wild foods, taking children out of school, emigrating to search for work, etc.), which in Madagascar's report were categorization into neutral, stress, crisis, and emergency responses, offering insights into households' strategies for adapting to natural disasters.

3.5.4 Marine dependent livelihoods and resource use

The *Marine dependent livelihoods and resource use* category, closely tied to both *Jobs, income & ocean-based labour* and *Access to basic needs and welfare*, also showed substantial data availability (n=151, Figure 2), particularly regarding food production. The HIES reviewed commonly captured data on self-produced commodities, including fish and invertebrates, offering potential insights into subsistence and informal livelihoods which may not be well captured in modules covering employment and income. Agricultural and fisheries surveys also offered insights into ocean-based livelihoods, collecting information on fishing activities, access to gear, and livelihood diversity. Despite strong coverage of income and food related livelihood strategies, no data was identified on how the ocean contributes to other basic household needs like cooking fuel (e.g. mangrove wood) or building materials (e.g. coral, reeds).

3.5.5 Food and nutrition security

The review identified 61 indicators relevant to *Food and nutrition security (*Figure 2*),* the majority of which come from HIES surveys. In addition to covering home production of commodities like fish and seafood, the HIES surveys reviewed also recorded the proportion of this production which is consumed by the household, as well as quantities of food items which are purchased, received as gifts, and consumed away from home. Vanuatu's HIES exemplifies the potential of such data, using a detailed Pacific-specific classification system built off international standards and a related nutrient database to convert food items in quantities into nutritional values (e.g. grams of dietary protein, micrograms of vitamin A). This enables more precise analysis of contributions from ocean-derived food categories such as "Kawakawa, Bonito, Flying fish, .." to dietary intake of protein and micronutrients. However, this level of detail was not found in any other countries reviewed, limiting the number of indicators available for *Food and nutrition security* which are specifically related to the marine environment (n=12, Figure 2).

3.5.6 Social demographics and trends

A large share of reviewed indicators (n = 111, Figure 2) related to *Social structures and demographic trends*, capturing fundamental demographic and household characteristics across reporting countries.

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[5] 2019-20 Household Income and Expenditure Survey Main Report. Fiji Bureau of Statistics. https://www.statsfiji.gov.fj/download/113/hies-2019-20/3847/2019-20_household_income_and_expenditure_survey.pdf

These included common population measures such as population size, density, and growth rate, as well as indicators describing age and sex structure, dependency ratios, and migration status. Many countries also monitored household composition, for example, the number and average size of households or the proportion of households headed by women (Costa Rica), and cultural and social diversity, including ethnicity, language, and religion (Belize, Vanuatu). Measures of disability prevalence and functional difficulty were widely included (e.g., Maldives, Sri Lanka).

3.5.7 Human health

There was a moderate level of data available covering *Health and wellbeing* (n=86, Figure 2). Many of these indicators came from widely adopted measures within the Multi-Dimensional Poverty Index which assesses how people experience poverty in key areas of related to health and well-being, often using question from the HIES. Components of MPI include indicators such as access to water, sanitation, and healthcare. Several countries, such as Vanuatu and Madagascar, include direct measures of subjective wellbeing. Vanuatu National Sustainable Development Survey (implemented as an expanded HIES) stands out in providing analysis of subjective wellbeing indicators according to a variety of factors, including indigenous land access and employment status. This type of analysis provides important insights into how various assets and social constraints are related to wellbeing.

3.5.8 Gender equity and social inclusion

Fewer indicators (n = 56, Figure 2) directly addressed *Gender equity and social inclusion* (e.g. the ratio of men to women in director and manager positions (e.g. Costa Rica). Vanuatu provided several good examples including, the proportion women-headed households with access to indigenous customary lands, the proportion of youth that feel valued in society, and the proportion of the population experiencing discrimination. Despite the lower availability of indicators addressing *Gender equity and social inclusion,* nearly a third of reviewed indicators were disaggregated by sex and less often by age and socioeconomic status, enabling analysis of disparities of indicators directly related to other categories.

3.5.9 Knowledge and skills

Knowledge and skills (n=55, Figure 2) related indicators were usually represented through attainment levels and literacy rates. Although over half (n=28) are suitable for integration into Ocean Accounts, none are directly ocean-related (Figure 2). Instead, all suitable indicators identified are more generalized population indicators which could be analyzed for coastal populations. However, a few countries had environmental or aquatic related indicators covering *Knowledge and skills*, such as the number of fishers and fish farmers attending training sessions (e.g. Costa Rica Fisheries Statistics) and access to environmental information, by source (e.g. Belize GPHC), though ocean literacy itself remains unmeasured in the identified sources.

3.5.10 Access and rights to marine resources and services

Forty-four (Figure 2) of the identified indicators were related to *Access and rights to marine resource and services*. Available data was largely limited to indirect measures from housing and land tenure measured through HIES or GPHC. Some aspects of access to the ocean for recreation may be understood through domestic tourism surveys, however, only Belize's Domestic Tourism Survey included relevant indicators, such as the number of domestic trips involving beach visits or participation in fishing and water-based activities. Vanuatu's HIES was one of the few exceptions, with distinct indicators such as the proportion of the population with free access to marine resources, and the proportion of the population within 30-minute walking distance to nearest "sea passage," providing insights into physical and customary access to the ocean.

3.5.11 Blue economy and sustainable trade

Data on *Blue economy and sustainable trade* (n= 43, Figure 2) were the largely limited to fisheries and aquaculture production statistics, and typically lacking detail on household economic activities, market

access, or trade related to marine resources and industries or social impacts. However, this may be in part explained by limited online dissemination of statistics from fisheries ministries as opposed to national statistics offices. Examples identified during the audit includes: (i) average time to nearest market for selling fishing products, (ii) active national fishing licenses by license/fleet type, (iii) percentage distribution of sources of financing for informal fisheries and fish farmers, and (iv) volume and monetary value of self-produced fish from household fishing and aquaculture which is for home consumption

3.5.12 Other social data categories

Few of the indicators identified were related *to Local governance and participation* (n=17), *Indigenous, traditional, & local knowledge and stewardship* (n=16), *Social cohesion & engagement* (n=16) , *Cultural, sacred, and personal connections to the ocean* (n=16), *Human security, safety and disaster preparedness* (n=15), *Nature-based leisure, recreation & tourism* (n= 14; Figure 2). For *Indigenous, traditional, & local knowledge and stewardship*, indicators were found exclusively in the national datasets of Mozambique and Vanuatu. Mozambique's Artisanal Fisheries and Aquaculture Census reports statistics on the proportion of fishing centres co-managed with Community Fisheries Councils, including gender-disaggregated data on participation in these groups. Vanuatu's HIES stood out for its coverage of traditional knowledge. It included indicators on the proportion of the population with indigenous/traditional skills, such as canoe building, paddling, and fishing with handmade spears, as well as the proportion of the population knowledge of local flora and fauna, and cultural practices like traditional stories, dances, songs, and games. However, these indicators focus on quantifying the population maintaining this knowledge rather than capturing specific Indigenous, traditional, and local knowledge related to the ocean.

Indicators related to *Local governance and participation, Social networks and cohesion* and *Sense of place* primarily came from sources in Vanuatu and Costa Rica. Indicators related to *Social networks and cohesion* include indicators such as "Mean level of trust in other people" (Vanuatu, HIES) and "Membership in a community or professional organization" (Costa Rica, National Household Survey). For *Sense of place and cultural identity,* examples include "Annual number of ceremonies with household participation" (Vanuatu HIES) and "Percent of population who visit cultural sites" (Costa Rica, National Culture Survey).

4. Discussion

The evolution of Ocean Accounts to include social data represents a critical response to longstanding gaps in environmental accounting frameworks. While the System of Environmental-Economic Accounting (SEEA) has successfully integrated environmental assets and flows into economic accounting, the social dimension has historically lagged behind both economic and environmental components.[6,7,8]

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[6] Perkiss, S., Gacutan, J., Moerman, L., Nichols, R., Voyer, M., Atchison, J., Brennan-Horley, C., & Herath, S. (2025). Exploring Accounting for the Ocean: Utilisation of the Sociology of Worth to Assess Current Practice and Develop Propositions for Holistic Accounting. *Social and Environmental Accountability Journal*, *45*(1), 14–41. https://doi.org/10.1080/0969160X.2024.2419913

[7] Loureiro, T. G., Milligan, B., Gacutan, J., Adewumi, I. J., & Findlay, K. (2023). Ocean accounts as an approach to foster, monitor, and report progress towards sustainable development in a changing ocean – The Systems and Flows Model. *Marine Policy*, *154*, 105668. https://doi.org/10.1016/j.marpol.2023.105668

[8] Shellock, R. J., Thoms, R. E., James, P. A. S., Loureiro, T. G., Rosado, C., Swaleh, M., Kurniati, E., Lecuyer, O., Contreras, C., Arinda, R., Oleson, K. L. L., Buchary, E. A., Rosdiana, A., Grimsrud, K. M., Chen, W., Finau, G., Chambo, J. J., Granada Alarcon Blazquez, M., de Wolf, N., … Cappabianca, R. (2025). Social Accounts for the ocean: A path to inclusive and equitable ocean decision-making. *Environmental Science & Policy*, *173*, 104221. https://doi.org/10.1016/j.envsci.2025.104221

Existing literature on Social Accounts within ocean accounting frameworks has been predominantly conceptual, focusing on defining what Social Accounts could and should encompass. Two systematic mapping studies have revealed that there has been limited work on Social Accounts for environmental systems, with only a handful of papers explicitly using the term "Social Accounts" in the ocean context.[9] There were no practical examples of implementation found across ocean, land, or freshwater systems. This theoretical foundation has established important principles: (i) that Social Accounts should capture the "human-ocean relationship" across categories including inclusivity, equity, social impacts, and cultural connections, (ii) that these accounts should be interoperable with national accounting systems and (iii) that they should bring together scattered social knowledge from across sectors, institutions, and communities to ensure data is credible, legitimate, and salient for decision-making.

The theoretical framework for Social Accounts has identified multiple key categories spanning from employment and income to traditional knowledge and governance structures. However, this conceptual development has outpaced practical implementation, creating a significant gap between theoretical aspiration and operational reality. Questions remain largely unanswered about whether countries possess the necessary data infrastructure to support Social Accounts, what adaptations might be required to existing statistical systems, and whether the proposed theoretical frameworks align with the realities of national data collection capabilities.

This implementation gap is particularly significant given the growing international commitment to Ocean Accounts, with 19 countries having pledged to advance Ocean Accounts for sustainable ocean development by 2030 and the political declaration of the UN Ocean Conference recognising the “critical need” for ocean accounting. Without understanding the practical feasibility of incorporating social data, there is a risk that Ocean Accounts will continue to focus primarily on economic and environmental data, perpetuating the systematic exclusion of the human dimension that these frameworks were designed to address.

The present study bridges this critical gap between theory and practice by conducting the first systematic evaluation of whether existing national data systems can support the theoretical frameworks that have been proposed for Social Accounts. Rather than developing additional conceptual frameworks, this research addressed the following fundamental questions to assess: availability, suitability and implementation readiness across the 8 countries:

- What social data relevant to ocean accounting already exists within national statistical systems, and how comprehensive is this coverage across different social data categories?
- Can existing datasets be disaggregated by socio-demographic characteristics to support ocean accounting?
- Are existing datasets spatially connected to marine environments and ocean-based activities in ways that support ocean accounting frameworks?
- To what extent can countries begin developing Social Accounts immediately using existing data, versus requiring new primary data collection efforts?

The discussion concludes with an overview of recommendations which can be implemented by countries to aid the design and implementation of Social Accounts for the ocean.

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[9] Shellock, R.J., Spillias, S., James, P.A.S. Bridgland, J., Fernandez-Abila, C.J., Alarcon Blazquez, M., Gacutan, J., Thoms, R.E. (in prep). Putting people at the heart of ocean decision-making: the integration of social considerations in Ocean Accounting

4.1. What social data already exists within national statistical systems, and how comprehensive is this coverage across different social data categories?

Our analysis finds that national statistical systems contain extensive social data relevant to Ocean Accounts, with comprehensive coverage across a number of social data categories but there are significant gaps in socio-cultural measurement.

The analysis revealed that substantial social data already exists within national statistical systems that can support Ocean Accounts development. Across eight countries, we identified 880 indicators spanning all 17 social data categories, demonstrating that the foundation for incorporating social data into Ocean Accounts is significant. This wealth of information stems primarily from well-established national survey infrastructures, particularly Household Income and Expenditure Surveys (HIES), Population and Housing Censuses, and Labour Force Surveys, which are implemented relatively regularly across all reviewed countries.

Four categories demonstrate high availability with both comprehensive country coverage and substantial indicator depth. They are: (i) *Access to basic needs and welfare* (186 indicators), (ii) *Jobs, income and ocean-based labour* (194 indicators), (iii) *Marine-dependent livelihoods and resource use* (151 indicators), and (iv) *Vulnerability and resilience to environmental change* (169 indicators). All eight countries measure these categories, and among those countries, each has collected an average of 19-24 relevant indicators per category. This means that when countries do collect data on these topics, they gather substantial detail rather than just basic information. This strong performance reflects the widespread adoption of internationally standardized survey methodologies, particularly HIES, which systematically collect employment, income, consumption, and welfare data using established classification systems like ISIC, ISCO, and COICOP.

Six social data categories show moderate availability, including domains such as: (i*) Food and nutrition security*, (ii) *Human health*, (iii) *Gender equity and social inclusion*, and (iv) *Knowledge and skills*. These categories typically achieve high country coverage (measured in 7-8 countries) but contain fewer indicators per country (7-14 on average). This pattern suggests that while countries consistently measure these aspects, the depth of measurement varies significantly across national systems.

Seven categories demonstrate low availability, primarily those addressing socio-cultural and governance aspects of human-ocean relationships. These reflect people's values, identities, relationships, traditions, and ways of knowing. In an ocean context, these can include cultural practices tied to the ocean (e.g. the construction of traditional fishing boats or customary fishing ceremonies), sense of place or belonging to coastal areas, participation in community marine stewardship, Indigenous or local ecological knowledge, and oral histories and stories related to the sea. These aspects are essential for understanding how communities relate to the ocean and experience and respond to change, yet they were widely overlooked in the national data systems reviewed as part of this study. This is also the case for indicators on local governance, access, and participation which were largely missing. These are critical for understanding who holds power, makes decisions, and is excluded from ocean management and resource use.

Emerging examples from Vanuatu and Mozambique demonstrate that place-based measurement is possible within national data systems. These countries have designed indicators to capture traditional ocean skills, cultural practices, and participation in local management. These pioneering approaches offer valuable learnings that other countries can draw upon and adapt to their own contexts. Opportunities remain to expand the measurement of a spectrum of social and cultural relationships with the ocean. This includes governance structures, rights, and power dynamics that shape access and decision-making.

4.2. Can existing datasets be disaggregated by socio-demographic characteristics to support ocean accounting?

Existing datasets provide strong basic disaggregation capabilities to support ocean accounting. However, limitations exist for coastal-specific and marginalized population analysis. The analysis reveals mixed capabilities for sociodemographic disaggregation within existing national datasets. This means that the ability to break down data by different social and demographic groups varies significantly. Some types of breakdowns are widely available while others are severely limited. Standard disaggregation by urban/rural residence (44% of indicators), sex (30%), and age (16%) is widely available, which enables analysis of basic demographic differences in ocean-dependent communities. Socio-economic status (14%) and education level (8%) are also relatively well represented, providing insights into economic stratification and educational access patterns.

However, disaggregation relevant to marginalized coastal populations is limited. Only 2% of indicators disaggregate by ethnicity, disability, or employment status, while Indigenous status appears in just 1% of cases. Critical coastal vulnerability categories such as households in low-lying areas or remote coastal zones are entirely absent from disaggregation schemes across the 8 countries. Similarly, categories such as household involvement in fishing activities or food insecurity appeared in fewer than 1% of cases. Other characteristics such as LGBTQI+ identity were also missing altogether.

This limitation reflects the systematic exclusion and poor coverage of key coastal populations from national data systems. In some cases, entire social groups or activities central to certain communities are missing from sampling frames. For example, Mozambique's formal monitoring system does not include gleaning, a female-dominated livelihood that represents over half of the artisanal fishery in some regions. Similarly, in Belize, monitoring focuses on high-value species like lobster and conch, while widely consumed finfish remain unmonitored due to complexity and resource limitations. These survey designs can systematically exclude informal, subsistence-based, or women-led livelihoods, reinforcing existing power imbalances and ensuring that disparities in access, ownership, and outcomes related to marine resources remain invisible to decision-makers.

Where variables for disaggregation are not explicitly published, they may nonetheless exist in underlying microdata. This highlights the need for researchers and compilers to actively engage with and request specific variables from national data providers. In other cases, vulnerable populations such as households in low-lying or isolated coastal areas can be identified and disaggregated when data are spatially referenced at sufficiently fine scales. However, when key data or variables are missing entirely, survey designs themselves require revision to ensure comprehensive representation of coastal populations.

4.3. Are existing datasets spatially or thematically connected to marine environments and ocean-based activities in ways that support ocean accounting frameworks?

4.3.1. Spatially connected

Spatial integration is essential for the incorporation of social data in Ocean Accounts, to ensure an understanding of the flows from ecosystems to society. This relies on aligning social and environmental data within Basic Spatial Units (BSUs) that span land, coast, and ocean. While 68% of all indicators (593 indicators) include spatial references, only 52% (462 indicators) combine spatial data with a level of geographic resolution (i.e., the smallest administrative unit for which the survey is statistically representative). This suggests coastal populations are *likely* included in sufficient numbers for meaningful analysis.

Most national censuses provide georeferenced observations or census block-level data that can be mapped to coastal BSUs, making them a key source of spatially-referenced and representative information for use in ocean accounting. However, the general nature of the socioeconomic indicators in censuses limits their usefulness for constructing holistic Ocean Accounts. More detailed information typically comes from sample-based household surveys.

However, these surveys use a multi-stage stratified sampling approach, creating specific challenges for coastal analysis. In such designs, populations are first stratified into groups (for example, by province and then by urban or rural areas), and primary sampling units are selected accordingly. Surveys are rarely designed to ensure representation of coastal populations. Only two surveys across all eight countries deliberately included coastal-inland stratification in their sample design, both from Mozambique. Therefore, we also use the level of geographic detail (i.e., the smallest administrative unit for which the survey is statistically representative) as an operational proxy for coastal representativeness. Forty-seven percent of indicators are derived from surveys which are at a low a geographic resolution (i.e. representative at the national or first administrative level) and do not include and explicit coastal stratum, suggesting they are unlikely to include coastal populations or activities in the sampling frame in sufficient numbers for meaningful analysis.

Even among the indicators identified as having a suitable geographic representation, our analysis cannot determine whether the underlying surveys were designed with sufficient statistical power to detect meaningful differences or patterns in coastal populations. This limitation arises because, even at finer geographic resolutions, coastal areas may make up only a subset of total enumeration areas. As a result, the effective sample size for coastal populations may still be small, leading to limited statistical power, even when coastal areas are technically covered by the sampling frame. In these cases, representation and sufficient statistical power require an explicit coastal stratum and oversampling of coastal populations.

4.3.2. Thematically connected

Indicators may also be suitable for integration into ocean accounting frameworks if they are thematically relevant to coastal activities or populations. However, ocean-related indicators remain severely underdeveloped within national statistical systems. The scarcity of ocean-related indicators (49 indicators in total) compared to general aquatic indicators (175 indicators) reflects national statistical systems designed around broad economic sectors rather than ecosystem-specific activities.

These 175 general aquatic indicators include measures like "employment in fishing and aquaculture," "household consumption of fish and seafood," "income from fishing activities," or "number of fishing licenses issued". However, these aquatic indicators don’t specify whether the activities occur in oceans, rivers, lakes, or fish farms. This means that surveys typically capture "fishing" or "aquaculture" without distinguishing whether these activities occur in marine waters, rivers, lakes, or ponds. For example, employment data may show people working in "fishing and aquaculture" but cannot separate marine fishers from freshwater fishers, limiting the ability to understand specifically ocean-dependent livelihoods and communities.

International classification systems have potential to resolve this issue, but implementation at more detailed levels faces challenges. Systems like ISIC, ISCO, and COICOP can theoretically support ocean-related analysis. However, their usefulness depends on detailed coding implementation and enumerator training. For example, Vanuatu's 2019-2020 HIES employed ISIC at the four-digit level, which differentiates between marine and freshwater fishing, but they report that limited enumerator training resulted in responses often being reported using broader two-digit codes like "Fishing and aquaculture," obscuring the granularity needed for ocean-specific analysis.[10] In addition, references to

[10] The Technical Report for the 2019-2020 NSDP Baseline Survey of Vanuatu (which includes the HIES survey for the year) states that while individual productive activities are classified according to the International Standard Industrial Classification (ISIC) at the Class level (4-digit), to avoid individual disclosure and “due to the fact that enumerators were not trained to a great

specific coastal zones or marine ecosystems were even less common, with estuaries and lagoons (20 indicators), marine zones like nearshore/offshore (17 indicators), or marine habitats such as mangroves and coral reefs (3 indicators) appearing infrequently.

Beyond classification issues, standard instruments like the HIES and population censuses can fail to comprehensively capture the full complexity of coastal livelihoods, which may be seasonal, multi-activity, and informal. Sectoral employment questions generally only captured a respondents' "main job," with little detail on secondary, informal, or subsistence activities. This creates a visibility gap, particularly for women and marginalized groups who perform informal or unpaid labour. For instance, Fiji's Agricultural Census showed high female participation in fisheries, yet many women did not report it as a primary or secondary job. This may be because this work was for household consumption and not recognized as a formal "occupation."[11]

Other household surveys, particularly those focused on agricultural, rural, or informal sector households, could potentially offer more relevant details, as they allow for more targeted questionnaires and a more tailored sampling design. For surveys or this nature, agricultural censuses and surveys were the most commonly used instruments across the eight national data systems reviewed. These instruments typically are designed to capture farming, livestock, fisheries, and forestry households. However, these surveys tend to focus on crops and livestock, in line with internationally standardized methodologies developed by agencies such as the FAO and World Bank. In contrast, there are fewer standardized tools collecting household-level fisheries and aquaculture data. As a result, fisheries and aquaculture remain underrepresented and there are few standardized tools designed to capture household-level dynamics in coastal and marine sectors. Only Mozambique had a dedicated census instrument for fisheries and aquaculture, while Fiji integrated a detailed fisheries module within its Agricultural Census.

4.4. To what extent can countries begin developing Social Accounts immediately using existing data versus requiring new primary data collection efforts?

The analysis demonstrates that many countries have sufficient information to begin developing Social Accounts using existing data. This existing data reduces the need for costly primary data collection, but better survey design and administration could eliminate the need though strategic improvements to enhance quality and coastal relevance.

Countries can begin developing Social Accounts immediately using existing data; this analysis demonstrates that sufficient indicators already exist across high-priority social data categories to support the implementation of pilot Social Accounts. The widespread implementation of HIES across all eight countries provides a particularly robust foundation, offering integrated coverage of employment, income, consumption, poverty, and basic welfare measures that can immediately inform ocean governance decisions.

Implementation readiness varies significantly across social data categories. The four high-availability social data categories (jobs and income, basic needs and welfare, marine-dependent livelihoods, and environmental vulnerability) can support immediate implementation, with countries possessing 19-24 relevant indicators on average. Moderate-availability categories like health, food security, and

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extent to 'tease out' specific information for low-level assignment of ISIC codes, it is recommended that industry reporting is done by ISIC Divisions (2-digits) and not lower."

[11] 2019-20 Household Income and Expenditure Survey Main Report. Fiji Bureau of Statistics. https://www.statsfiji.gov.fj/download/113/hies-2019-20/3847/2019-20_household_income_and_expenditure_survey.pdf

education contain sufficient data (7-14 indicators per country) for meaningful analysis, though with less comprehensive coverage. However, socio-cultural categories currently require targeted data collection efforts or innovative methodological approaches to achieve meaningful representation.

Strategic improvements can significantly enhance quality without requiring wholesale system redesign. Most identified limitations represent adaptations of existing survey approaches rather than entirely new data collection systems. First, the implementation of surveys which undertake coastal population sampling, which would require modifications to the sampling strategy, rather than a new survey for coastal populations. Second, more granular application of existing classification system. For example, the use of existing international classification systems (like ISIC, ISCO, and COICOP mentioned in the report) at a more detailed level to distinguish between marine and freshwater activities. Instead of coding all fishing as "03 - Fishing and aquaculture," surveys could use the four-digit level codes (i.e. “0311-Marine fishing” and “0312- Freshwater fishing”). This requires improved enumerator training to consistently apply these detailed codes rather than designing entirely new survey instruments. This would require updates to enumerator training rather than new survey instruments. Third, the application of enhanced spatial referencing. This can be achieved through GPS coordinate collection during existing fieldwork. These modifications leverage current institutional capacities while addressing specific coastal representation gaps.

Building Pilot Social Accounts using secondary data can demonstrate feasibility while informing system improvements. Countries can initiate Social Accounts development using currently suitable indicators (476 indicators across the eight countries) while simultaneously implementing targeted improvements to strengthen coastal representation and ocean-specific measurement. This staged approach allows for immediate progress on Ocean Accounts commitments while building evidence for more comprehensive system enhancements. The methodology presented here provides statistical agencies with practical tools to evaluate their social data readiness and identify specific improvement priorities within their existing operational frameworks.

The findings demonstrate that the development of Social Accounts are achievable using current institutional data, making comprehensive Ocean Accounts accessible to countries regardless of their statistical development level. Rather than representing a barrier to Ocean Accounts implementation, social data integration emerges as an opportunity to leverage existing national investments in statistical infrastructure while enhancing the equity and inclusivity of ocean governance systems.

4.5. Recommendations

To improve the applicability of national data to Social Accounts, we provide a series of recommendations that could be implemented to improve national surveys. These adaptations can help countries better understand the complex, plural nature of coastal communities and the ocean economy.

4.5.1. Ecosystem-relevant stratification and classification

Traditional survey designs often rely on administrative boundaries that may not reflect the ecological realities of coastal environments. To better capture the human-ocean relationship, countries can adapt their data collection approaches to align with marine ecosystems and coastal geography. This ecosystem-focused approach enables more precise analysis of how different coastal environments support human activities and helps identify ecosystem-specific dependencies and vulnerabilities.

By incorporating ecosystem-relevant stratification, countries can move beyond broad categories like "fishing" to understand the specific ways communities interact with coral reefs, mangroves, estuaries, and other marine environments. This granular approach is essential for developing targeted policies

and management strategies that reflect the diversity of coastal social-ecological systems. The main approaches that can be applied are summarized in Table 4.

Table 4: *Overview of approaches for ecosystem-relevant stratification and classification.*

Approach	Description	How this could be implemented?
1. Improved questionnaire design	Developing questionnaires that categorize activities according to specific ecosystems to understand mangrove-based fishing, reef gleaning, or estuarine aquaculture.	Design survey questions that ask respondents to specify which marine ecosystems they use (e.g., “Do you fish in: coral reefs, mangroves, seagrass beds, open ocean?”). Include follow-up questions about specific activities in each ecosystem type or which specific species are sourced.
2. Ecosystem stratification	Rather than relying solely on administrative divisions, sample frames should stratify populations by ecological zones including reefs, estuaries, mangroves, and other coastal ecosystems	Map coastal enumeration areas according to their proximity to specific marine ecosystems. Create sampling strata based on ecosystem types rather than just administrative boundaries. Ensure each major ecosystem type has adequate representation in the sample.
3. Proximity-based analysis	Designing data collection to enable analysis by ecosystem type or proximity to specific marine environments	Record GPS coordinates of households or distance measurements to different coastal features. Include questions about travel time to access different marine resources. Map enumeration areas to specific ecosystem types using GIS analysis.
4. Granular classification codes	Use more detailed international classification systems (ISIC at 4-digit level) to distinguish marine from freshwater activities	Train enumerators to apply detailed ISIC codes that separate "Marine fishing" (0311) from "Freshwater fishing" (0312). Use COICOP codes that distinguish "Marine fish" from "Freshwater fish" in consumption modules. Invest in comprehensive training programs for field staff.

4.5.2. Leveraging multiple data sources to improve resolution

While household surveys provide rich thematic detail, they often have insufficient coastal representation due to sampling limitations. Conversely, national censuses offer complete population coverage but contain limited detail on the complex relationships between people and marine resources. Countries can overcome these individual limitations by strategically combining multiple existing data sources.

This integrated approach maximizes the value of current statistical infrastructure without requiring expensive new data collection programs. By harmonizing variables across different surveys and censuses, countries can leverage the comprehensive coverage of censuses with the detailed insights from HIES surveys. This methodology is particularly valuable for coastal analysis, where small population sizes often result in inadequate representation in standard national surveys. The main approaches that can be applied are summarized in Table 5.

Table 5: *Overview of approaches for leveraging multiple data sources to improve resolution.*

Approach	Description	How this could be implemented?
1. Integration of data from multiple sources	Combine full population coverage from censuses with rich thematic detail from household surveys to model conditions in under-sampled coastal areas.	Identify common variables between census and HIES (household size, education, housing type). Use statistical modelling to predict detailed outcomes (marine livelihood participation) in census areas based on patterns observed in survey data. Validate models using known coastal indicators.
2. Harmonised predictor variables	Collect overlapping variables between censuses and household surveys using standard coding schemes	Ensure both census and HIES collect identical questions on key predictors like employment sector, education level, and housing characteristics. Use standardized coding schemes across all data collection instruments. Create data dictionaries that map variables across different surveys.
3. Spatial integration requirements	Ensure all data collection enables linkage between comprehensive census coverage and detailed survey insights	Geocode all survey responses with GPS coordinates where possible. Ensure enumeration areas are mapped and spatially referenced. Create spatial databases that link household locations to marine ecosystem maps and coastal zone boundaries.
4. Statistical modelling approaches	Use advanced statistical techniques to interpolate detailed information to areas with limited survey coverage	Apply small area estimation techniques using census data as auxiliary information. Use machine learning approaches to predict marine livelihood indicators in non-surveyed areas. Validate predictions using independent data sources where available.

4.5.3. Deliberate coastal stratification and oversampling

One of the most significant barriers to integrating social data into Ocean Accounts is the underrepresentation of coastal populations in national survey designs. Standard sampling approaches often treat coastal areas as part of broader administrative units, resulting in too few coastal households to support reliable analysis. This limitation can be addressed through deliberate modifications to sampling designs that prioritize adequate coastal representation.

The approaches outlined below require modest adjustments to existing survey methodologies rather than complete redesigns. Countries can implement coastal stratification within their current survey cycles, building on established statistical practices while ensuring that coastal communities become visible in national data systems. These modifications are essential for creating Ocean Accounts that accurately reflect the experiences and dependencies of ocean-reliant populations. The main approaches that can be applied are summarized in Table 6.

Table 6: Approaches for deliberate coastal stratification and oversampling.

Approach	Description	How this could be implemented?
1. Coastal-inland stratification	Deliberately stratify populations into coastal and non-coastal zones before sampling occurs	Define coastal zones using specific distance criteria (e.g., within 5km of coastline). Create separate sampling frames for coastal and inland populations. Allocate sample sizes to ensure adequate representation of both strata.
2. Strategic oversampling	Sample coastal households at higher rates than their population share to ensure sufficient observations for reliable analysis	Calculate required sample sizes for reliable coastal estimates. Increase coastal sampling rates proportionally (e.g., if coastal areas are 10% of population, sample them at 20% rate). Apply appropriate statistical weights in analysis to account for oversampling.
3. Representative sampling	Ensure coastal samples reflect geographic, ecological, and cultural diversity along the coast	Map coastal diversity including different ecosystem types, settlement patterns, and cultural groups. Stratify coastal sampling to include representation from each major coastal zone type. Avoid concentrating samples only in easily accessible coastal areas.
4. Multi-stage coastal sampling	Implement specialized sampling designs that account for coastal population distribution patterns	First stage: Select coastal enumeration areas representing different coastal types. Second stage: Systematically sample households within selected coastal areas. Include remote and isolated coastal communities through targeted sampling approaches.

4.5.4. Inclusive data collection and disaggregation

Current national data systems often miss the complex, informal, and subsistence-based activities that characterize many coastal livelihoods, particularly those of women and marginalized groups. Traditional survey approaches that focus on "main jobs" may overlook the seasonal, supplementary, informal, or subsistence-based practices such as gleaning, small-scale fishing, and resource processing activities that are central to coastal economies but not captured in formal employment statistics.

Addressing these gaps requires expanding both what is measured and how data collection is conducted. This includes recognizing the multi-activity nature of coastal livelihoods, ensuring that data collection reaches all community members, and developing indicators that capture the cultural and governance dimensions of human-ocean relationships. These improvements enhance the equity and completeness of Ocean Accounts while ensuring that the voices and experiences of all coastal community members are represented in policy decisions. The main approaches that can be applied are summarized in Table 7.

Table 7: *Approaches for inclusive data collection and disaggregation.*

Approach	Description	How this could be implemented?
1. Comprehensive livelihood capture	Move beyond "main job" questions to capture seasonal, informal, and subsistence activities that characterize coastal livelihoods	Include multiple employment modules asking about primary, secondary, and seasonal work. Add specific questions about subsistence activities, foot-based fisheries, and home consumption and production of fish. Create detailed time-use modules that capture informal economic activities.
2. Inclusive sampling strategies	Adjust data collection methods to include marginalized groups and activities often missed by standard approaches.	Conduct surveys at multiple locations including homes, markets, landing sites, and processing areas. Interview both men and women individually about their own activities. Include non-monetary economic activities in livelihood modules.
3. Expanded disaggregation variables	Systematically include variables that enable analysis of marginalized and vulnerable coastal populations	Add questions on Indigenous status, disability, migration status, and other key identities. Include household-level variables like proximity to coast, involvement in fishing, and food security status. Create variables that identify households in low-lying or climate-vulnerable coastal areas.
4. Context-specific sociocultural indicators	Develop indicators that capture place-based relationships with marine environments and local governance systems.	Co-design indicators with coastal communities that reflect their cultural connections to the ocean. Include questions about traditional knowledge, customary access rights, and participation in local marine management. Integrate qualitative methods alongside quantitative surveys to capture complex social-ecological relationships.

5. Conclusion

This comprehensive review of national data systems across eight countries demonstrates there is substantial existing information is available to enable countries to immediately incorporate social data into Ocean Accounts. The widespread implementation of national survey infrastructures, particularly Household Income and Expenditure Surveys (HIES), Labour Force Surveys, and Population Censuses, provide robust data availability for critical areas including employment patterns, income distribution, poverty metrics, and livelihood dependencies. They also have moderate, but workable coverage for human health outcomes, food security, and educational access indicators. While sufficient data exists to begin implementation immediately, strategic improvements can significantly enhance the quality, relevance, and equity of Social Accounts (including deliberate stratification of coastal populations, recording both formal and informal ocean-related activities, ensuring spatial linkages with coastal and marine habitats and strengthening disaggregation across social groups of concern). Crucially, most of these improvements represent adaptations of existing survey approaches rather than entirely new data collection systems. This positions Social Accounts as achievable using current institutional capacities and making them accessible to countries regardless of their statistical development level. By incorporating social data into Ocean Accounts, we can finally ensure that the voices, experiences, and needs of the 3 billion people who rely on seafood for protein and the 600 million whose livelihoods depend on fishing and aquaculture become more visible in national decision-making processes. This integration of social data represents a methodological advancement towards more comprehensive ocean governance frameworks that systematically include coastal communities and their knowledge systems.

6. Supplementary Materials (SM)

6.1. Detailed steps for data audit

The following steps describe the methods applied to complete the data audit in detail.

6.1.1. Identification of potential data sources

The process began with a mapping of key government institutions most likely to produce relevant data in each country. These included the National Statistics Office (primary data provider), as well as ministries responsible for tourism, environment and natural resources, agriculture, and fisheries and marine resources.

Web searches were conducted on institutional websites to catalogue datasets produced in the past 10 years. Priority was given to the following instruments, recognizing that specific nomenclature may vary between countries.

SM Table 1: *Descriptive summaries of sources prioritized for the data audit.*

Datasets/Sources	Description
General Population and Housing Censuses (GPHC)	Comprehensive nationwide census usually conducted every 10 years, providing baseline demographic and housing data such as population size, age distribution, household composition, and dwelling characteristics. Offers the most fundamental demographic and social baseline for analysis, at fine-scale administrative levels, critical for contextualizing all other datasets.
Household Income and Expenditure Surveys (HIES)	Regular surveys (usually every 3-5 years) of households focused on income, expenditures, consumption patterns, and living standards. Often includes modules on employment, poverty, and food security. Provides detailed indicators which can be linked to aquatic/marine activities and can help measure welfare, poverty, and inequality.
Labour Force Surveys (LFS)	Regular surveys (usually every 1-2 years) capturing labour market dynamics, including employment, unemployment, underemployment, and sometimes sectoral/industry breakdowns. **Justification:** Aids in understanding labour supply, occupational structures, and coastal employment trends, particularly in fishing, aquaculture, and tourism-related work.
Agricultural and fisheries censuses/surveys	Large-scale censuses or surveys of agricultural and fisheries production, farm characteristics, and livelihoods. These may be combined or conducted separately. Often capture coastal livelihood data, particularly in small-scale fisheries and aquaculture-dependent communities.
Fisheries and aquaculture statistics	Typically collected annually, covering production volumes, landings, species composition, and sometimes socioeconomic information of fishers and aquaculture operators.

Tourism surveys	Surveys of domestic tourism demand, visitor characteristics, expenditures, and destinations. Some include marine or coastal tourism segments.
Informal sector surveys	Targeted surveys designed to capture economic activities outside formal regulation, such as small-scale enterprises, self-employment, and informal labour. Can be relevant for coastal communities where informal employment (e.g., small-scale fisheries, market vendors, tourism services) is a major livelihood source often missed by formal economy statistics.
Rural or integrated surveys	Multi-sectoral surveys that may include data on agriculture, fisheries, health, education, and infrastructure, often with a rural focus. These may have better coverage or rural coastal areas.

A consistent search strategy was followed, navigating to “Publications,” “Reports,” “Data,” or “Surveys” sections, and cataloguing all potentially relevant sources listed (see step 2).

6.1.2. Recording of sources

All identified sources were logged a standardized “Sources” database, where each row represented one dataset, with basic metadata including source title, most recent year, and responsible agency. No exclusions were made during this stage; all sources were recorded, that could be potentially relevant, even if not directly related to ocean issues. Reasons for exclusion were documented later during the screening stage.

6.1.3. Validation of sources using AI

To ensure completeness, AI powered searches were employed to cross-check the list of identified data sources using ChatGPT4 and Claude. Prompts were designed to elicit national-level surveys and statistical reports conducted by the statistical office and relevant ministries in a country. For example, for Mozambique for following prompt was used:

"List all major national data sources and surveys conducted by the Mozambique’s National Statistical Institute and relevant ministries that might contain information [list of social data categories (see SM Table 1)]"

The outputs were compared with the initial database, and any additional or recently overlooked sources were incorporated if they could be verified and accessed.

Introductory, explanatory sections, and tables of contents of primary reports or source-web pages were reviewed against the predefined social data categories for the Social Accounts framework.

SM Table 2: *Descriptive summaries and example indicators for the 17 data categories proposed by Shellock and James (2024) and Shellock et al. (in prep).*

Social data category	Description	Example indicators
Gender equity and social inclusion	The involvement of women and other marginalised individuals, groups and communities in the ocean economy.	• Number of women with leadership roles in the community • Proportion of women in ocean industries • Equality of civil liberties index • Equal resource distribution index
Jobs, income & ocean-based labour	Jobs, labour and income generated from ocean-based activities & industries, its distribution and community dependence on industries.	• Number of jobs in ocean industries • Proportion of population working in ocean industries • Labour conditions • Household income from ocean industries • Value added by industries
Access and Rights to Marine Resources & Services	People's access, rights and ownership related to the oceans and its services.	• Proportion of artisanal fishing centres accessible by road • Residential proximity to the ocean • Frequency of visits to the ocean • Proportion of population with access to sea passage
Human security, safety and disaster preparedness	Protection of individuals from ocean-related hazards, maritime threats and broader disaster risks. This involves learning and adaptive capacity to anticipate, respond to, and recover from challenges.	• Number of early warning systems and monitoring stations (coastal, marine) • Fisheries infringement rate- Number of violations per 1,000 fishing licenses by management area •Recovery Time Index: Average months to restore livelihoods post-disaster •Access to emergency credit and financial assistance programs
Marine-dependent livelihoods & resource use	The ability of individuals and communities to secure the essentials of life, their dependence on the ocean and their ability to diversify their livelihood.	• Dependence on mangroves for resources • Diversity index of employment. • Dependence on ocean-based tourism • Income from non-ocean livelihoods
Food and nutrition security	Intake of food derived from the ocean and its utilization by the body to maintain health, growth, and energy.	• Fish and seafood consumption per capita • Contribution of seafood to animal protein supply • % marine dietary protein • Dietary Diversity Scores

Access to basic needs and welfare	People's access to their basic needs and their welfare related to the oceans and its services.	• Number of people in poverty • Number of women in poverty • Number of children in poverty • Number of people in food poverty
Human health	Exposure of individuals to the ocean and how that influences their human health.	• Life satisfaction • Happiness • Perceived quality of life • Physical activity levels • Cardiovascular health
Knowledge and skills	Knowledge sharing, skills building and awareness raising related to the sustainable management of the ocean.	• Awareness and perceptions of the oceans. • Awareness and perceptions of climate risk and causes • Proportion of households with access to environmental information, by source • Proportion of households concerned about environmental degradation related to the marine environment
Indigenous, traditional, & local knowledge and stewardship	Deep-rooted, place-based understanding of ecosystems, values, and practices developed by coastal communities over generations.	• % speaking indigenous languages in coastal areas • Sacred marine sites per 100 km coastline • Records of traditional and legally recognised access rights •% of historical fishing grounds still accessible
Blue economy and sustainable trade	The social impacts of sustainable trade of ocean resources and ocean-based industries.	• Value-added per worker • Fish and seafood production • Coastal subsistence harvest value • Wood harvesting production
Social structures & demographic trends	Social and demographic characteristics of the human populations that interact with, depend on, or impact marine environments.	• Number of coastal communities • Population size • Gender • Ethnicity
Vulnerability & resilience to environmental change	Measure the vulnerability, resilience and adaptive capacity of communities and groups in coastal areas to change.	• Number of houses protected by mangroves • Number of houses protected from storms and sea-level rise by coral reefs • Income diversification • Flexibility to modify fishing areas
Social cohesion & engagement	The relationships and interactions among coastal communities and ocean stakeholders.	•Social network density and connectivity among ocean stakeholders •Levels of cooperation within and among coastal community groups

		•Community organization membership rates •Frequency and quality of interactions between different ocean user groups
Cultural, sacred, and personal connections to the ocean	Peoples' perceptions and interpretations of the ocean, such as attachment, identity, symbolic meaning and traditions.	•% of population attending cultural activities •% of population who engage in cultural activities •Participation in ocean-related traditions, festivals, ceremonies •Strength of place attachment
Nature-based leisure, recreation & tourism	Social and demographic characteristics of the human populations that interact with, depend on, or impact marine environments.	•Percentage of the population who perform recreational activities •Number of recreational fishing licenses •Participation in wildlife watching (million days) •Number of domestic trips with fishing/water activities
Local governance and participation	Ocean governance structures and institutions, people's participation in decision-making about the coastal environment, and perceptions of fairness and accountability	•Participation rates in public consultations and decision-making processes •Community involvement in environmental planning and management •Perceived fairness and accountability in decision-making processes •Voter turnout in coastal community elections

Sources were retained if they contained employment, income, demographic, health, education, food security, or ocean/coastal livelihood data. Sources were excluded if they only reported macroeconomic indicators, business/enterprise-level information, or purely administrative records without household or individual-level information.

For each source, an inclusions decision was recorded in a field of the database, with reasons for exclusion noted where applicable.

6.1.4. Detailed review of relevant sources

For all retained sources, associated documentation was downloaded, including analytical reports, methodological manuals, questionnaires, and codebooks. Metadata fields in the Excel template were completed, covering frequency, sampling methods, representativeness, population coverage, stratification (e.g., coastal vs. inland), accessibility, and limitations (SM Table X). Hyperlinks to reports, questionnaires, and manuals were added where available. A quality assessment was conducted for each source, noting gaps such as small sample sizes, limited geographic coverage, or outdated information.

SM Table 3: Descriptions of source metadata fields applied to retained sources during the detailed review (Step 5 of the review process).

Metadata Category	Description
Frequency	How often data is collected (e.g., every 5 years).
Year initiated	The year data collection began.
Latest year	When the most recent data was collected.
Number of data points	Total number of data points (e.g., 2000, 2005, 2010, 2015, 2020 = 5 data points).
Population data was collected from	The target group for data collection (e.g., households, businesses, fishers).
Sample size	Number of units surveyed (e.g., households, individuals, businesses).
Population size	The total relevant population size (e.g., all households in a community).
Sampling method	Strategy used to select samples (e.g., random, stratified, cluster).
Sample description	Overview of the sampling approach, representativeness, and methods.
Coastal stratum	Whether the sample was stratified by coastal vs inland areas (true/false).
Key definitions or standards	Any definitions, standards, or terminologies explained in the source.
Questionnaires	Details of questionnaires used (structure, content).
Respondent	Who provided the responses (e.g., household head, all family members, individuals over a certain age).
Smallest representative geographic unit	Most detailed geographic division used (e.g., census block, district, national).
Unit name	Label of the smallest geographic unit (e.g., province, state).
Spatial reference	Description of any spatial attributes (e.g., coordinates).associated with the survey/data
Limitations	Quality assessment (e.g., small sample sizes, limited coverage, outdated data, missing docs).

Format accessed	Format in which data was obtained (e.g., report, Excel, webpage).
Data availability	Level of accessibility (e.g., open-access, request-based, restricted).
Accessibility concerns	Any foreseen barriers to accessing the data
Consent and confidentiality	How consent and confidentiality were managed (if mentioned).
Report link	URL to the main report (if available).
Questionnaire link	URL to the questionnaire (if available).
Field or methodological manual link	URL to manual/protocol used for data collection.
Additional links	Other relevant links for the source information.
Reason for exclusion	If excluded, the reason why the data source was not included.

6.1.5. Recording of relevant indicators

During the detailed review, all relevant indicators relating to one or more social data categories were logged into a standardized *Indicators* database. Each row represented a single indicator, linked to its source through identifying information. Indicators were recorded using their exact wording whenever possible and were mapped to relevant social data categories (SM Table 1) using standardized coding labels. Given the complex and dynamic nature of human–ocean relationships, substantial thematic overlap was observed across the proposed categories. Accordingly, indicators were often mapped to multiple dimensions. Several categories, such as Gender equity and social inclusion, Access to basic needs and welfare, and Vulnerability and resilience to environmental change, were particularly cross-cutting. Importantly, direct relevance to the ocean was not considered at this step, as general population indicators may also be valuable for coastal analysis when they are spatially explicit and derived from surveys which are designed to be representative of coastal areas. For this reason, both ocean-specific indicators and more general population indicators relating to the categories were logged.

6.1.6. Detailed review and cataloguing of indicators

With each identified indicator, additional metadata was recorded to better characterize the nature of the indicator and assess its suitability for analyzing social data categories within an Ocean Accounts framework. The metadata captured included measurement units, disaggregation categories, and potential for spatial differentiation (e.g., coastal vs. inland areas, nearshore vs. offshore, or ecosystem-specific). Limitations, derivative indicators, and related measures for future consideration were also noted. A detailed list of all recorded metadata is provided in SM Table 3.

SM Table 4: Descriptions of indicator metadata fields applied during the cataloguing of indicators (Step 7 of the review process).

Indicator Metadata	Description
Indicator name	Exact wording from the source (where possible).
Source name	Name of source, matching Sources database
Acronym	Shortened version of the source name
Indicator source type	The type of source documentation where the indicator was found (e.g., report, questionnaire, summary table).
Indicator link	URL(s) where the indicator is discussed.
Page/section	Page or section in the source documentation where the indicator appears.
Unit	How the indicator is measured (e.g., %, $, hours, frequency).
Disaggregation	Sociodemographic breakdowns available (e.g., sex, ethnicity).
Description	Description of the indicator (from source documentaion or derived if missing).
Spatial linkage – coastal vs inland	Whether data differentiates coastal vs inland (true/false).
Spatial linkage – territorial vs EEZ, nearshore vs offshore	Whether data differentiates territorial vs EEZ, or nearshore vs offshore (true/false).
Spatial linkage – physical/hydrological features	Whether data differentiates hydrological features (e.g., beach, estuary, lagoon) (true/false).
Spatial linkage – specific ecosystem types	Whether data differentiates ecosystem types (e.g., mangroves, seagrass, coral) (true/false).
Spatial linkage – geolocation/coordinates	Whether the report mentions specific spatial references or coordinates (true/false).
Limitations and challenges	Any issues in using this indicator (e.g., low coverage, outdated, unclear methodology).
Additional derivative indicators	Note of any indicators that while not reported, could be theoretically calculated recoding/transformation or the original indicator
Related indicators for future consideration	Note of any indicators that would require additional information to be collected but are related to the original indicator

Additional link	Other relevant URL(s) for the indicator

6.2. Additional results

6.2.1. Availability

SM Table 5: *Summary of availability metrics for each of the 17 social data categories proposed by Shellock and James (2024) and Shellock et al. (in prep). Columns report: (1) the total number of countries with at least one indicator for the category (Number of countries), (2) the total number of indicators identified across all countries (Number of indicators), and (3) the conditional average number of indicators per country, calculated only for those countries that measure the dimension (Conditional average per country). Based on these values, categories were classified by two categorical measures—Coverage (high, moderate, or low, reflecting how many countries include the data category) and Count (high, moderate, or low, reflecting the depth of measurement within reporting countries). These two measures were then combined into a Composite Availability category, which highlights social data categories that are both broadly and deeply measured versus those with limited or uneven data availability. Indicators can be categorized across multiple social data categories.*

Social data category	Number of countries	Number of indicators	Conditional average per country	Coverage	Count	Composite Availability
Access to basic needs and welfare	8	186	23	High	High	High
Jobs, income & ocean-based labour	8	194	24	High	High	High
Marine-dependent livelihoods & resource use	8	151	19	High	High	High
Vulnerability & resilience to environmental change	8	169	21	High	High	High
Blue economy and sustainable trade	5	43	8	Moderate	Moderate	Moderate
Food and nutrition security	8	61	8	High	Moderate	Moderate
Gender equity and social inclusion	8	56	7	High	Moderate	Moderate
Human health	8	86	11	High	Moderate	Moderate
Knowledge and skills	8	55	7	High	Moderate	Moderate
Social structures & demographic trends	8	111	14	High	Moderate	Moderate
Access and Rights to Marine Resources & Services	8	44	5	High	Low	Low

Cultural, sacred, and personal connections to the ocean	2	15	7	Low	Moderate	Low
Human security, safety and disaster preparedness	7	14	2	Moderate	Low	Low
Indigenous, traditional, & local knowledge and stewardship	2	16	8	Low	Moderate	Low
Local governance and participation	3	17	6	Low	Low	Low
Social cohesion & engagement	4	16	4	Moderate	Low	Low
Nature-based leisure, recreation & tourism	3	14	4	Low	Low	Low

6.2.2. Suitability

SM Table 6: Analysis of suitable indicator for application within the Ocean Accounts framework across the social data categories. Note that indicators can be categorized across data categories and across multiple linkage types. Therefore rows and columns do not sum to totals.

	General population indicators	**Indicators suitable for ocean accounting frameworks**		**Total**
Social data category		Coastally representative & spatially explicit	Ocean related	
Jobs, income & ocean-based labour	97	96	9	194
Access to basic needs and welfare	100	86	0	186
Vulnerability & resilience to environmental change	77	92	10	169

Marine-dependent livelihoods & resource use	37	114	27	151
Social structures & demographic trends	31	80	0	111
Human health	44	42	0	86
Food and nutrition security	31	21	12	61
Gender equity and social inclusion	33	23	3	56
Knowledge and skills	27	28	0	55
Access and Rights to Marine Resources & Services	19	21	6	44
Blue economy and sustainable trade	23	20	7	43
Local governance and participation	14	3	3	17
Indigenous, traditional, & local knowledge and stewardship	14	2	2	16
Social cohesion & engagement	14	2	2	16
Cultural, sacred, and personal connections to the ocean	15	0	0	15
Human security, safety and disaster preparedness	8	6	0	14
Nature-based leisure, recreation & tourism	8	2	4	14
Total	**404**	462 **476**	49	**880**

6.2.3. Examples of indicators by social data category

SM Table 7 Examples of indicators identified across the 17 social data categories, by type of indicator (general vs. aquatic or ocean-related). Indicators classified as *general* represent broad population measures, such as household income, poverty, or demographic characteristics. *Aquatic* indicators capture linkages to water-based systems without distinguishing between freshwater and marine environments, while *ocean-related* indicators refer specifically to marine and coastal contexts. Special attention is given to social data categories with lower coverage across countries, where additional examples are provided to illustrate the diversity of indicators that could exist, even if they are currently reported only in a few contexts.

Dimension	Type of indicator	Example indicator	Indicator description	Country (source)
Jobs, income & ocean-based labour	General	Employment by main occupation and main activity	Number of jobs in ocean industries (general ISCO/ISIC classifications)	Multiple (HIES, LFS)
		Unemployment rate	Percent of working age population that is unemployed	Multiple (HIES, LFS)
	Ocean-related	Share of employment in primary and secondary occupations in fisheries	Share of population or household members who identify fishing as his or her primary or secondary occupation in the last 12 months, by activity (inshore fishing, offshore fishing, freshwater fishing fish processing, selling fish, other)	Fiji (Fiji Agriculture Census)
		Share of annual household income from fisheries	Share of annual household income from fisheries (i) cash sale and (ii) home production	Vanuatu (National Sustainable Development Survey)
Access to basic needs and welfare	General	Basic needs hardship rates	Percent of population whose income falls below the “cost of basic needs” poverty line measures hardship by calculating the minimum consumption threshold required to meet essential food and non-food needs	Vanuatu (National Sustainable Development Survey)
		Multidimensional poverty index	Percent of the population in multidimensional poverty i.e. living in households experiencing multiple deprivations in dimensions such as education, health and standard of living.	Multiple (HIES)

Vulnerability & resilience to environmental change	General	Proportion of households with insecure dwellings	The proportion of households who live in houses with walls/roof made from less durable material (e.g. grass, reeds, thatch, sticks, palmetto, and similar)	Belize (HIES)
	Ocean-related	Response to the effects of cyclones, by type of response	The proportion of households that take one or more measures to minimize the effects of cyclones on an individual basis. Actions include: Borrow Food, Buy food using credit, Increase consumption of wild foods, decrease the amount of food ingested, Taking children out of school, Emigrating to search for work, etc.	Mozambique (HIES)
		Impacts of cyclones/tropical storms on income & assets	Percentage of households experiencing either a (i) increase, (ii) decrease, or (iii) no change in their (a) income, (b) assets, (c) agricultural production, and (d) livestock following cyclones/tropical storms	Madagascar (HIES)
Marine-dependent livelihoods & resource use	General	Proportion of households who are dependent on agricultural activities as main source of income	The proportion of households which participate in agricultural activities (growing crops, raising animals, fishing and aquaculture, and hunting and foraging), who are dependent on agricultural activities as the main source of income.	Belize (Population and Housing Census)
	Aquatic-related	Hours spent fishing and processing fish	Number of hours spent fishing or processing fish in the last 7 days	Maldives (HIES)
	Ocean-related	Number of households engaged in marine aquaculture	Number of households that engage in marine aquaculture, by species (shrimp/prawn, fish food, ornamental fish, aquatic plants/seaweeds, crab, lobster, sea cucumber)	Sri Lanka (Economic Census - Agricultural activities)
		Main fishing methods and	Percent distribution of household engage in fishing	Vanuatu (National

		species caught by households active in fishing and seafood collection	activities by fishing method, including net, handline, trolling, spearfishing night, spearfishing day, gleaning/collecting and by main reported catch, including reef fish, commercial invertebrates, other invertebrates, deep water fish. tuna, other pelagic fish and other fish	Sustainable Development Survey)
		Livelihood diversity of fishing households	Percentage of fishing households that practice one or more mixed-livelihoods (including crop, livestock, fisheries and forestry)	Fiji (Fiji Agriculture Census)
Food and nutrition security	General	Proportion of households experiencing moderate or severe food insecurity	Proportion of households experiencing moderate or severe food insecurity according to the Food Insecurity Experience Scale (FIES)	Multiple (HIES)
		Children without one meal with protein daily	Percentage of children that do not have one meal with meat, chicken or fish or vegetarian equivalent daily	Fiji (HIES)
	Aquatic-related	Household consumption of fish and seafood	Quantity of food items consumed at home by members of the household during the past seven days including home produce, food items received as gifts, food items purchased	Maldives (HIES)
	Ocean-related	Fish and shellfish contribution to protein and micronutrients available for consumption (%)	Contribution of different fish and shellfish to the available supply of protein and vitamins A, B1, B2, B12, C; calcium; and iron	Vanuatu (National Sustainable Development Survey)
Human health	General	Proportion of households connected to sewerage system	Proportion of households connected to sewerage system	Maldives (HIES)

		Population that cannot afford medicine	Percentage of adult population that cannot afford to buy medicines they need	Fiji (HIES)
		Subjective wellbeing by indigenous land access; by employment status; by participation in ceremonies; etc.	Proportion of population Thriving, Struggling, Suffering according to whether they have free access to indigenous customary land; according to whether they are employed; according to whether they participate in ceremonies; and among many other social conditions	Vanuatu (National Sustainable Development Survey)
Gender equity and social inclusion	General	Ratio of men to women in director and manager positions	Ratio of men to women in management positions	Costa Rica (National Business Survey)
		Proportion of households headed by women with access to indigenous customary lands	Proportion of households headed by women with free access to indigenous customary lands	Vanuatu (National Sustainable Development Survey)
		Proportion of youth age 13–30 that feel valued in society	Proportion of youth ages 15–30 that are thriving; Mean level of agreement, “I am able to influence decisions that affect my local area/community", ranked 0–10, for youth age 15–30	Vanuatu (National Sustainable Development Survey)
		Proportion of population experiencing discrimination	Proportion of population age 15+ that have experienced discrimination based on (i) race, (ii) nationality, ethnicity or place of origin, (iii) colour, (iv) religion, (v) age, (vi) sex, (vii) sexual orientation, (iix) marital status, (ix) family status or (x) disability in previous 12 months	Vanuatu (National Sustainable Development Survey)
		Gender Parity Index in literacy	Female literacy rate over Male literacy rate in %	Madagascar (HIES)

	Aquatic-related	Proportion of women in fisheries and aquaculture who are members of a Community Fisheries Counsel	The proportion of female artisanal fisheries and aquaculture operators who are members of the Community Fisheries Council - i.e. the main decision-making entity at the community level	Mozambique (Artisanal Fisheries and Aquaculture Census)
Knowledge and skills	General	Literacy rate	The proportion of the population (+15) who can read and write	Multiple (HIES)
		Proportion of households with access to environmental information, by source	The proportion of households with access to environmental information, by source (relatives/friends, newspaper, TV, radio, Social Media, Internet, School/library, Environmental interest group, Government or local town, city or village council, other)	Belize (GPHC)
	Aquatic-related	Number of fishers attending aquaculture training sessions	The number of participants in training sessions for fisheries and fish farmers held by Costa Rican Institute of Fisheries and aquaculture, by month. The names of the trainings and association participating are also recorded.	Costa Rica (Fisheries Statistics and Sector Records)
Access and Rights to Marine Resources & Services	General	Land tenure	Proportion of households by land tenure: customary, rural lease, urban lease, occupation right w/o payment, occupy with informal arrangement, other	Multiple (HIES, GPHC)
	Ocean-related	Proportion of population with access to sea passage	Proportion of population within 30 minutes of a sea passage	Vanuatu (National Sustainable Development Survey)
		Proportion of population with free access to marine resources	Proportion of population with freely accessible marine resources	Vanuatu (National Sustainable Development Survey)

Blue economy and sustainable trade	Aquatic-related	Fish market accessibility	Average time it takes to get to nearest market for selling fishing products: less than 30 minutes, between 30-59 minutes, 1-2 hours, +2 hours, produce collected by buyer, landing site sale only	Fiji (Agriculture Census)
		Number of fishing licences, by fleet, gear, and engine type	Active national fishing licenses by license/fleet type (e.g., small scale, recreational, commercial), gear type, and motor type (in board, outboard, none) base of operations (location)	Costa Rica (Fisheries Statistics and Sector Records)
		Sources of financing for operators in informal fisheries and aquaculture	Percentage distribution of sources of financing for informal fisheries and fish farmers, including savings institutions, family loan, customer loan, supplier loan, producers union, load from credit institution, others	Mozambique (Informal Sector Survey)
		Subsistence fisheries and aquaculture production	Volume and monetary value of self-produced fish from household fishing and aquaculture which is for home consumption	Multiple (HIES)
	Ocean-related	Per unit price of fish, by market	For all commodities sold by fishers and vendors, the market, price per unit, and unit of sale at the most recent sale	Fiji (Agriculture Census)
Local governance and participation	General	Mean level of agreement that decision-making is inclusive and responsive	Mean level of agreement with the statement, “I am able to influence decisions that affect my local area/ community” among population age 15+, 0–10 scale; also reported for female and youth populations	Vanuatu (National Sustainable Development Survey)
		Proportion of population with positive assessment of their chief’s ability to manage	Proportion of households with favourable assessment of their Chief’s ability to manage community resources	Vanuatu (National Sustainable Development Survey)

		community resources		
	Aquatic-related	Proportion of fishing centres represented by a Community Fisheries Council (CCP, local community governance body)	Proportion of fishing centres covered by local governance bodies called Community Fisheries Councils	Mozambique (Artisanal Fisheries and Aquaculture Census)
Indigenous, traditional, & local knowledge and stewardship	Aquatic-related	Proportion of population with traditional fishing skills	Proportion of population age 15+ that is able to 1) build a canoe, 2) paddle a canoe, 3) fish with a canoe, 4) use handmade fishing spear	Vanuatu (National Sustainable Development Survey)
	General	Knowledge of traditional planting calendar	Proportion of population with knowledge of when in the year it is appropriate to plant/harvest crops following the traditional planting calendar	Vanuatu (National Sustainable Development Survey)
Social cohesion & engagement	General	Percent of population that have someone they can count on in times of need	Percent of the population ages 15 and over that have someone they can count on in times of (i) sickness or illness (health need) and (ii) financial need	Vanuatu (National Sustainable Development Survey)
		Mean level of trust in other people	The mean level of trust in others in their community on a 0-10 scale	Vanuatu (National Sustainable Development Survey)
		Membership in community or professional organizations	Whether a household member is a member of a community-based organization, union, cooperative, etc.	Costa Rica (National Household Survey)
		Volunteerism	Percent of population giving and receiving voluntary support to/from others in their community or area annually	Sri Lanka (GPHC)
		Proportion of households which attend	Percent of households that (i) Attend every community meeting (ii) Attend some	Vanuatu (National Sustainable

		community meetings	community meetings (iii) Never attend community meetings (iv) live in communities that do not have regular meetings; by gender of household head	Development Survey)
Cultural, sacred, and personal connections to the ocean	General	Proportion of population with knowledge of traditional stories, dances, songs, and games	Proportion of population age 15+ with knowledge of how to 1) recite traditional story, 2) perform dance, 3) sing traditional song and 4) explain rules of traditional children's game	Vanuatu (National Sustainable Development Survey)
		Participation in ceremonies	Annual number of ceremonies with household participation	Vanuatu (National Sustainable Development Survey)
		Percent of households requiring use of traditional wealth items	Percent of households requiring access to these traditional wealth items, including pigs (live or sacrificial pigs, pig skulls, and pig tusks), poultry, cattle, yams and other root crops, mats, and kava which fuel the traditional economy in Vanuatu.	Vanuatu (National Sustainable Development Survey)
		Percent of population visiting cultural sites	Percent of population 5+ who visit (i) sites of natural heritage, (ii) museums, (iii) historical monuments or archaeological sites, (iv) culture houses or centres, (v) art galleries or exhibitions	Costa Rica (National Culture Survey)
		Percent of population remembering aspects of Costa Rican cultural identity	Percent of population recalling main Costa Rican dishes, celebrations, music, legends, and handicrafts	Costa Rica (National Culture Survey)
Human security, safety and	General	Proportion of households with information on natural disasters	The proportion of households that have access to information about occurrence or not of natural disasters	Mozambique (HIES)

disaster preparedness		Proportion of population who feel safe in their community	Proportion of population age 15+ that feel safe from violent attack when walking alone after dark in their community or area	Vanuatu (National Sustainable Development Survey)
Nature-based leisure, recreation & tourism	General	Household and per capita expenditure on domestic travel	Average and median household and per capita expenditure on domestic travel	Maldives (HIES)
	Aquatic-related	Number of domestic trips with water activities	Number of domestic trips with water activities including fishing, kayaking, and scuba diving	Belize (National Domestic Tourism Survey)
	Ocean-related	Number of domestic trips which visited the beach	The proportion of domestic trips where the beach was visited.	Belize (National Domestic Tourism Survey)
		Expenditure of domestic tourists visiting coastal districts	Expenditure of tourists (defined as someone traveling 50k or more) visiting coastal districts	Mozambique (HIES)
Social structures & demographic trends	General	Age structure	Population distribution by age	Multiple (GPHC, HIES)
		Urbanization rate	The percentage of the total population living in urban areas	Multiple (HIES)
		Demographic dependency	Demographic dependency	Multiple (GPHC, HIES)
		Average household size	Average number of members in a household	Multiple (GPHC, HIES)