ECO 2022/31



Enhancing equitable economic growth by promoting sustainable fisheries in the EA-SA-IO region



BLUE ECONOMY FISHERIES SATELLITE ACCOUNT (BEFSA)

REGIONAL FRAMEWORK (Draft)

Dr Anand Sookun (NKE)

Promoted and Funded by





Implementing partners















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February 2022

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Acknowledgements

The process of development of the framework involved the collaboration of the ECOFISH Integrated Project Management Unit (IPMU) and the COMESA, which organised and facilitated webinars and meetings. Countries responded as well though emails and by participating in virtual meetings and providing valuable information about the country status regarding the level of development of ocean related data and other information.

The collaboration of all those involved are hereby duly acknowledged.

Abbreviations

AFD	Agence Francaise de Developement
AU	African Union
BE	Blue Economy
BEFSA	Bleu Economy Fisheries Satellite Accounts
BEVTK	Blue Economy Valuation Toolkit
COMESA	Common Market For Eastern and Southern Africa
EA-SA-IO	East Africa – South Africa – Indian Ocean
FDES	Framework for the Development of Environment Statistics
GDP	Gross Domestic Product
GVA	Gross Value Added
IGAD	Intergovernmental Authority on Development
IOC	Indian Ocean Commission
IORA	Indian Ocean Rim Association
IOT	Input Output Table
ISIC	International Standard Industrial Classification
OECD	Organisation for Economic Cooperation and Development
R&D	Research and Development
SAM	Social Accounting Matrix
SDGs	Sustainable Development Goals
SEEA	System of Environment and Economic Accounting
SNA	System of National Accounts
SUT	Supply and Use Table
UNECA	United Nations Economic Commission for Africa

2. INTRODUCTION

Following the precept – "we cannot manage what we cannot measure, and we measure what we do", the E€OFISH Marine Fisheries (IOC) Work Plan aims to establish the foundation of Ocean Accounts (OA) and Blue Economy (BE) Fisheries Satellite Account (BEFSA). This will support evidence-based policymaking and management decisions in the marine fisheries of Eastern Africa – Southern Africa – Indian Ocean (EA-SA-IO) region. This will also mainstream the principles of sustainable development of fisheries resources for the social, economic and ecological goals of the UN Agenda 2030 and the African Union's (AU's) *Transforming Africa 2063*. Inland Fisheries can also use the framework.

The OA and BEFSA framework is inspired by the concurrent initiative of the UNECA and other international agencies engaged in promoting the concept in the region. It will develop symbiotic links between existing National Statistical Systems (NSS) datasets. A tutorial/manual will accompany it with planned capacity building for countries and regional organisations to benefit from this innovative tool.

1.1. Background

Sustainable Development, whether as Green or Blue Economy, is **not about doing** different things but doing the same things differently. Besides science and technology, it relates to *human behavioural change, social innovations and a* rule-based market economy. The E€OFISH programme leverages regional economic cooperation and integration on the African continent: No Poverty - No Hunger - Nobody is left Behind - Security and Peace (UN Global Agenda 2030 and AU's Transforming Africa 2063). The programme provided a grant of 28 million euros over five years as from July 2019. The EU Delegation in Mauritius charters it. The IOC Secretariat implements it in partnership with the East African Regional Economic Communities (RECs), and Regional Inland and Marine Fisheries Bodies to benefit 22 ACP islands, and coastal and landlocked countries in the region. The programme with other regional multilateral and bilateral agencies is inspired by the Blue Economy paradigm to mainstream *a wealth management approach to* thrive sustainable fisheries as a response to the unprecedented challenges of climate change, biodiversity loss, economic inequalities and the disruptive effects of the COVID 19 pandemic.

1.2. Rationale

Apart from Mauritius and Seychelles, the other ACP states of the EA-SA-IO region constitute *the world's largest number of Least Developed Countries (LDC) and the Fragile States*. They are characterised by endemic poverty, food insecurity, social unrest, and weak governance exacerbated by environmental stressors, including climate change and the COVID 19 pandemic. The wild fisheries sector holds a contrasting landscape where *the inland and 80% of marine fisheries resources are*

exploited by subsistence and traditional artisanal fishing. The total catch is meant for household consumption, and any opportunistic surplus is sold locally. The postharvest losses are estimated at 35% of the total annual production due to a lack of essential services and supply chain logistics. The per capita fish consumption is less than half the global average of 21 kg, and will decline further due to high population growth. Most East African countries have greater fish resource potentials in their inland than marine sectors. In a nutshell, the wild fisheries resources are characterised as poorly regulated open access and informal, a textbook example of the Tragedy of the Commons. The remaining 20% comprises the industrial fisheries dominated by export-oriented multinational enterprises (high-value fish and fishery products, such as tuna and shrimp), through licensing and joint venture arrangements. These fish stocks and their contribution to the coastal economies in terms of wealth and job creation is still unclear. The natural resources represents an enormous underperforming natural renewable capital. Sustainably managed, the fisheries sector can be a game-changer for transforming the local and national economies in the region. However, it requires a new mind-set and the OA and BEFSA will help to account for the BE and fisheries with macroeconomic indicators, statistics and accounts.

Strength, Weaknesses, Opportunities, and threats (SWOT) in OA and BEFSA data

A SWOT analysis regarding the readiness of the partner countries to implement BEFSA and the outcomes are presented in Table 1.

Strengths	Weaknesses
 National Accounts, e.g. SNA 2008, already established in many countries, Environment statistics are being developed, COMESA and others like UNECA have capacity development initiatives. 	 Details of the fisheries and related value chains not always updated, The area is new and lacks capacity No systematic data collection.
Opportunities	Threats
 Opportunities Capacity building often available, e.g. COMESA, UNSD, World Bank, UNECA Several guidelines exists, e.g. UN FDES, and SEEA. 	 <i>Lack of willingness and interest of countries to pursue regular data collection,</i> <i>Lack of human and financial resources</i>

Table 1: SWOT Analysis

Considering the specificity of the scope and coverage of the ocean economy, some challenges are expected in the attempt to build the Ocean Economy Satellite Accounts, as outlined below:

- Scarcity of the data.
- Disaggregation of data: The aggregation of data applying the International Standard Industrial Classification (ISIC) system makes it difficult to identify and quantify the ocean-based output. Many of the published statistics (such as the National Accounts), present estimates at levels of aggregation not suitable for Ocean Accounts. Therefore, the ISIC can be arranged for the different value chains or sectors of the BE.
- Lack of human and technical capacities: Capacity in terms of resources to collect and manage data, through an ongoing activity, is still scarce.
- Willingness/Political Will: Need for decision and policy makers, to make available the necessary resources, including staffing and funds.

The SWOT clearly reveals that the OA and BEFSA are in need and opportunities exist.

The good practice, however, is that many countries attempt to produce some statistics and indicators on fisheries, including the macro-economic ones, though they are not regularly published. Therefore, the application of the BEFSA will enhance the production and publication of regular statistics.

1.3. Aims and objectives

The initiative aims to strengthen the national capacities to assess and monitor the sustainable development of their fisheries sector. The framework attempts to address loopholes in BE/fisheries data collection, management, capacity building, and other contingent works. Hence, the framework consists of the following:

- 1) An introduction to the background and development of OA and BEFSA;
- 2) Ocean Accounting (OA)
- 3) Blue Economy Fisheries Satellite Account (BEFSA)
- 4) Operationalisation and governance
- 5) Conclusion and Recommendations

The geographical scope of this initiative targets the countries of the maritime façade of Eastern-Southern Africa and the Indian Ocean region: Comoros, Djibouti, Eritrea, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Sudan, Somalia, and Tanzania. Some of these countries already have a BE or related Strategic Framework, which is not yet functioning fully (cf. <u>Annexe II</u>).

1.4. Aligning with Concurrent initiatives

T The initiatives to mainstream BE into diverse marine-based sectors include The African Union (AU) Blue Economy Strategy 2020, the UNECA Blue Economy Valuation Toolkit (BEVTK), the AFD funded IORAs BE management, and the Nairobi Convention Clearinghouse¹ amongst others. Importantly, the COMESA initiative - Medium Term Strategic Plan 2016-2020, recognizes importance of the Blue/Ocean Economy and the 2017-2020 Statistics Strategy by Council in November 2017, initiated a BE Statistics framework development.

1.5. Scope of the Blue Economy

The **African Union's (AUs)** "Africa Blue Economy Strategy Implementation Plan, 2021-2025"² considers the following for BE growth:

- 1) Thematic Area 1: Fisheries, aquaculture, conservation and sustainable aquatic ecosystems
- 2) Thematic Area 2: Shipping/transportation, trade, ports, maritime security, safety and enforcement
- 3) Thematic Area 3: Coastal & Marine Tourism, Climate Resilience, Environment and Infrastructure
- 4) Thematic Area 4: Sustainable Energy, Mineral Resources and Innovative Industries
- 5) Thematic Area 5: Polices, Institutional and Governance, Employment, Job creation and Poverty Eradication, Innovative Financing

These form the basis for the development of the OA and BEFSA.

¹ Nairobi Convention

²Africa Blue Economy Strategy Implementation Plan 2021-2025. Available from: https://www.researchgate.net/publication/346841034_Africa_Blue_Economy_Strategy_Implementation_Plan_ 2021-2025 [accessed Feb 08 2022].

2. OCEAN ACCOUNTS FRAMEWORK

2.1 Understanding Ocean Accounts

An Ocean Account³ (OA) is a structured compilation of consistent and comparable information, including statistics, indicators and maps, **concerning marine and coastal environments**. OA is compatible with relevant international statistical standards and approaches (including System of National Accounts (**SNA**), System of Environmental-Economic Accounting (**SEEA**), and the Framework for the Development of Environment Statistics (**FDES**)). OA also meet the ten UN Fundamental Principles of Official Statistics (**FPOS**⁴), which ensures that official statistics inform good policy making.

Ocean Accounts can fundamentally provide a collection of tables and supporting data that describes:

- Interactions between the economy and the environment,
- The stocks and changes in stocks of environmental assets (natural capital), and
- Social and governance factors affecting environmental assets and associated benefits.

2.2. Conceptual Framework for Ocean Accounts

OA can enable governments to monitor three critical trends with respect to their ocean economy:

- i. Changes in ocean wealth, including produced assets (e.g. fisheries, ports, offshore energy), and non-produced assets (e.g. mangroves, coral reefs);
- ii. Ocean-related income distribution (e.g., income from fisheries or tourism);
- iii. The contribution of ocean-based economic activities (e.g. GDP from oceanrelated sectors).

Ocean accounts can either be fully integrated into existing national accounting frameworks or operate as thematic satellite accounts. The international standards and best practices for developing the OA are based on:

- The key elements of the SNA 2008, the SEEA, the FDES 2013, and the SDG indicators,
- Africa's Blue Economy: A policy handbook 2019

³ GOAP 2020: Global Ocean Accounts Partnership - Technical Guidance on Ocean Accounting

⁴ UN Fundamental Principles of Official Statistics <u>FPOS</u>

- Integrated Environmental and Economic Accounting for Fisheries (UNSD 2004 – white cover)
- Measuring the Blue Economy: The System of National Accounts & Use of Blue Economy Satellite Accounts⁵
- System of Environmental-Economic Accounting for Agriculture, Forestry and Fisheries (SEEA AFF)⁶;
- Understanding and measuring the contribution of aquaculture and fisheries to gross domestic product (GDP), FAO 2019⁷
- Ecosystem Natural Capital Accounts: A Quick-Start Package⁸
- UN Economic Commission for Africa (UNECA) BE Valuation Toolkit

The interdisciplinary and cross-sectoral scope of BE provides growth potential in several areas, especially fisheries, aquaculture, mariculture, coastal tourism, marine biotechnology, and ocean energy. The traditional and emerging industries in the ocean economy are highlighted in Table 2 and <u>Annexe III</u>.

Type of Activity	Ocean Service	Industry	Drivers of Growth
		Fisheries	Food security
Harvest of living	Seafood	Aquaculture	Demand for Protein
resources	Marine	Pharmaceuticals,	R&D for Healthcare and
	biotechnology	chemicals	industry
Extraction of non-	Minerals	Seabed mining	Demand for minerals
generation of new	Energy	Oil and gas	Demand for alternative
resources		Renewables	energy sources
	Fresh water	Desalination	Demand for fresh water
Commerce and	Transport and trade	Shipping	Growth in seaborne
trade in and around		Port Infrastructure	trade; International
the oceans		and Services	regulations
	Tourism and	Tourism	Growth of global tourism
	recreation	Coastal development	Coastal urbanization
			Domestic regulation

Table 2: Type of activities related to the BE

⁵ CDB Working Paper <u>No. 2019/02</u>

⁶ FAO and UN. 2020. System of Environmental-Economic Accounting for Agriculture, Forestry and Fisheries (<u>SEEA AFF</u>). Rome.

⁷ FAO 2019: Cai, J.N., Huang, H. & Leung, P.S. 2019. Understanding and measuring the contribution of aquaculture and fisheries to gross domestic product (GDP). FAO Fisheries and Aquaculture, Technical Paper No. 606. Rome, FAO. 80 pp. Licence: CC BY-NC-SA 3.0 IGO.

⁸ Jean-Louis Weber (2014). Ecosystem Natural Capital Accounts: A Quick Start Package, Montreal, Technical Series No. 77, Secretariat of the Convention on Biological Diversity

Type of Activity	Ocean Service	Industry	Drivers of Growth
Response to ocean health	Ocean monitoring and surveillance	Technology and R&D	R&D in ocean technologies
challenges	Carbon Sequestration	Blue Carbon	Growth in coastal and ocean protection and conservation activities
	Coastal Protection	Habitat protection and restoration	
	Waste Disposal	Assimilation of nutrients and wastes	

2.2.1 The Ecosystem Services of the Ocean

The ocean and coastal zones (mangroves, seagrass, and coral reefs) and other marine ecosystem services have high economic values. These ecosystem goods and services (EGS) are presented in Figure 1.



Figure 1: Ecosystem services of the Ocean

Source: Ebarvia. M. C.⁹

The **Green and Blue Economy** interconnection, under OA, can be formulated as follows:

- <u>Green Economy</u> entails operationalisation of the principles of sustainable development; and
- Blue Economy is about the greening of aquatic and marine based natural resources and ecosystems, e.g. FAO Code of Conduct for Responsible

⁹ Ebravia, M.C. Blue Economy Assessment, PEMSEA

Fisheries, SGD 14 – Life Below Water and Blue Growth Initiatives for the small-scale fisheries.

Interconnectedness of the macro-ecosystems: water cycles, land-based effluents, climate change, Integrated Coastal Zone Management (ICZM), Local Sustainable Livelihood Approach, Marine Spatial Planning and other systemic approaches.

Ocean Economy¹⁰ can be divided into ocean based industries and marine ecosystems (Fig.2). In many cases, marine ecosystems provide intermediate inputs to the ocean-based industries. For example, coral reefs provide shelter and habitat for fish nurseries and unique genetic resources, while at the same time providing recreational value for maritime tourism. Conversely, ocean industries can affect the health of marine ecosystems, e.g., through discharge if ship waste or pollution from oil spills.



Figure 2: The flows in the ocean economy

Source: OECD

2.3 Methodological Approach

2.3.1. From Existing Statistics and Accounts to Ocean Accounts

Based on the AU's Africa Blue Economy Strategy Implementation Plan,

2021-2025 and its five Thematic Areas already mentioned, the existing statistical data can be disaggregated to fit into the OA. The proposed framework extends the data coverage for the different sustainability components: the economy, the social and the environmental aspects (Fig. 3).

¹⁰ Source: OECD (2016), The Ocean Economy in 2030



Figure 3: Proposed structure for ocean accounting

National Accounts, as published by countries worldwide, often covers broad sectors such as Agriculture, Forestry and Fishing, Manufacturing, and others, for the economy. Likewise, employment and social data seldom covers gender and poverty, etc. Environment statistics, when available, often includes only some natural capitals, such as forests and a few other lands, and statistics on water, wastes, and human settlements. Therefore, this proposed regional framework will elaborate on the disaggregated economic, social and environmental data.

Any publication on Ocean Accounts and BEFSA Accounts can vary from country to country. Countries can choose what items to include in their Ocean Accounts that can be tailored according to national needs as well as regional and international obligations like SDG reporting.

2.3.2. Categorisation of the BE pillars

The BE pillars (Economy-Social-Environmental) include sectors that will need to be **categorised according to the International Classifications, such as the International Standard Industrial Classification (ISIC)**, so that it meets the statistical standards for compiling accounts. Table 3 presents the main economic sectors according to the AU Thematic Areas, the ecosystem types, and the BE sectors, which are all matched to ISIC. **Detailed ISIC** for the OA are presented in **Table A3 in the Annex III**. The sectors, besides fisheries, that can be selected for OA include tourism, manufacturing and other services. **Countries can customise the thematic areas to meet their needs.**

AUs Thematic Areas	Type of ecosystem	Blue Economy sectors	ISIC codes
	services		(Examples – cf. Table 5 and Annex III)
Thematic Area 1	Harvesting of living	Fishing (inland, coastal,	A
Fisheries, aquaculture,	aquatic resources	and deep seas)	
conservation and	(seafood, plant	Aquaculture	
sustainable aquatic	marine organisms,	Mariculture	
ecosystems		Pharmaceuticals,	
	products)	chemicals, cosmetics, genetic research	
Thematic Area 2	Commerce and trade	Maritime transport and	С, Н, N
Shipping/transportation,	in and around the	services	
trade, ports, maritime	ocean and rivers	Port infrastructure	
security, safety and		Shipbuilding and repairs	
enforcement		River transport	
		Tourism and recreation	
Thematic Area 3	Protection	Coastal protection	I, L, M, N
Coastal and maritime		Marine ecosystem	
tourism, climate		protection	
change, resilience,		Water resource protection	
environment and			
Thematic Area 4	Extraction of	Deen-sea and seabed	B D
Sustainable energy and	nonliving resources	minina	0,0
mineral resources and	and generation of	Offshore oil and gas	
innovative industries	new energy	Penewable energy	
	resources	Marino calt baryosting	
		coastal mining of sand,	
		construction materials	
Thematic Area 5	Cultural and religious	Cultural and religious	Q, R, S, T
Polices, institutional	values	practices	
and governance,	Knowledge and	Biophysical,	M, S
employment, job	information	socioeconomic, and	
creation and poverty		political research	
eradication, and			
innovative financing			

Table 3: Key blue economy ecosystem service and sectors

Source: UNECA: adapted from Blue economy Policy Handbook 2016

2.3.3. Ocean-related data

Generally, ocean related data relates to national accounts, fisheries, environment, and social data. These are available but are scattered in various organisations. For instance, the coastal marine fisheries are predominantly small-scale open access and informal that may be recorded or surveyed. Therefore, they have be documented and structured to feed into the OA.

A simple template integrating the economic-social-environmental components is presented below.

	Unit	2000	2005	2010	2015	2020
A. ECONOMY	Currency, Value Added at basic prices					
Fisheries value added Of which						
Coastal/Artisanal/Small Scale (SSF)						
Commercial/industrial						
Aquaculture						
Others						
Total fisheries						
Manufacturing						
Of which fish and related products						
Services						
Of which tourism (coastal)						
Total of BE						
B. SOCIAL						
Employment	No. of persons					
Of which male						
Of which female						
GINI						
C. ENVIRONMENTAL						
EEZ area	Km2					
Marine Protected Areas						
Fish catch	Tonnes					

Table 4: A simple ocean accounts

Other details of the three sustainability components are presented below.

2.3.4. The Economic Component

Marine or ocean related activities are often embedded in the ISIC Groups such as Fishing in the Agriculture, Forestry and Fishing; and Tourism in Accommodation and related Activities, and others. Ocean Accounts will require **detailed and disaggregated ISIC for ocean related activities** (Table 5).

		Value Added (Currency, at basic prices)			
ISIC Code	Code Description	2000	2010	2020	
А	Agriculture, forestry and fishing				
A03	Fishing and aquaculture				
A031	Fishing				
A0311	Marine fishing				
A0312	Freshwater fishing				
A032	Aquaculture				
A0321	Marine aquaculture				
A0322	Freshwater aquaculture				
С	Manufacturing				
C102	Processing and preserving of fish, crustaceans and molluscs				
C1020	Processing and preserving of fish, crustaceans and molluscs				
	Etc				
	Total VA for Ocean Econ. Or BE				

	Table 5:	Example	Ocean	related	activities	and	economic	indicators
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Ocean related activities encompasses a number of sectors as grouped in Table A3 in Annex III.

With disaggregation, indicators like the **Gross Value Added (GVA), employment, trade**, and a few others, can be worked out. Specific disaggregation can be for trade of products (can be done with **Harmonised System (HS)** codes or **Central Product Classification (CPC),** e.g. frozen fish; and employment by the **International Standard Code for Occupation (ISCO)**. Additional indicators include Exchange rates, household final consumption expenditure and a few others.

Ocean vs Inland Activities (National Protocol)

Ocean and inland-based activities are linked but there is a need for drawing a line between the two. Coastal states include those that have a coastline and continental or big countries can take the region 100 km inland from the coastline as coastal. For island states, by default the whole country can be considered coastal. This **framework can be extended** to land based activities related to the BE, such as for inland lakes and rivers. **Economic Indicators** that can be considered include:

- Output: The output or sometimes the gross output can be obtained by multiplying the price by the quantity of any product from any specified sector or activity: GO = P x Q. For example for coastal fishing, the fish landings can provide the quantity of fish caught in any specified period. The market prices of the fish can then be used to obtain the output¹¹.
- **Intermediate consumptions (IC):** the inputs required, except labour, to generate the output. These can be minimum for some fisheries type like artisanal, and significant for others like industrial.
- Investment: include the purchase of machinery, (including software) and buildings (offices, infrastructure, and dwellings) and the constitution of stocks (inventories) and is known as gross capital formation (GCF). When stockbuilding (or "changes in inventories") is excluded, leaving only the purchases of buildings and machinery, the result is known as gross fixed capital formation (GFCF).
- Trade: Data for import and exports can be organised by type of commodity or product. The values can be in monetary terms or in physical quantities. (Imports (IC) / Export treatment)

Assumptions: **imputations** and **data reconstruction techniques** can sometimes be used, e.g. for the IC, in the absence of data for fuel and other inputs used for artisanal fishing (a proportion of the output is taken as IC – see example from Kenya national accounts below).

¹¹ For ocean accounting, details are required, e.g., for the different types of fisheries, such as coastal/artisanal/small scale, semi-industrial, and industrial, the segments/sectors can be selected from Table A3 in Annex III as appropriate. The price and quantities vary according to fish species, effort, and other factors affecting the catch. The market demand also affects the price, e.g., some fish are graded as first, second and third choice where the price is higher for first choice fish species. Therefore, the detailed prices and quantities for each fisheries types can be used to obtain their outputs. A similar concept can be applied to other sectors/activities, such as seafood processing/canning in the manufacturing sector)

Example from Kenya

Kenya produces its national accounts based on the SNA 2008 production approach, and the sectors are broadly classified according to the ISIC rev 4. For instance, for Fishing, the marketed output for fish and other fishing products are based on data from Fisheries Department on fish landed by quantities and values. **Intermediate Consumption** is assumed to be **5 per cent** of **market output** informed by household consumption pattern and employment. Likewise, for other sectors/sub sectors, the approaches are similar and adequately described in its national accounts <u>sources and methods</u>.

The value added for the broad sectors are thus obtained from the production approach. The ocean accounts can be computed based on the sectors identified for the ocean related activities, as provided in this manual.

Data: Data sources include national agencies and authorities and the private sector, and these need to be organized into a database for AO. The data can be from <u>National Accounts</u>, or from line-Ministries like Finance, and the Central Bank, Fisheries and Environmental Ministries, among others. In some cases, sectoral accounts, such as for agriculture, forestry and fisheries or mining and quarrying, can be split out to provide the specific statistics related to the BE or the ocean. National accounts aggregates/statistics/indicators such as the **value added**, **GDP** or GDP per capita are often available. Other indicators, such as on investments, etc. can also be obtained as aggregates such as the **Gross Capital Formation (GCF)**.

Frequency: Annual and sometimes quarterly data are available.

Units: Economic data, in monetary terms - in Local Currency Units (LCU), are sometimes aggregated to thousands or millions. Some, like the GDP or sectoral value added, are measured at **basic or current prices** and sometimes at **constant prices** to remove inflation effects and price volatility, etc. Other useful ones include Inflation rates, Consumer Price indices (CPIs), interest rates and trade (imports and exports - also measured in **physical quantities**, e.g. tonnes.

2.3.5. The Social Component

The social aspects of the BE relate to the employment and earnings (wages) by gender, poverty incidences, and measures of wealth such as GINI and Lorenz curves, and the Human Development Index (HDI). Others can be added such as bad weather allowances for fishers, social security, etc.

Social Indicators and Statistics help for understanding society and social change. For instance, the social costs and benefits may be provided by the total expenditure on social protection benefits in monetary terms, or as a percentage of GDP. Benchmarks can be established by using indices such as the HDI and GINI.

Sustainable development approaches such as the **circular economy or BE** may require employment, gender and poverty statistics. The social data can be drawn from various sectoral activities, including but not limited to:

- SDGs.
- Population by gender and by region, e.g. coastal, riverine, etc.
- Demographic indicators, e.g. life expectancy for coastal communities, etc.
- Employment by gender and ocean related jobs, including characteristics such as part-time/full time, and informal jobs.
- GINI
- Average Household Incomes, including net purchasing power and unpaid works.
- HDI
- Health prevalence of diseases, malnutrition, etc. [well-being index]
- Poverty prevalence, comparison with national/ international benchmarks/ poverty lines
- Loss of lives (hazards / accidents) safety at sea

Sources of data: Any census or surveys that are related to labour, population or demography can provide relevant data that can be sorted for BE or the ocean activities and industries. Likewise, specific data on poverty, health, social security and others can be sourced from primary or secondary data collections.

Frequency: annual or quarterly or sometimes for medium (3-5 years) or longer terms (5+ years) would be available¹².

Units: Numbers, such as population (counts/no. of people by gender), monetary values such as for income, and indices such as HDI are common for social statistics. Some other metrics include percentages or ratios.

2.3.6. The Environmental Component

Some countries have started to develop environment statistics, especially based on the UN Framework for the Development of Environment Statistics (FDES). These are categorised as components:

- 1. Environmental Conditions and Quality, e.g. marine ecosystems extent and condition
- 2. Environmental Resources and their Use: e.g. Marine resources, Minerals, energy. etc.
- 3. Emissions, Residuals and Waste: Wastes (marine/ coastal), chemicals releases, wastewater, etc.
- 4. Disasters and Extreme Events: extreme events/climate change, oil spills, etc.
- 5. Human Settlements and Environmental Health: Demography, marine pollutions, etc.
- 6. Environment Protection, Management and Engagement: Finance, policies, risk reductions, climate change adaptation, sensitizations, etc.

¹² The frequency of dissemination of data can be governed by existing national practices such as IMF's General Data dissemination Standards (GDDS) or Special Data Dissemination Standards (SDDS), if a country adheres to such protocols. Otherwise, any national protocol can be used or designed.

The environmental data to be collected and these can be sorted according to their relevance for ocean and BE related activities.

Moreover, the Ecosystem Natural Capital Accounting (<u>ENCA</u>) and the SEEA cover ecosystem goods and services that can be linked to the ocean and its related activities (Estuaries, Lagoons, Coastal flats (beaches and mudflats), Coral reefs and the Sea (interface with land). The Convention on Biodiversity (CBD)¹³ provides practical guidance on how to operationalise the ENCA.

Suggested **Environmental Statistics and Indicators** based on the FDES¹⁴ are in Table 6 (cf. Annex I).

	Environmental component	Statistics and indicators			
1.	Environmental Conditions and Quality	 Exclusive Economic Zone (EEZ), Area Known flora and fauna species, Number Protected areas and species Marine water quality 			
2.	Environmental Resources and their Use	 Production, consumption and trade of minerals, energy, Fish incl. aquaculture and fishery products, Total water abstraction, Volume Desalinated water, Volume 			
3.	Emissions, Residuals and Waste Ocean related	 Pollution from marine related activities including Emissions of greenhouse gases, wastewater generated, oil spills and others 			
4.	Disasters and Extreme Events	 Occurrence of natural extreme events and disasters and technological/man-made disasters their impacts Number of people killed, injured, homeless, affected Economic losses and Physical Occurrence and impacts of technological disasters Area affected by technological disasters, Area 			
5.	Human Settlements and Environmental Health	Urban and rural populationPopulation living in coastal areas, Number			
6.	Environment Protection, Management and Engagement	Includes: Finance, policies, risk reductions, climate change adaptation, sensitizations, Preparedness and management systems for natural extreme events and disasters			

Table 6: Suggested Statistics and Indicators related to Marine thematic areasfrom the FDES

¹³ Jean-Louis Weber (2014). Ecosystem Natural Capital Accounts: A Quick Start Package, Montreal, Technical Series No. 77, Secretariat of the Convention on Biological Diversity, 248 pages

¹⁴ UN (2017) Framework for the Development of Environment Statistics (FDES 2013)

Sources of data: various sectors/topics including environment statistics, if well established, can provide the necessary data. Otherwise, as this is a **multidisciplinary area**, various sources need to be tapped, e.g. **marine, disaster risks, meteorological services, fisheries departments or line ministries**, etc. Others such as social statistics and other sectoral units such as housing or the SDGs can also provide some of the data. . Any census or surveys that have an environment, fisheries or coastal and ocean related topics can also provide relevant data for BE or the ocean activities and industries. Therefore, the data can be sourced from primary or secondary data collections.

Frequency: Environmental data can have different frequency of collection, ranging from hourly, daily to weekly, monthly to yearly or even decadal, depending on the topic considered. Most often, annual or quarterly or sometimes for medium (3-5 years) or longer terms (5+ years) would be available. For instance, fish catch could be daily and can be lumped as quarterly or annual, while health of ecosystems can be assessed for medium terms, or a longer period depending on the assessment process.

Units: Discrete Numbers, such as population counts/no. of species, or area of ecosystems, and monetary values such as value of fish catch, and indices such as ocean health index are common for environment statistics. Special units may also be involved here due to the scientific and technical nature of the subject and these include parameters for water quality, mass or volume of some of the ocean products, and others. Some other metrics include percentages or ratios.

2.4. Integrating Economic, Social, and Environmental Components

2.4.1. The process model and integrated satellite accounts

The process (Figure 4) in the ocean or any other aquatic environment generates **flows**, e.g. fish, from **stocks**, e.g. mangrove or lagoon, and these interact with the **economic and other activities**, such as fishing, and processing of seafood. Fisheries products can flow to different industries and the end-products can be consumed by households (social benefits). Households and industries can **generate residuals** such as wastewater that can return to the environment or ecosystems in a treated or untreated way and/or they can as well be used by other activities such as wastewater treatment plants. The interactions (economic, social and environmental) can be captured in tools like the Supply and Use Tables - SUT (physical quantities – for PSUT, or the monetary values). The mechanics and other details of the SUT and other such tools can be found in frameworks such as the SEEA. The three BE pillars and integration of them will provide a holistic view of the BE and ocean related activities and events.



Figure 4: The interaction of the economy-social-environmental segments

Source: Adapted from GOAP 2019 15

¹⁵ Technical Guidance on Ocean Accounting Aug 02, 2019

Other **tools, besides** the **SUT**, include the Input-Output Tables (**IOT**), the Social Accounting Matrix (**SAM**) and the **asset accounts** that can integrate the **ecosystem goods and services** - regulating, provisioning, support, and cultural, etc. An IOT describes the sale and purchase relationships between producers and consumers within an economy. They can either show flows of final and intermediate goods and services defined according to industry outputs (industry × industry tables) or according to product outputs (product × product tables)¹⁶. The **SAM**¹⁷ is as an organized matrix representation of all transactions and transfers between different production activities, factors of production, and institutions (households, corporate sector, and government) within the economy and with respect to the rest of the world. A SAM can be regarded as an extension of input-output (I-O) tables.

The accompanying manuals provide some details and demo examples that can be considered by the countries. The tools such as SUT, IOT and SAM will need to be customised to meet the needs of the country and also depending on the detailed data available to develop such matrices.

Sources of data: The data for this component can be sourced from various topics including national accounts/economic statistics, social statistics and environment statistics, if well established in the country. Otherwise, as this is a multi-disciplinary area, various sources need to be tapped, e.g. marine, disaster risks, meteorological services, fisheries departments or line ministries, etc. Others such as demographic statistics and other sectoral themes such as housing or the SDGs can be sourced from relevant departments. Any census or surveys that have an environment, fisheries or coastal and ocean related topics can also provide relevant data on BE or the ocean activities and industries. Therefore, the data can be sourced from primary or secondary data collections.

Frequency: The frequency of data availability depends on the topic. ranging from hourly, daily to weekly, monthly to yearly or even decadal, depending on the topic considered. Most often, annual or quarterly or sometimes for medium (3-5 years) or longer terms (5+ years) would be available. For instance, fish catch could be daily and can be lumped as quarterly or annual, while health of ecosystems can be assessed for medium terms, or a longer period depending on the assessment process.

Units: Discrete Numbers, such as population counts/no. of species, or area of ecosystems, and monetary values such as value of fish catch, and indices such as ocean health index are common. Some other metrics include percentages or ratios.

¹⁶ OECD, <u>https://www.oecd.org/sti/ind/input-outputtables.htm</u>

¹⁷ Each cell shows payment from its column account to its row account. The measurement of the contribution of the ocean-based activities to the economy will focus on the direct and indirect services rendered by the ocean to the population depending on it.

3. BLUE ECONOMY FISHERIES SATELLITE ACCOUNTS (BEFSA)

The satellite account approach is a simpler, less data demanding method that can generate GDP measures, as well as other measures for annual assessment like trade, food and other consumption patterns that can be used for monitoring the economic development and sustainability.

The BEFSA can provide a more holistic and accurate representation of the economic contribution of the marine fisheries. It has a common but differentiated approach from the OA as it details out the fisheries component to account for hidden or ignored parts.

3.1. Understanding Sustainable Fisheries

Aquatic resources are renewable but not infinite or inexhaustible. Hence, there are noted degradation of the coastal marine ecosystems resulting from human-induced and environmental stressors, including climate change. Initiatives to safely manage the aquatic resources include:

- FAO Code of Conduct for Responsible Fisheries 1995 & Voluntary Guidelines for Sustainable and Inclusive Small-Scale Fisheries (SSF) 2015 are the backbone of sustainable management of fisheries. Year 2022 is proclaimed the International Year of SSF!
- Sustainable Development Goals (SDGs), particularly the SDG 14 "Life Below Water", which aims to conserve and sustainably use the oceans, seas and marine resources;
- FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries that are embedded into the AU Policy Framework and Reform Strategies for Sustainable Fisheries and Aquaculture in Africa to leapfrog the socioeconomic aspirations of Transforming Africa 2063.

Sustainable Development, when applied to fisheries, should be guided by the triplebottom-line of Sustainable Development:

- i. Environment: relates to the health and productivity of the fishery resources and other associated species keeping safe biological limit of capture, limiting impact of gear, preserving and restoring habitats such as corals, mangroves, estuaries, and avoiding marine pollution, etc.
- ii. Economy: refers to the system of costs and benefits within the fishery and monetary flows into and out of the fishery *flows* of fish resources to the economy and its use –demand and supply.
- iii. Society: The societal component encompasses the social costs and benefits in monetary or non-monetary values, which are important factors of human welfare jobs, gender, poverty, social safety nets, etc.

Supporting these is Governance that includes Legal and Policy frameworks as well as formal, and informal practices and beliefs governing the system (Rules of the Game). It is also important to integrate the significance of Science-Technology-Innovation (STI) that has the potential to be a game-changer for sustainable fisheries.

3.2 Conceptual Framework

3.2.1. Scope and coverage

The capture fisheries comprise all activities to harvest a given fish resource, including pre-harvest and post-harvest activities. It may refer to the location, the target resource (e.g. hake), the technology used (e.g. trawl or beach seine), the social characteristics (e.g. artisanal, industrial), the purpose (e.g., commercial, subsistence, or recreational) as well as the season (e.g. winter)¹⁸.

Since there are observed lack of disaggregated data to cover the **whole value chain** of the fisheries sector, and **not just the fishing** sector as is common in the national accounts, a detailed split of the activities is required, as in Figure 5 below and **matched with the corresponding ISIC** in <u>Annex III</u>.



Figure 5: The holistic fisheries sector components

Integrating information on fisheries facilitates understanding of the trade-offs and dependencies between the activities shown in Fig. 5 and their related environmental factors. Considering the fisheries part of the SEEA AFF (FAO¹⁹) will enable an

¹⁸ OECD (2015), Ognanisation for Economic Development and Cooperation, <u>Glossary of Statistical Terms</u>
¹⁹ FAO:

accounting development where countries can adapt the different functional components of the system. The SEEA AFF integrates information on the environment and economic activities, including fisheries, using the structures and principles laid out in the SEEA Central Framework (SEEA CF).

3.2.2. Defining the BEFSA Framework

The BEFSA Framework draws on internationally accepted and standardized systems like the SNA, and the interactions between socio-economic and environmental factors can be drawn from other guidelines like SEEA or SEEA AFF. The BEFSA is meant to fill the gaps and extend the existing frameworks and initiatives to include the most important components of the marine and coastal environments and their related inland linkages. The ISIC sectors in Annex III can be extended for fisheries. For sustainable fisheries, Figure 6 presents indicators and other data can be matched with the appropriate ISIC for fisheries and related activities, to include the triple bottom line.



SUSTAINOMICS OF MARINE FISHERIES

Figure 6: Sustainomics of marine fisheries

The BEFSA focus on fisheries and the integration of the flows from and to the environment , e.g. using SUT and asset accounts, among others. It thus extends and also complements other frameworks like the SEEA CF and SEEA Ecosystem Accounting (EEA) (assess ecosystem asset conditions and extents). Others may as well help, like the CBDs ENCA Quick Start Package and the UNECA BEVTK Toolkit, and the UN ESCAP and the GOAP.

3.3. Methodological Approach

3.3.1. Structuring of Fisheries Accounts

Accounts may be compiled in either physical or monetary units, or a hybrid combination of both. A **value chain approach (VCA)** ensures that the contribution

of fisheries in all of its aspects are adequately covered, including pre-harvest, harvest, and post-harvest activities. The components to be included in the Fishery Satellite Account includes the benefits of a certain economic activity. Two types of economic contributions can be considered:

- Values derived from harvest from fish and their parts, which includes fresh and frozen fish directly sold at markets, processed fish food, non-food products (e.g. fish meal and fish oils, chemical extracts), ornamental parts, and a few others.
- The economic activities providing essential support and services to enable fisheries and fishery-related activities, which includes production and marketing of gears, fuel, machineries, port services, ingredients for processing, and a few others.

The Structure of Fisheries Accounts (Fig. 7) includes physical and monetary accounts enhanced by the inclusion of all the values chains, including the **backward (upstream) and forward (downstream) linkages**. This can also be interpreted as **the pre-harvest**, **harvest and post-harvest** activities.



Figure 7: Structure of the BEFSA

The economic segment of the fisheries in the BE can fully be captured by the GDP provided that its **linkages** to other sectors are adequately covered. For this, some of the issues to be considered are:

Fisheries v/s Fishing: fisheries GDP according to SNA 2008 is "fishing" rather than "fisheries" which is more inclusive and holistic. The post-harvest activities, including "fish processing" are not accounted for in the "fishing" sector but in "manufacturing". The same applies to other flows like fish transhipment repairs and maintenance; entertainment, ship-chandling, etc. Moreover, inland and marine, capture and farmed, small-scale (non-commercial and commercial) and industrial and ornamental fisheries are pile up in "fishing". Recreational and Sport fisheries are sometimes recorded under "Tourism".

The value chain approach (VCA) assesses the direct, indirect, and induced contribution of fisheries to the national economy. The selection of the appropriate ISIC related to fisheries forms the basis of the BEFSA.

Domiciliation/Residency: The concept of residence differentiates what economic activities to be recorded as a domestic product. The residency concept is important in riparian countries that have locally based foreign fishing vessels. Policy frameworks such as Offshore Business Centres, Stock Exchange, and Freeport Hubs etc. has to be accounted for in GDP or GNI as appropriate²⁰.

Geographic Area: The geographic dimension is a critical factor for fishing activities and its sustainable management, such as population growth, investment, climate change and pollution. The proclamation of the Exclusive Economic Zones (EEZ) by the island and coastal states has been instrumental to protecting the nation's economic activity and growth but not safeguard against overfishing and illegal fishing practices – e.g. migratory fish stocks. From the fish wealth perspective, it is important to have disaggregated data to determine the nationality of the harvest from the national and other EEZs and high seas affected by local and foreign-flagged vessels.

Institutional Value-Added: The fisheries resources and ecosystems are considered as natural capital or public goods and the government, including various public agencies, are responsible for the administration and sustainable development of the sector, which should be accounted for²¹.

Other Conceptual Frameworks: Generally, the IOT, SUT, and SAM can provide systematic information on the cost structure as well as forward and backward linkages of industries and the flow of goods and services in the economy. These should be adequately ventilated to provide disaggregated data. In the situation where IOT cannot be applied, a Value Chain Approach (VCA) (essentially a simplified Input-Output approach) can be used to trace the different components (small-scale fishing, processing, marketing, transhipment and associate services, fisheries licensing revenue etc.) of the industries one by one to create simple IOT for measuring the indirect GVA.

3.3.2. Building the Fisheries BE Statistical System

The Fisheries BE statistical system draws its items from the accounts structure described above. Thus, for each of its components, including marine capture fisheries and its branches, the data needs to be organised as appropriate. This would entail the inclusion of inventorying (adequate coverage of fisheries), mapping all

²⁰ Sometimes the offshore centres are misused by unethical businesses to perpetrate fraudulent activities such as tax evasion, illegal fishing and fisheries-related crimes.

²¹ In the nearshore fisheries, these rights and obligations are sometimes shared with the indigenous or traditional fishing communities. Therefore, public agencies play a vital role as regulator and facilitator in the fisheries sector. The sector is both a source of revenue and livelihood.

activities, creating profiles of the different segments, and benchmarking for monitoring purposes.

The proposed template/dashboard for fisheries can be drawn from an inventory of fisheries²² and related tools²³ that record fisheries related activities. These can then be organised, with additional data sourced elsewhere, according to segments in Fig 5 and others. A simple template for compiling fisheries statistics and accounts are provided in Table 7.

Fisheries	Data	Units	2000	2010	2020	
items						
Inshore fishing	Non Commercial/Subsistence	Quantities and monetary values (can inc. value added)				
	Commercial/traditional	Quantities and monetary values (can inc. value added)				
Offshore Fishing	Extended artisanal	Quantities and monetary values (can inc. value added)				
	Industrial	Quantities and monetary values (can inc. value added)				
Fish processing		Quantities and monetary values (can inc. value added)				
Wholesale and retail trade	Local markets	Quantities and monetary values (can inc. value added)				
	Exports	Quantities and monetary values (can inc. value added)				
Others as appropriate						

Table 7: Example Fisheries Value Chain production (physical/monetary units)

Data

The interactions in the tools or matrices (SUT, IOT etc.) are developed and populated, using simplified tabular presentations and graphics. These may show specific issues such as pollution by residuals or wastes generated by industries or consumers/end-users, the reuse of residuals, or the economic outputs from natural ecosystem inputs, and other issues.

²² Taconet et al, 2010, FAO, Fisheries Inventory: Method and Guidelines

²³ FAO Fisheries and Resources Monitoring System (FIRM):

Sources: Data can be from National accounts, social statistics, and environmental statistics and more specifically from fisheries statistics, the main part of which is the catch from landings or other means. Any census or surveys that are related to fisheries, can provide relevant data for fisheries activities and industries. Other parts of the fisheries value chain need to be considered, including the **pre-harvest**, **harvest**, **and post-harvest activities** in specific sectors. Sometimes, **wholesale and retail prices** are regularly collected and processed, as well as **industrial productions**, **trade** (imports and exports), **port and related activities**, and **stevedoring**, **administrative**, **financial and logistic** support services. Hence, specific data can be sourced from **primary or secondary data collections**. **Informal activities** can also be captured by using common good practices²⁴.

Frequency: daily (e.g. from landings), weekly or monthly, then lumped into annual or quarterly would be available. For instance, daily landings are recorded by fisheries extension officers and are compiled in fisheries databases from where the required data can be obtained.

Units: Numbers, such as catch quantities by species, monetary values such as Value Added, prices by type of fisheries and species, and other related statistics. Some other metrics include percentages or ratios.

Economic variables

The **Value Added** for the different segments of fisheries grouped into detailed ISIC categories.

GVA = Gross Output - Intermediate Consumption

Other economic variables include employment and trade.

An example for Fishing sector GVA for Mauritius is provided below. Some available resources²⁵ can be used as guidance.

Example: GVA for Fishing in Mauritius

In cases of lack of proper accounts, a variety of methods, based essentially on the commodity flow approach is used to estimate **gross output**, **intermediate consumption and value added**. Data on the **quantity of fish** caught are provided by the Ministry of Ocean Economy, Marine Resources, Fisheries, Shipping and Outer Island. Separate figures are given in respect of lagoon and bank fishing. These are then valued at market prices available from the Prices unit. The transport and retail margins are estimated and deducted from the market price value to give **gross output at basic prices**. **Intermediate inputs** for lagoon fishing is very low as the fishermen who are engaged in fishing in coastal waters, use artisanal methods and the catch is usually sold fresh. Bank fishing involves higher costs as the fish are caught in high seas in larger vessels. Also, these fish are sold frozen.

https://www.fao.org/3/x2465e/x2465e.pdf

²⁴ FAO 1998: Guidelines for the routine collection of capture fishery data:

²⁵ UNECA (n.d). Guidebook on the Use of Administrative Data in National Accounts; OECD (2002), National Accounts methods to achieve exhaustiveness

Forex earnings: Proceeds from the export of goods and services of a country.

Investments: In the national accounts²⁶, investment, constitution of stocks (inventories) - **gross capital formation (GCF)**, **or** with stock-building (or "changes in inventories") excluded - **gross fixed capital formation (GFCF)**.

Gross Income: Income (employees' salaries + company profits). This can be extended to ocean related activities where the income derived by individuals, households, as well as establishments or industries/sectors can be included.

Social variables

These are mainly the benefits that people obtain. The social indicators include:

Employment: categorised by ISIC and if possible by ISCO occupations: e.g. ISCO-88 International Standard Classification of Occupations, e.g. Major Group 6. Minor Group 615 - Fishery Workers, Hunters and Trappers²⁷. These include:

- Aquatic life cultivation workers
- Marine and coastal waters fishery workers
- Deep-sea fishery worker

Wages, e.g. for fishers, and others

Gender, e.g. by specific occupations, etc.

Fish food: includes the fisheries commodities consumed as presented in national food balance sheets²⁸.

Unpaid household fisheries-related work. Nature of work – part / full time Fishing assets Fisheries infrastructure and market logistics Management Cost

Environmental variables

An ecosystem approach to fisheries²⁹ including biotic, abiotic, and human components of ecosystems can account for human impacts. These are documented in standard **fisheries statistics** (catch, effort by gear types) (See FAO³⁰). Further information and indicators for the environmental component include:

- Fish Stocks
- Fisheries Ecosystems

²⁶ Lequiller, F. and D. Blades (2014), <u>Understanding National Accounts</u>: Second Edition, OECD Publishing.

²⁷ FAO 2004: Handbook of Fishery Statistical Standards

²⁸ See e.g. FAO: <u>https://www.fao.org/fishery/statistics/global-consumption/en</u>

²⁹ Coordinating Working Party on Fishery Statistics (<u>CWP</u>)

³⁰ FAO: Coordinating Working Party on Fishery Statistics (<u>CWP</u>)
- Fisheries and Catch, etc.
 - Fishing effort / assets
 - Catch per unit effort (CPUE)
 - Catch and landings
 - Capture fisheries statistics
 - Nationality of catch and landings Fishery fleet
 - Fishers
 - Fishing gear classification Fisheries production
 - Aquaculture production
 - Food balance sheets on apparent consumption
 - Fishery commodities classification
- Ecosystems (marine and others)
- MPA: designated Marine Protected Areas
- Marine spatial planning: includes well demarcated areas that can be on maps and Geographical Information System (GIS) databases.

4. Cross Cutting Themes

The cross cutting themes can apply to both the OA and the BEFSA. Countries can choose which ones are suitable for any of the two sets of accounts.

4.1. Climate Change

While climate change can be caused by ocean related activities – e.g. from emissions of greenhouse gases, they have also the mitigation actions in terms of absorbing carbon dioxide. Moreover, the adaptation needs should also be considered, e.g. for fishers and coastal communities.

The accounting and statistics can be drawn from the above-mentioned sustainability components of the OA and BEFSA. These include

- ✓ carbon sequestration from mangroves,
- \checkmark the coastal populations and their trends,
- $\checkmark~$ the fishing fleet and vessels and their GHG emissions,
- $\checkmark~$ the adaptive measures adopted, etc.
- ✓ Ocean Heat or Temperature
- ✓ Sea Surface Temperature (SST)
- ✓ Sea Level Rise (SLR)
- ✓ Ocean pH Acidification
- ✓ Land loss e.g. beach erosion
- ✓ Coastal flooding
- \checkmark Salt water intrusion into water bodies and groundwater
- ✓ Coastal wetlands and other assets

These could be part of environment statistics and other sectoral statistics such as demography, land use, social indicators, and others can be added as well.

4.2. SDGs

The Sustainable Development Goals (SDGs), and particularly the SGD 14: *Conserve and sustainably use the oceans, seas and marine resources for sustainable development,* are a special crosscutting issue related to the AO and BEFSA. The UN mentions³¹: "Our oceans — their temperature, circulation, chemistry, and ecosystems — play a fundamental role in making Earth habitable.

³¹ UN: Life below water

The UN has defined 10 Targets and 10 Indicators for SDG 14. Targets specify the goals and Indicators represent the metrics by which the world aims to track whether these Targets are achieved. The indicators range from pollution, biodiversity, sustainable fisheries, economic benefits, support to small scale fishers, and others. These can form part of the BEFSA's cross cutting themes.

4.3. COVID-19 Pandemic

The COVID-19 Pandemic has since its onset in 2019 set the world in another strategic junction. The BE and ocean related activities, including fisheries, marine transport and trade, and the overall national economies have been diversely affected. In the near term³², the impacts of COVID-19 on the health of the ocean have largely been positive due to the reduction in various sectoral pressures that lead to pollution, overfishing, habitat loss/conversion, invasive species introductions and the impacts of climate change on the ocean. While the ocean may enjoy some near-term benefits, the livelihoods and food security of tens or even hundreds of millions of people may be seriously affected.

The role of the BE and ocean accounting system and its related statistics and indicators can reveal the impacts in different sectors of the economic, social and environmental domains. There has been several studies carried through funded projects and data could be available for including into the ocean accounting framework. The themes and issues that can be considered include;

- \checkmark Fishing, disaggregated by type
- ✓ Shipping
- ✓ Tourism
- ✓ Coastal constructions
- ✓ Oil and gas
- ✓ Ecosystem quality

These can be further ventilated and including trends, to obtain some valuable information on the ocean related impacts of the pandemic.

4.4. Other related accounts

Accounts and statistics can be extended to cover other related areas. These include relationships of ocean/marine/BE/coastal topics to water – e.g. water use and return (wastewater, sludge) by fish canning industries etc., and tourism – contribution of tourism from accommodation/hotels, leisure, food/fish consumptions, etc. –from Tourism Satellite Accounts (TSA),and Energy Accounts for BE related activities, e.g. use of ocean renewable energy.

³² UNDP: <u>https://www.undp.org/blog/ocean-and-covid-19#:~:text=AND%20COVID-19-</u>, <u>The%20ocean%20and%20COVID-19,-POSTED%200N%20JUNE</u>

4.5. Example Accounts

Users and compilers of the accounts will have a choice from several of the formats and concepts to be provided in the regional framework and its accompanying manual from a few examples below.

3.2.1 Value Added

The Value Added for fisheries here includes the different types if fishing activities (grouped ISIC classes) as in Table 8. The concept is based on value added being the output net of intermediate consumption. In other words, VA = Output - IC as in common in national accounting.

	Output (1)	Interme	Gross value added			
		Water	Energy	Other	Total <mark>(2)</mark>	= (1) - (2)
Fisheries (Grouped ISIC classes)						
Fishing - marine	3032	538	269	985	1792	1240
Fishing - freshwater	12127	2105	1075	3942	7167	4960
Aquaculture - brackish*	7848	2087	696	1855	4638	3210
Aquaculture - marine	15	3	1	5	9	6
Aquaculture - freshwater	4050	1077	479	838	2394	1657
Total fisheries	27072	5855	2520	179	8553	11073
Ornamental fish						
Recreation/Leisure/Sport Fishing						

Table 8: Simplified Accounts for Value Added (Monetary)

4.5.2. Specific SUTs

More specific SUT can as well be compiled depending on availability of data. In the physical flow account³³ for fish and other aquatic products, the total supply and use of all fish and aquatic products, including production from capture fisheries and aquaculture, is recorded. Total **supply** consists of domestic production and imports; total **use** covers intermediate use of fish products, final consumption by households, changes in inventories and exports. The supply-and-use structure facilitates comparisons of data on the production, trade and consumption of fish products. It is divided into the **supply table** and the **use table**, with fish products grouped according to the categories as listed. For each product, **total supply must equal total use**. The following example shows one for the fish and aquatic products, which is a physical SUT (PSUT) with the **use table shown** (Table 9).

FAO and UN. 2020. System of Environmental-Economic Accounting for Agriculture, Forestry and Fisheries (SEEA AFF). Rome. https://doi.org/10.4060/ca7735en

A simple example of SUT can be derived from Table 6 by deleting the rows or columns to meeting the data availability challenges, as may be common in the EA-SA.IO region. For instance, if some of data on the fish types (e.g. pelagic) or other aquatic products such as molluscs are not available or difficult to estimate, then the corresponding rows can be eliminated and the SUT adjusted accordingly to obtain a simplified version. This would also be very useful for appropriate policy and decision making purposes.

		Output							
		Сар	oture fisher	ies	A	quacultu	Other catch (including household production)	Total output	
		Gross catch	Discarded catch	Nominal catch	Harvest	Harvest loss	Nominal harvest		
Fish and othe products	er aquatic								
Fish	Freshwater fish	3 062	43	3019	4036	57	3979		6998
	Demersal fish	1152	16	1135	71	1	70		1205
	Pelagic fish, including Tunas	1590	22	1568	9		9		1577
	Other pelagic fish	164	2	162					162
	Marine fish, other				599	8	591		591
Crustaceans		401		401	921	1	920		1321
Molluscs	Cephalopods	188		188					188
	Other molluscs								
Aquatic animals, other	Marine mammals								
	Other aquatic animals								
	Pearls, sponges and corals								
Aquatic plants, algae	Algae				10748	200	10548		10548
	Macro plants								

Table 9: Physical <u>use</u> table for fish and aquatic products (t)

4.5.3. Input-Output model

The input-output table, an example taken from FAO³⁴ (Table 10), includes six key industries on the fish value chain: (i) aquaculture; (ii) fishing; (iii) manufacture of aquafeed (aquafeed in short); (iv) building of fishing boats (fishing boat building or fishing boat in short); (v) fish processing; and (vi) fish marketing (transporters, storage services, wholesalers, retailers, etc.). Appropriate guidelines can be consulted for estimation techniques for missing data, as mentioned in section 13.2.2.

For simplicity, other industries in the economy, including some important ones on the fish value chain such as the restaurant and food catering industry, for example, are aggregated into the "rest of the economy" (ROE), i.e. the ROE sector.

In order to facilitate the estimation of aquaculture and/or fisheries' contribution to GDP³⁵, the input-output table in Table 7 have ntermediate inputs and final uses of domestic products.

The cells and the totals are based on the facts that GVA = GO-IC and Final Use = GO + IC. Thus, the intermediate inputs and final uses are small, and the value of imported products is consolidated in the import sector. For example, the total value of imported intermediate inputs used directly by aquaculture is in row 8, column 1; and the total value of imported products for final use in row 8, column 9.

Correspondingly, a column is added (column 8) to represent the import sector in order to facilitate input-output modelling. The import sector purchases no intermediate inputs. Hence, its "GVA" is equal to the total import of the entire economy (row 8, column 10). Unlike the GVA of other industries, which represents the value of primary inputs, the GVA of the import sector is essentially value added by foreign enterprises to the domestic economy through import.

The intermediate input matrix (rows 1–7 and columns 1–7) represents the domestic content (i.e. excluding imported intermediate inputs); the final use matrix (rows 1–7 and column 9) represents the domestic content of the total final use matrix (rows 1–7 and column 12).

Bottom up approaches can be used as a starting point. It refers to compiling new estimates by building them up from source data components to estimate the variable or account in question³⁶.

³⁴ Cai, J.N., Huang, H. & Leung, P.S. 2019. Understanding and measuring the contribution of aquaculture and fisheries to gross domestic product (GDP). FAO Fisheries and Aquaculture Technical Paper No. 606. Rome, FAO. 80 pp. Licence: CC BY-NC-SA 3.0 IGO.

³⁵ FAO 2019: Understanding and measuring the contribution of aquaculture and fisheries to gross domestic product (GDP)

³⁶ UN (2018) <u>Handbook on Backcasting</u>, draft.

Row no.	Column no.	1	2	3	4	5	6	7	8	9	10
		Aquaculture	Fishing	Manufacture of aqua feed	Manufacture of fishing	Fish processing	Fish marketing	Rest of the economy	Import	Final Use	Total output (Sum of rows 1 to 9)
1	Aquaculture		2								
2	Fishing	5	6	24	0	161	0	16	0	188	400
3	Manufacture of aqua feed		0								
4	Manufacture of fishing boats		0								
5	Fish processing		0								
6	Fish marketing		2								
7	Rest of the economy (ROE)		79								
8	Import		11								
9	Gross value added		300								
10	Total input (Sum of rows 1 to 9)		400								

Table 10: A condensed input-output table for the economy (million LCU or USD)

Operationality outcome for informed policy making must be the driving force.

4.5.4. The SAM model

The SAM (Table 11) would show the income and expenditures in the economy (production units/sectors, households, government, and the rest of the world. The SAM is a two-entry square table, which presents a series of double-entry accounts whose receipts, and outlays are recorded in rows and columns respectively³⁷.

³⁷ FAO 2012, Social Accounting Matrix (<u>SAM</u>) for analysing agricultural and rural development policies, Conceptual aspects and examples

	Expenditure						
		Agriculture	Of which Fisheries	Industry	Households	Government	Total
	Agriculture	50	10	20	25	15	110
Income	Of which Fisheries	15	5	5	15	10	50
	Industry	30	20	30	15	5	80
	Households	20	10	10	0	15	45
	Government	10	5	20	5	2	37
	Total	110	50	80	45	37	272

Table 11: Example of simplified SAM

In this matrix, the fisheries sector must pay 10 monetary unit (mu) to the agricultural sector (of which 5 to the fisheries sector) and 30 mu to the industrial sector for intermediate consumption. It must also pay 20 mu in salaries to households and 10 mu in taxes to the government. Other columns similarly shows the transactions for other segments of the economy. SAMs that are more complex can also be developed.

4.5.5. The VCA model

The VCA can be undertaken by grouping the different activities. The VCA goes beyond fishing and the backward and forward linkages include sectors that contribute to add value to the fisheries sector. For instance the fishing boats and equipment form part of pre-harvest activities, while the fish processing and retail form part of the post-harvest which occurs after the harvest.

The ISIC need to be identified and tabulated as appropriate to construct the different segments of the value chain (See example from Portugal³⁸).

4.5.6. ASSET Accounts

The Asset Accounts presented here is based on the FAO SEEA AFF. A **physical asset account** for fish and other aquatic resources shows the **total biomass** of all species subject to harvesting or cultivation activity within a national boundary. The scope of harvesting includes **commercial sea and freshwater operations and aquaculture, and subsistence and recreational harvesting** of aquatic resources. It would be desirable to have an inventory for this purpose at the local/sub-national level, including registration and licensing of fishers and fisheries products.

³⁸ Statistics Portugal: Satellite Account for the Sea – 2010-2013, Methodological Report

Asset accounts for fish and other aquatic resources can be compiled in **physical** or **monetary terms**. A full discussion on the accounting entries and associated measurement options is presented in the SEEA Central Framework, section 5.9. From the perspective of the SNA, fish and other aquatic resources comprise both cultivated and non-cultivated biological resources.

A basic physical asset account for fish and other aquatic resources is presented below, which shows the **opening and closing stock of aquatic resources**, and **additions and reductions in stock** resulting from natural growth, catches and other factors. The asset accounts would help to evaluate the impacts of fishing, in particular in fishing zones, where the catch or potential catch could be suitable indicators, e.g. to monitor climate change impacts.

- 1. **Opening stock =** *a*
- 2. Additions to stock
 - o Natural Growth
 - o Other Additions
- = Total Additions
 - 3. Reductions in stock
 - (Gross catch/harvest)
 - Natural losses
 - (Catastrophic Losses)
 - Other Reductions
 - = Total Reductions
 - 4. Net changes in stock
 - 5. Closing Stock = Opening + additions reductions = b

5. CASE STUDIES

Three countries have been used as pilots with simple case studies based on available data. These countries include Mauritius, Seychelles and Kenya. The case studies are presented below. It is to be noted that no elaborated accounts are compiled in these and many other countries. Therefore, little usage of the standards/guidelines have been made, such as the SEEA or FDES, etc.

Distinct cases for Ocean Accounts (OA) and BEFSA are presented with a view to highlighting good practices that can be linked to and developed into, OA or BEFSA. The cases more related OA are for Mauritius and Kenya; while the case for Seychelles is for BEFSA.

Case Study 1: Mauritius National Accounts

Fishing sector

The Ministry of Ocean Economy, Marine Resources, Fisheries, Shipping and Outer Island provide data on the quantity of fish caught. Separate figures are obtained for lagoon and bank fishing. The former is mostly artisanal or small-scale fishing (SSF) and the latter are mostly commercial. These are then valued at market prices available from the Prices unit which collects prices at different selling outlets across the country. The transport and retail margins are estimated and deducted from the market price value to give gross output at basic prices. Intermediate inputs for lagoon fishing is very low as the fishermen who are engaged in fishing in coastal waters, use artisanal methods and the catch is usually sold fresh. Bank fishing involves higher costs as the fish are caught in high seas in larger vessels. Also, these fish are sold frozen.

Ocean Accounts for the Economy

- 1. Activities that are linked to the Ocean include:
- a) those who use the Ocean (fishing, farming, desalination, marine transportation etc.)
- b) those who exist because of the ocean (ship building, ports and harbour, coastal activities-hotels, restaurants, sporting, public administration bodies and NGOs such Ministries of Fishing/environment, Coast Guards, research centres etc.)

These are according to the ISIC classes below:

Activity	ISIC (NSIC)
Salt production	08930
Seafood fishing and processing	
Fishing	Division 03
Fish processing	Group 102
Ship building and maintenance	30110
(Chantier Naval & Taylor Smith)	
Storage	
Bulk terminal	52109
Other storage	52101, 52102
Sea transport	Group 501
Services allied to transport	
Covers port services (MPA & CHC), clearing and forwarding agents	52220, 52240, 52291, 52299
Travel and tour operators	79110, 79120
Accomodation and food service activities	
Accomodation	
Leisure boat activities	93119, 93210, 93291

Case Study 1: OA related - Mauritius National Accounts -CONTINUED

Value added and contribution to GDP for activities identified as ocean economy, 2006-2019							
	Value Adde I	ed (Rs Million – _CU)	Contribut (tion to GDP %)			
	2006	2019	2006	2019			
GDP at basic prices (All industry Groups) (Rs Million)	98,551	437,528					
Activities/organisation							
Salt Production	16	2	0.01	0.00			
Seafood fishing and processing	2,342	4,169	1.18	0.95			
of which:							
Aquaculture	16	115	0.01	0.03			
Fishing other than aquaculture	401	1,586	0.20	0.36			
Fish processing	1,925	2467.5	0.97	0.56			
Ship building and maintenance	37	800	0.02	0.18			
Storage	500	1610.5	0.25	0.37			
Sea transport	116	179.1	0.06	0.04			
Services allied to transport	3,578	8698.1	1.80	1.99			
Hotels and restaurants	11,958	22971	6.02	5.25			
Leisure boat activities	644	3825.5	0.32	0.87			
Ship store and bunkering	380	2246	0.19	0.51			
Freeport activities	1,927	2685	0.97	0.61			
Mauritius Maritime Training Academy (excl. sea training school)	3	Not available. Merged with Shipping division	0.00	-			
Shipping Division (of Ministry of Land transport and Shipping)	9.1	19.1	0.00	0.00			
Mauritius Oceanography Institute	7.3	32.5	0.00	0.01			
External Communications Division	4.5	11.5	0.00	0.00			
Ministry of Fisheries	89.7	171.8	0.05	0.04			
Tourism Authority	8.4	56	0.00	0.01			
Beach Authority	5.8	32	0.00	0.01			
Fisherman Welfare Fund	0.9	3.4	0.00	0.00			
National Coast Guard	149.9	688.6	0.08	0.16			
Total	21,776	48,201	11.0	11.1			

Ocean Accounts for the Economy

CAVEAT

It is to be noted that Mauritius did not elaborate on the extended list of ISICs as proposed in this framework. Moreover, the SUT in accordance with the SEEA and related guidelines are yet to be developed.

Extending the coverage of sectors and including the socio-economic and environmental interactions in the SUT and IOT/SAM can improve and enhance he accounts. With extended coverage of sectors, it is likely that the contribution to the GDP may increase further up to 15% or maybe more.-

Case study 2 : OA related - Kenya

Kenya is part of the UNECA's project on the BEVTK toolkit for measuring the Blue Economy, as is Seychelles and several other countries. The toolkit generated some information on the economy, including employment, some social data mainly on HDI and poverty, and the environment comprising mainly the ecosystem services. The chart below provides a snapshot/dashboard from the BEVTK.

	GVA by sector	as a % of Total
Economic Activity by ISIC Section	generated by	GVA generated
	BE, USD	by BE
I - Accommodation and food service activities	181,818,899	37.34%
H - Transportation and storage	123,737,133	25.41%
C - Manufacturing	51,213,732	10.52%
N - Administrative and support service activities	33,266,305	6.83%
K - Financial and insurance activities	30,213,753	6.21%
O - Public administration and defence; compulsory social security	25,495,669	5.24%
A - Agriculture, forestry and fishing	11,071,217	2.27%
G - Wholesale and retail trade; repair of motor vehicles and motorcycles	10,487,172	2.15%
F - Construction	9,520,692	1.96%
M - Professional, scientific and technical activities	5,564,014	1.14%
E - Water supply; sewerage, waste management and remediation activities	1,691,859	0.35%
P - Education	1,532,858	0.31%
R - Arts, entertainment and recreation	1,270,627	0.26%
Grand Total	486,883,931	100.00%





Case Study 3: BEFSA related - Seychelles

In 2010, the National Bureau of Statistics (NBS) made an initial attempt to estimate an overall contribution of fisheries and fishery-related activities to national economy, by allocating a factor indicating an extent of contribution/ linkage with fisheries and fishery-related activities to each economic industrial category (SIC), based on expert judgment and stakeholders consultation. Even though the compilation exercise was in fact a quick accumulation of existing data, it still succeeded to reveal a relative importance of fishery in the national economy. Fishery Satellite Account is not only effective to make economic linkages among various industries visible, but also would be a powerful tool in analyzing and forecasting potential impacts of policy decisions.

	Economic Activities	Value Added(current price,S million)		
SIC		2015 SNA	2018 revised estimates	
A01	Agriculture	223	22	
A03	Fishing	152	2,26	
	Artisanal		19	
	Semi-industrial longline			
	Industrial purse seine		1,14	
	Industrial longline		90	
C10	Manufacture of food (IOT)	329	1,49	
	Manufacture of food (others)	30	3	
C11-12	Manufacture of beverages and tobacco	398	39	
C23	Manufacture of concrete, rock products, glass etc	102	10	
C13- 22,	Manufacturing, other	239	23	
24-33				
D	Electricity, gas, steam and air conditioning supply	420	42	
E	Water supply, sewerage, waste management and remediation activities	75	7	
F	Construction	575	57	
	Wholesale and retail trade; repair of motor	1,268	1,26	
G	vehicles and motorcycles			
	Fuel domestic	247	24	
	Fuel re-export	264	26	
	Others	757	75	
Н	Transportation and storage	2,057	2,05	
	Tankers, air transportation	808	80	
	Port authority	100	10	
	Water transportation	505	50	
	Others	605	60	
I	Hotels, Restaurants & Beverage serving activities, Other food service activities	2,085	2,08	
J	Information and communication	911	91	
ĸ	Financial and insurance activities	797	70	
L	Real estate activities, Residential rentals, Owner Occupied dwellings	2,511	2,51	
М	Professional scientific and technical activities	480	48	
N	Car hire, Other Tourism related, Administrative and other support service activities - Other	497	49	
0	Public administration and defence, compulsory social security	1,234	1,23	
Р	Education	392	39	
Q	Human health and social work activities	310	31	
R	Arts, entertainment and recreation	95	ç	
S	Other service activities	95	ç	
т	Activities of households as employers and undifferentiated producers			
	Gross Value Added for all industries	15 200	18 47	

6. **OPERATIONALISATION**

The main purpose of the operationalising of the Ocean Accounts and BEFSA is to develop a BE statistical system and an interdisciplinary dashboard for tracking and anticipating the trends of sustainable development of the sub-sector in the context of the Blue Economy. The process will need the collaboration with multilateral agencies and programmes in the region to establish this strategic tool.

The operationalisation includes an intra and inter agency cross-sectoral collaborations and a regional capacity development strategy and action plan.

6.1 Governing the framework

The national arrangements will be crucial for the sustained development of accounts and regular publication of the same. As outlined in Fig. 8, the key players will be from national institutions and external support may be required to make the process take off at the initial stages. The mapping of stakeholders is important at this stage. International and regional organisations like the COMESA, IOC or IGAD can provide technical assistance and to keep **a pool of experts** for that purpose is recommendable.



Figure 8: Institutional set up

6.1.1. Multi-disciplinary approach - Profile of Experts

Given the multi-disciplinary nature of the process for setting up the Ocean Accounting and BEFSA, there is need for several players to get involved. Since the ocean accounts cover a variety of topics, the stakeholders to be involved should be from a variety of disciplines. These include **Statisticians/National Accountants, Economists/Social Scientists, Fisheries Experts, Marine Scientists, Environmental Officers, and Researchers,** among others. The data structure should therefore be based on the three components in Figure 9 below, namely

economy, social, and environmental. Regarding the **Governance** part, it is to be noted that it can cut across all the other sectors or be a standalone component. They include qualitative as well as quantitative data.

In many countries, there are currently a few policies and strategies regarding Blue Economy sectors, such as fisheries, transportation, energy, mining, and tourism. However, they are developed with limited consideration of the inherent interconnections across sectors that share a common space. For example, in the case of energy development, opportunities emanating from ocean and sea energy are largely not considered, planned for, or reflected in current policies related to sectors such as tourism and transport. The great potential from the oceans and seas are largely not examined or considered in planning. A multisector and land-sea holistic approach would help enable the realization of a myriad of opportunities.



Figure 9: Data structure for ocean accounting

6.2 Data management and information products

Since the data involved will necessitate different sources, such as from national accounts, fisheries, social statistics, and environment, a centralized database is recommendable. The data can be simple numbers or complex formats such as *shapefiles* or remote sensing digital data. Therefore, most of the data could be in simple spreadsheet formats, while others will need special handling.

The best practices such as use of archives, storage media or servers and data hubs can be used. Some advanced data sharing mechanism can be through online platforms. The dissemination will require scheduled publications, as done by many statistical offices or line ministries.

6.2.1. Information exchange protocol

For **information exchange protocol**, relevant stakeholders that could be involved including the line ministries and related departments of fisheries, environment, energy, tourism, transport and others. One of the leading role of the National Statistical Offices (NSOs) will be instrumental in the process. The focal institution

should coordinate the whole process and secure the resources. This would enable the **right treatment of confidential and commercially sensitive information sharing**. The **National Statistical System (NSS) and the National Statistics Development Strategy (NSDS)** can help in this regards.

6.3. The Manual

The manual can assist the compilers to set up a **national system** that could be part of the **National Statistical System (NSS)** and to **engage relevant stakeholders** who can participate and provide data and thematic inputs in the accounts development process. Moreover, the manual provides **steps**, **methods**, **examples and other materials** that can facilitate **new as well as experienced experts** to develop the accounting and statistical system.

There are other materials developed during the Ecofish and other programmes that can be consulted to have more guidance. One of them is the report "Elaborating a Sustainable Development Reference System (SDRS) for the Marine Fisheries of the EA-SA-IO Region". It is based on formulation and implementation of a Sustainable Development Reference System (SDRS) for the marine fisheries sub-sector as a bedrock for assessing and monitoring the economic, social, environmental, and governance/institutional dimensions of sustainability for informed policymaking and management decision at various geographical scales.

For any account compiler, it is important to note that some knowledge of national accounts is needed. This manual will therefore not elaborate on the detailed technical concepts, definitions and scope, etc. of economic variables used in official statistics. New compilers should seek the advice of experienced experts and refer to the appropriate guidance documents such as the System of National Accounts (SNA) and the SEEA.

6.4. Policy, Governance and Potential Use of BEFSA

The collaborative process is meant to generate good governance for the accounting process whereby the stakeholders will be apprised and the important decision making tools shared. The stakeholders and beneficiaries will therefore include the stakeholders and particularly the line ministries, e.g. Fisheries or BE related agencies.

The NSOs and the line Ministry can own the whole process, but the stakeholders will as well benefit from the products and outcomes of the BEFSA development. The other users will be NGOS, Private sector and the public at large.

6.5. Regional Capacity Development Strategy, Action Plan and Road Map

Based on the technical parts of this regional framework and its accompanying manual, and the groundwork on the activities to be undertaken, measures are to be

adopted to meet the intended objectives. At national level, and even at the regional level, the process to follow can be figured out briefly as in the diagram in Fig. 10.



Figure 10: The process for implementing the ocean accounts and BEFSA

The principles to be adopted for capacity development:

- Make capacity building a core responsibility of the organisations
- Integrate capacity building with human resource development
- Create a culture of continuous capacity building
- Provide appropriate capacity building options to all levels of governance
- Manage capacity building effectively
- Support application of built skills in the work environment
- Evaluate and monitor capacity development

Key strategies and action plans (details in the timeframe that follows further below):

- Support mainstreaming of BE accounting among relevant stakeholders
- Encourage, strengthen and continue support
- Strengthen existing and help establish new and emerging collaborations
- Explore the potential of addressing institutional capacity needs through national strategy/policy on skills development, training and capacity building
- Review and analyse existing policies and legal frameworks for gaps, conflicts, and contradictions and opportunities for improved frameworks
- Address capacity building needs for special themes such as coastal protection, economic valuation of natural resources, and land use planning, etc. with a view to generate adequate information base.

Some of the processes are described in the following sections.

6.7. Capacity building and Back-stopping support

The BEFSA development will necessitate a participatory approach whereby **pilot countries**, and if possible, others, have to be brought on board. The capacity building and backstopping will be provided when the countries start to identify and

collect existing and available data related to the BEFSA. Tools and means used can comprise **regional workshops**, **e-leaning and modular trainings**.

Towards the end of the project, and even afterwards, the pilot and if possible, other member countries, will be provided with any requested technical support for the publication of improved fisheries economic indicators and periodic Satellite Accounts.

Therefore, the process above develops a **Regional Capacity Development Strategy and Action Plan** with emphasis on the principles of subsidiarity, complementary and South-South Cooperation to ensure the long-term sustainability of the project.

6.8. Thematic Technical Working Group

The Thematic Technical Working Group (TTWG) will need be to set up with strong footholds. This will enhance **inter-agency and cross-sector collaboration**, while engaging stakeholders from Fisheries, Environment, Industries, Marine Security, National Statistics Office, research organisations, NGOs and others, for improving the fisheries economic indicators. This enhanced Inter-agency and Cross-sector collaboration will foster regular **exchange of lessons learned** and enable **sharing of best practices**.

6.9. Policy Brief and advocacy

The policy brief can be developed to highlight improvement of fisheries and BE data use and the significance of the BEFSA for evidence-based policymaking, analysis and monitoring. It will highlight the purpose of the BEFSA, key messages, the importance of sustainable fisheries and BE, key challenges, policy actions based on BEFSA, with case studies, actual and forecasted demands and supply gaps, and the benefits to people, the economy and the environment.

6.10. Communication and visibility materials

Throughout the process of developing the BEFSA, Communications and Policy dialogues will enhance participation from different stakeholders. Therefore, Communication and visibility materials can be developed through the programme. This may include newsletters, and the use of infographics and other means of attractive information dissemination techniques.

7. Recommendation, Way Forward and Conclusion

7.1. Logical framework

This is an opportunity to initiate the concept of Ocean Accounting and BEFSA with natural capital in the marine fisheries economy and to pave the way for an integrative or cross-sector approach in the regional Blue Economy. The intervention is conceived as a Cross-Regional Initiative to entrench the value added of regional cooperation in the EA-SA-IO marine fisheries. The Logical Framework (Log frame) should depict the following proposed processes, that can be tailored/altered depending on the country situation.

- 1. Setting the objectives: This step may include:
 - Improve macroeconomic indicators of the marine fisheries sub-sector;
 - Complement national accounts with a OA and BEFSA concept;
 - Make use of the Regional Framework/Manual for the consolidation of economic measures of the marine fisheries sub-sector for the EA-SA-IO region;
 - Seek Capacity Development with an appropriate Strategy and Action Plan;
 - Enhance Inter-agency and Cross-sector collaboration and regular exchange of lessons learned and best practices;
 - Create awareness and advocacy for Evidence-based policymaking and monitoring;
 - A regular publication programme.
- 2. Expected outcomes
 - An assessment of the gap between the actual and minimum/benchmark datasets in economic, social and environmental areas of marine fisheries sub-sector in the national accounts;
 - Based on the regional methodological framework, include harmonised concept and definitions of a set of measures for the marine fisheries sub-sector in the National Accounts and the publication of a periodic Blue Economy Fisheries Satellite Account;
 - Adequate human and technical capacities developed at the national level;
 - Any issue regarding sharing of sensitive data between partners resolved through a protocol or memorandum of understanding;
 - Enhanced inter-agency and cross-sector collaboration (Fisheries, Environment, Industries, Marine Security, National Statistics Office ...) for improving the fisheries economic indicators;
 - Publication of improved fisheries economic indicators and periodic Satellite Account;

- Communications and Policy dialogues.
- 3. Planned Activities
 - Conduct an inventory of the existing institutional frameworks, key stakeholders, datasets and economic indicators of the various branches of the marine fisheries
 - Organize a high-level technical Consultative and Validation Workshop
 - Seek back-stopping support
- 4. Technical Scope and orientations
 - Toward a full coverage of the fisheries sector
 - Meaningful segmentation of economic activities
 - Responsive to the current needs of the country
 - Foundation for a comprehensive BE Statistical System
 - Build on current achievements and work-in-progress
- **5.** Define the Profile of Team and any external expert/consultant
- 6. Assumptions
 - The intervention is conducted on the existing fisheries economic, social and environmental micro-data in the country. The unavailability of adequate and reliable disaggregated data could be a major challenge for achieving the set objectives.
 - The issues related to point (i) will be mitigated by several regional concurrent interventions, namely Fisheries Management Information System, and a Regional Observatory for assessing and monitoring of impacts of climate change and biodiversity in coastal fisheries ecosystems.
 - The engagement and effective collaboration of the key stakeholders at the national and regional levels is critical for the success of the project.
 - Exchange of information between the partners in the country and Regional Economic Community (DMRO) would benefit from existing **Data Sharing and Confidentiality Protocols.**
 - It is assumed that the current policy failures in the marine fisheries results from information asymmetries and not from any vested interest or denial of scientific data.
- 7. Implementing partners
 - National Focal Instructions
 - Regional support: e.g. COMESA-EAC-SADC Tripartite Agreement 2015.
- 8. Financing
 - Seek financing as appropriate national budget and external support with technical assistance.

7.2. Time frame

The chart in Table 12 provides the stepwise implementation process until at the national and eventually the regional level; the products and data are made available on a regular basis.

Steps	Task/Event	Yea	ar 1		Yea	ar 2	
Step 1	Designate national focal institution						
	Designate desk officers/core team						
	Identify stakeholders and make institutional arrangements/setups						
	Create a Technical Working Group (TWG)						
	Designate National Thematic experts						
	ToRs						
	Hire consultants (optional)						
Step 2	Initiate request for technical support (optional)						
	Improve IT backbone and all resources						
	National inception meeting/workshop						
	National self- assessment						
	Data collection/database building						
	Compilation of statistics and accounts						
Step 3	Preparation of data analysis						
	Report						
	Validation workshop/TWG and stakeholders						
Step 4	Future improvements						
	Exit strategy / creating a working group at the regional level						
	Continued cycle						

Table 12: Proposed Work Programme

7.3. Conclusion

The BEFSA will develop symbiotic links between existing datasets of the National Statistical Systems and other relevant sources to provide more comprehensive and realistic estimates of the aggregated fisheries wealth at the national and regional level following the blue economy (BE) paradigm. Taking all the above conceptual descriptions, which are in fact in line with those of the **BEFSA concept note, and the Ecofish technical handbook**, the development of BEFSA will attempt to achieve the expected results to bring the BE as a sound engine for development.

The BEFSA is one of a set of strategic tools that will be developed by the E€OFISH Marine Fisheries Work Plan to empower regional organisations and partner countries to pursue sustainable and inclusive fisheries as a growth sector. This initiative is also embedded in the various Work Plans and follows the normal course of project-cycle management as a semi-autonomous project.

The decentralised approach is thought necessary to ensure engagement/ownership on the part of the key stakeholders and beneficiaries right from the start. The Lead DMRO (COMESA & IGAD) can designate a Thematic Coordinator who will be responsible for the implementation and coordination of the project activities across the partner countries of their respective constituency. They can assure a seamless collaboration with the implementing partners regarding the procurement of experts, organisation of technical meetings and workshops as well as monitoring of the project performance.

7.4. Further Reading

The international standards and best practices for developing the ocean accounts will be based on the key elements of the System of National Accounts (SNA) 2008, the System of Environmental-Economic Accounting (SEEA) the Framework for the Development of Environment Statistics (FDES) 2013), the SDG indicators, and a few other guidance documents, including:

- Ecofish Technical Handbook
- System of Environmental-Economic Accounting for Agriculture, Forestry and Fisheries (SEEA AFF)³⁹;
- Africa's Blue Economy: A policy handbook
- Measuring the Blue Economy: The System of National Accounts & Use of Blue Economy Satellite Accounts⁴⁰
- Understanding and measuring the contribution of aquaculture and fisheries to gross domestic product (GDP), FAO 2019⁴¹

³⁹ FAO and UN. 2020. System of Environmental-Economic Accounting for Agriculture, Forestry and Fisheries (SEEA AFF). Rome. <u>https://doi.org/10.4060/ca7735en</u>

⁴⁰ CDB Working Paper <u>No. 2019/02</u>

⁴¹ FAO 2019: Cai, J.N., Huang, H. & Leung, P.S. 2019. Understanding and measuring the contribution of aquaculture and fisheries to gross domestic product (GDP). FAO Fisheries and Aquaculture, Technical Paper No. 606. Rome, FAO. 80 pp. Licence: CC BY-NC-SA 3.0 IGO.

- Global Ocean Accounts Partnership: <u>Technical Guidance on Ocean Accounting</u>
- Ecosystem Natural Capital Accounts: A Quick-Start Package⁴²
- Framework for the development of Environment Statistics (FDES 2013)⁴³
- UNECA BEVLK

The framework and this manual aim to develop a simple and cost-effective ocean accounting principles for compiling, evaluating, and reporting indicators on sustainable ocean activities in the EA-SA-IO region. It is an interdisciplinary and multidimensional framework.

Example country publications

India: HANDBOOK ON FISHERIES STATISTICS 2020

Portugal: Satellite Account for the Sea - 2010-2013

Samoa: <u>Samoa Ocean Accounts Pilot</u> - Tourism Satellite Account Linkages to GDP and SEEA

 ⁴² Jean-Louis Weber (2014). Ecosystem Natural Capital Accounts: A Quick Start Package, Montreal, Technical Series No. 77, Secretariat of the Convention on Biological Diversity
 ⁴³ Framework for the Development of Framework (EDES 2013)

⁴³ Framework for the Development of Environment Statistics (FDES 2013) <u>https://unstats.un.org/unsd/envstats/fdes.cshtml</u>

ANNEXE

Annex I: Some suggested indicators based on the FDES⁴⁴

Table A1:	Suggested Statistics and Indicators related to Marine thematic areas
	from the FDES

Environmental component	Statistics and indicators
 Environmental Conditions and Quality IIcludes statistics about the physical, biological and chemical characteristics of the environment and their changes over time. 	 Exclusive Economic Zone (EEZ), Area Sea level, Depth Known flora and fauna species, Number 2. Endemic flora and fauna species, Number 3. Invasive alien flora and fauna species, Number 4. Species population, Number 5. Habitat fragmentation, Area, Description, Location, Number Protected areas and species Marine water quality
2. Environmental Resources and their Use Includes naturally occurring living and non-living components of the earth, together constituting the biophysical environment, which may provide benefits to humanity. Environmental resources include natural resources, such as subsoil resources (mineral and energy), soil resources, biological resources and water resources, and land. They may be naturally renewable (e.g., fish, timber or water) or non-renewable (e.g., minerals.	 Production and trade of minerals Production, trade and consumption of energy Fish capture production, Mass Aquaculture production, Mass Imports of fish and fishery products, Currency, Mass, Volume Exports of fish and fishery products, Currency, Mass, Volume Stocks of aquatic resources, Mass Additions to aquatic resources, Mass Reductions in aquatic resources, Mass Total water abstraction, Volume Desalinated water, Volume

⁴⁴ UN (2017) Framework for the Development of Environment Statistics (FDES 2013)

Environmental component	Statistics and indicators
3. Emissions, Residuals and Waste Ocean related contains statistics on the amount and characteristics of residuals generated by human production and consumption processes, their management, and their final release to the environment. Residuals are flows of solid, liquid and gaseous materials, and energy, that are discarded, discharged or emitted by establishments and households through processes of production, consumption or accumulation. Residuals may be discarded, discharged or emitted directly to the environment or be captured, collected, treated, recycled or reused	 Emissions of greenhouse gases Total emissions of direct greenhouse gases (GHGs), by gas Volume of wastewater generated, Volume By ISIC economic activity By tourists National Discharge of wastewater to the environment Total volume of wastewater discharged to the environment after treatment, Volume Total volume of wastewater discharged to the environment without treatment, Volume Total volume of wastewater discharged to the environment without treatment, Volume
4. Disasters and Extreme Events ocean and costal related Includes Natural Extreme Events and Disasters; and Technological Disasters, e.g. oil spills Natural extreme events and disasters impact human lives, habitats and ecosystems in ways depending on their intensity, the extent to which the human habitat is prepared and the environmental conditions prevailing in the territories, particularly those where humans live.	 Occurrence of natural extreme events and disasters and their impacts Number of people killed Number of people injured Number of people homeless Number of people affected Economic losses (e.g., damage to buildings, transportation networks, loss of revenue for businesses, utility disruption, etc.) Physical losses/damages (e.g., area and amount of crops, livestock, aquaculture, biomass etc.) Occurrence and impacts of technological disasters Number of people killed, Number Number of people homeless, Number Number of people affected, Number Economic losses due to technological disasters (e.g., damage to buildings, transportation networks, loss of revenue for businesses, utility disruption, etc.), Currency

Environmental component	Statistics and indicators
	 Physical losses/damages due to technological disasters (e.g., area and amount of crops, livestock, aquaculture, biomass etc.), Area, Description, Number Effects of technological disasters on integrity of ecosystems Area affected by technological disasters, Area
5. Human Settlements and Environmental Health Contains statistics on the environment in which humans live and work, particularly with regard to living conditions and environmental health	 Urban and rural population Population living in coastal areas, Number
 6. Environment Protection, Management and Engagement A country's engagement in the protection and management of the environment and, therefore, the resources it dedicates to that task, is related to information, awareness and social demand. It is also related to the country's ability to finance environmental protection activities and participate in international efforts directed at these activities. International stewardship, national political engagement, civil society participation, and effective policies and programmes have a role to play in mutually reinforcing each other. 	 Includes: Finance, policies, risk reductions, climate change adaptation, sensitizations, Preparedness for natural extreme events and disasters National natural extreme event and disaster preparedness and management systems

Annex II: National BE Strategic Frameworks

Table A1: Blue-Economy Strategic Frameworks in Comoros, Madagascar, Mauritius, Mozambique, and Seychelles

Country	Strategic Framework	Pillars or objectives
	Strategic Framework for a Blue Economy National	1.Strengthening of national safety and security
	Policy.	2. Enhancement of key sectors of BE with training and job creation for the young
Comoros		3. Protection of coastal, aquatic, and marine ecosystems with waste management.
		4.Adaptation of institutional framework
		5. Reorient pillars of the regional integration framework
Madagascar	A National Blue Economy strategy is in process of preparation.	The Madagascar National Development Plan 2015-2019 does not refer to Blue Economy.
Mauritius	The Mauritius 3-Year Strategic Plan 2017/18 – 2019/20 lists the Ocean- based activities as having the potential to boost growth and create wealth. The Ministry of Blue Economy, Marine Resources, Fisheries and Shipping has a Five-year Fishery Development Plan and a National Action Plan to prevent, deter and eliminate illegal, unreported and un-	Various sectors have been earmarked by the Government for development as described on the website of the Economic Development Board (EDB). These are: fishing, seafood and aquaculture; Seaport related activities, including: investment opportunities in regional trans- shipment base, bunkering, petroleum storage for re-export, shipbuilding, repairs and allied services, ship chandling, ballast water treatment, ship waste treatment, homeporting for cruise

Country	Strategic Framework	Pillars or objectives
	regulated fishing and an aquaculture masterplan.	lines and ancillary services to vessels and the cruise industry); marine services including marine ICT, marine finance and marine biotech; deep sea-water applications*; game-changer industries and oil and gas support sector). In the budget 2018-2019, it was announced that an Ocean Economy Unit will be set up with the responsibility of preparing a National Ocean Policy Paper.
Mozambique	The Mozambique Policy and Strategy of the Sea (POLMAR) was developed in2017 to serve several objectives including the development of a blue economy.	POLMAR is built around 7 pillars which are: (i) Governance and legal framework (ii) Inter-institutional coordination (iii) Marine and coastal environment (iv) Economic development (v) Territorial development (vi) Human capital development and (vii) International cooperation. The document indicates that the Government will establish policy directions in the following areas: (i) ports and infrastructure (ii) maritime transport and shipping industry (iii) fisheries and aquaculture (iv) culture, tourism and sports (v) minerals and
Seychelles	The Seychelles Blue Economy Strategic Policy Framework and	The Framework is built around 4 key strategic priorities for action and investment that are:

Country	Strategic Framework	Pillars or objectives
	Roadmap: Charting th Future (2018-2030).	e 1. Creating sustainable wealth based on the diversification of existing ocean-based sectors (fisheries, tourism, ports) focusing on value addition, value chains, quality not quantity; sustainability credentials and good practice and exploring new and emerging sectors (mariculture, renewable energy, biotechnology, digital connectivity, trade) focusing on establishing the policy setting, feasibility and pilot projects
		2. Sharing prosperity
		3. Securing healthy and productive oceans and
		4. Strengthening the enabling environment.
		Results sought (as stated in the framework) include:
		Increased investment in the diversification of existing ocean- based economic sectors (particularly fisheries, tourism and ports); Exploration and feasibility of new and emerging maritime sectors (for example marine- based aquaculture, renewable energy, offshore petroleum and marine biotechnology); New research, innovation and generation of knowledge about Seychelles' ocean space, resources and management needs; Improved prevention of ocean/blue economy risks including illegal, unreported and unrequilated (IUII) fishing marine

Country	Strategic Framework	Pillars or objectives
		pollution and climate change through integrated approaches to effective regional cooperation on maritime security.

Source: Adapted from Bolaki.B (2020), Bineswaree Bolaky, "Operationalising Blue Economy in Africa: The Case of South West Indian Ocean," ORF Issue Brief No. 398, September 2020, Observer Research Foundation.

Annex III ISIC Codes

Table A3: Structure of	f the BE	according to	the ISIC
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Code	Code Description	Remarks
value		
А	Agriculture, forestry and fishing	Can be disaggregated further to
A03	Fishing and aquaculture	include Marine fishing,
A031	Fishing	including traditional or small
A0311	Marine fishing	scale and Industrial which
A0312	Freshwater fishing	includes mainly the Offshore
A032	Aquaculture	fishing gears, on shore/offshore,
A0321	Marine aquaculture	artisanal/commercial, etc. Some
A0322	Freshwater aquaculture	data like catch, fisher
		population, boats and equipment
		can also be used in the social
		and environmental components
		optionally detailed by Gear Type
		(e.g. Trawl and Trap, Purse
		Seine, Long Line, etc) and
		species, (e.g. Pelagic - Tuna and
		Tuna like species and deep sea
		demersal fish).
		The important Small-
		scale/artisanal/Coastal can
		include benthic/ground fish
		species (mollusks, shrimp,
		lobster, squids), and demersal-
		sedentary and meso-pelagic fish
		-reef fishes. Moreover, this
		sector can also include the
		Recreational/sport fishing.
		A similar classification can be
		made for Inland/Freshwater
		fishing with Artisanal and Semi-
		industrial/Industrial fishing.
		Aquaculture is also part of the
		fisheries and can be divided into
		Marine aquaculture and
		Freshwater aquaculture.
В	Mining and quarrying	
B06	Extraction of crude petroleum and natural	Ocean based or in lakes or other
	gas	water bodies

Code Value	Code Description	Remarks
B061	Extraction of crude petroleum	Ocean related extraction and
B0610	Extraction of crude petroleum	mining include quarrying of
B062	Extraction of natural gas	stone, sand and clay, and
B0620	Extraction of natural gas	extraction of salt. Freshwater
B07	Mining of metal ores	related extraction and mining as
B08	Other mining and quarrying	well can be considered. Mining
B081	Quarrying of stone, sand and clay	support service activities can
B0810	Quarrying of stone, sand and clay	also contribute to the ocean and
B089	Mining and quarrying n.e.c.	other related activities
B0893	Extraction of salt	
B09	Mining support service activities	Dredging, constructions and
B091	Support activities for petroleum and natural	others
	gas extraction	
B0910	Support activities for petroleum and natural	
	gas extraction	
B099	Support activities for other mining and	
	quarrying	
B0990	Support activities for other mining and	
	quarrying	
С	Manufacturing ⁴⁵	
C102	Processing and preserving of fish,	e.g. canning
	crustaceans and molluscs	
C1020	Processing and preserving of fish,	
	crustaceans and molluscs	
C1080	Manufacture of prepared animal feeds	e.g. fish meals
C1511	Tanning and dressing of leather; dressing	e.g. from fish hide
	and dyeing of fur	
C1512	Manufacture of luggage, handbags and the	

⁴⁵ Includes importantly the processing and preserving of fish, crustaceans and molluscs. The activities include Freezing, Salting, Smoking, Drying, Fresh chilled, and Canning. Others include;

Manufacture of prepared animal feeds, e.g. Fish feeds/meals

Tanning and dressing of leather; dressing and dyeing of fur, including marine products

Manufacture of luggage, handbags and the like, saddlery and harness, including marine/aquatic products

Manufacture of pharmaceuticals, medicinal chemical and botanical products, from marine and aquatic products

Cutting, shaping and finishing of stone, e.g. corals, gems, etc

Manufacture of machinery for mining, quarrying and construction

Manufacture of machinery for food, beverage and tobacco processing, for marine and aquatic products

Manufacture of machinery for textile, apparel and leather production, for marine and aquatic products

Building of ships and floating structures

Building of pleasure and sporting boats Boats and ships, engines/motors

Repair of transport equipment, except motor vehicles, includes repair and maintenance of ships and pleasure boats

For Boats and ships, engines/motors

Code Value	Code Description	Remarks
	like, saddlery and harness	
C1520	Manufacture of footwear	
C2100	Manufacture of pharmaceuticals, medicinal	e.g. from fish oils, minerals,
	chemical and botanical products	algae
C2396	Cutting, shaping and finishing of stone,	e.g. corals, gems, etc.
	Manufacture of machinery for mining,	
C2824	quarrying and construction	
C2825	Manufacture of machinery for food,	
	beverage and tobacco processing, for	
	marine and aquatic products	
C2826	Manufacture of machinery for textile,	
	apparel and leather production, for marine	
	and aquatic products	
C2651	Manufacture of measuring, testing,	Devices used for navigation
	navigating and control equipment	
C301	Building of ships and boats	
C3011	Building of ships and floating structures	
C3012	Building of pleasure and sporting boats	
C3040	Manufacture of military fighting vehicles	Water born navigation
C3212	Manufacture of imitation jewelry and	From sea based minerals, etc.
	related articles	
D	Electricity, gas, steam and air conditioning	
	supply	
D35	Electricity, gas, steam and air conditioning	Ocean Renewable energy
	supply	Deep Ocean Water Application
D3510	Electric power generation, transmission and	(DOWA) for cooling, etc.
	distribution	
D3530	Steam and air conditioning supply	
E	Water supply; sewerage, waste	
	management and remediation activities	
E3600	Water collection, treatment and supply	Desalination of sea water
E3700	Sewerage	Wastes from the sea, including
E3811	Collection of non-hazardous waste	plastics, and their recycling, etc.
E3812	Collection of hazardous waste	Sewer sea or river outfall for
E382	Waste treatment and disposal	treated or non-treated
E3821	Treatment and disposal of non-hazardous	wastewater/effluents
	waste	
E3822	Treatment and disposal of hazardous waste	
F	Construction	

Code Value	Code Description	Remarks
F4100	Construction of buildings	Ocean/ beach, river or lakes
F4290	Construction of other civil engineering	banks structures, buildings,
	projects	hotels, jetties, marinas, ports,
F4312	Site preparation	etc.
F4322	Plumbing, heat and air-conditioning	
	installation	
F439	Other specialized construction activities	
G	Wholesale and retail trade; repair of motor	
	vehicles and motorcycles	
G4630	Wholesale of food, beverages and tobacco	Fish shops, cold storage, etc.
G472	Retail sale of food, beverages and tobacco	
	in specialized stores	
G4763	Retail sale of sporting equipment in	Fishing and diving equipment,
	specialized stores	etc.
G4772	Retail sale of pharmaceutical and medical	Ocean based medical products
	goods, cosmetic and toilet articles in	
	specialized stores	
G4781	Retail sale via stalls and markets of food,	Sales of fisheries and other
	beverages and tobacco products	aquatic products
G4782	Retail sale via stalls and markets of textiles,	
	clothing and footwear	
G4789	Retail sale via stalls and markets of other	
	goods	
Н	Transportation and storage	
H4930	Transport via pipeline	Transport of fuels, gas etc.
H501	Sea and coastal water transport	Passenger and freight
H5011	Sea and coastal passenger water transport	transport/cruise ships, yachting,
H5012	Sea and coastal freight water transport	etc.
H502	Inland water transport	
H5021	Inland passenger water transport	
H5022	Inland freight water transport	
H52	Warehousing and support activities for	Harbour, ports, marinas, and
	transportation	related services
H5222	Service activities incidental to water	
	transportation	
H5224	Cargo handling	
I	Accommodation and food service activities	
I5510	Short term accommodation activities	Hotels and tourism
15520	Camping grounds, recreational vehicle	
	parks and trailer parks	

Code Value	Code Description	Remarks
J	Information and communication	Marine cables, GPS devices,
J6190	Other telecommunications activities	navigation controls, etc.
К	Financial and insurance activities	
K651	Insurance	Maritime insurance, fisherman
K6512	Non-life insurance	welfare, etc.
K6520	Reinsurance	
K6621	Risk and damage evaluation	
K6622	Activities of insurance agents and brokers	
L	Real estate activities	
L6810	Real estate activities with own or leased	Villas, Guest houses, etc.
	property	
L6820	Real estate activities on a fee or contract	
	basis	
М	Professional, scientific and technical	
	activities	
M7110	Architectural and engineering activities and	Design of coastal/marine and
	related technical consultancy	water related structures
M7210	Research and experimental development on	Marine and aquatic related
	natural sciences and engineering	consultancies and research
M7490	Other professional, scientific and technical	
	activities n.e.c.	
Ν	Administrative and support service activities	
N7721	Renting and leasing of recreational and	e.g. yachting, fishing trips,
	sports goods	pleasure crafts
N79	Travel agency, tour operator, reservation	Cruise ships, etc.
	service and related activities	
N7990	Other reservation service and related	
	activities	
N8020	Security systems service activities	Beach patrols, fisheries
		protection, etc.
N8130	Landscape care and maintenance service	Beach maintenance, etc.
	activities	
0	Public administration and defence;	
	compulsory social security	
08422	Defence activities	Coast guards
Р	Education	
P8522	Technical and vocational secondary	Training and extension service
	education	for fishers and on marine and
P8530	Higher education	aquatic themes, skippers,
		sailors, etc.
Code Value	Code Description	Remarks
---------------	--	--------------------------------
P8541	Sports and recreation education University and research levels	
R9103	Botanical and zoological gardens and nature	
	reserves activities	
Q	Human health and social work activities	
Q8690	Other human health activities Fisherman welfare/thalassotherapy, spas,	
Q8790	Other residential care activities	etc.
R	Arts, entertainment and recreation	
R93	Sports activities and amusement and	Water sports and pleasure
	recreation activities	activities, etc.
R9321	Activities of amusement parks and theme	
	parks	
R9329	Other amusement and recreation activities	
	n.e.c.	
S	Other service activities	
S9412	Activities of professional membership	Diving centres, NGOS on marine
	organizations	and aquatic activities, etc.
S9499	Activities of other membership	
	organizations n.e.c.	
Т	Activities of households as employers;	
	undifferentiated goods- and services-	
	producing activities of households for own	
	use	
Т98	Undifferentiated goods- and services-	Livelihood fisheries, etc.
	producing activities of private households	
	for own use	
U9900	Activities of extraterritorial organizations	Support services by regional
	and bodies	bodies etc.

Annex IV: Example Methodology Sheet

Valued Added: For any fishing type, such as artisanal or small scale, or commercial/offshore, the following calculation steps can be undertaken and it can be modified depending on the approach and circumstances.

Items	Variable	Notes
OUTPUT	0 = a x b	Output are usually the gross one and is the
	хс	amount received in the sector/activity. This can
		be formed from different set of undertakings by
		establishments in that sector.
Mean catch per day	а	
Prices	b	
(Wholesale/retail		
averaged for species)		
Other incoming	С	
INTERMEDIATE	IC =	
CONSUMPTION	\sum_{d}^{i} IC type	
Fuel	d	
Baits and related	е	
items		
Fishing gear	f	
repair/replacement		
Ice	g	
Food/provisions	h	
Others	i	
VALUE ADDED	VA = 0 -	The sum of value added for other
	IC	disaggregated activities, e.g. artisanal fishing,
		commercial fishing or aquaculture, etc., can
		provide the Total Value Added for that sector
		(e.g. for Fishing) as well as GDP and its
		contribution to the national GDP.

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