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THE BLUE ECONOMY IN SEYCHELLES

Socio-economic and ecological assessment of the Blue Economy in Seychelles

SUSTAINABLE DEVELOPMENT GOALS

United Nations
Economic Commission for Africa

Socio-economic and ecological evaluation of the Blue Economy in Seychelles

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Executive Summary

This analytical report presents the results of a refined assessment of Seychelles' Blue Economy using the Blue Economy valuation toolkit (BEVTK) framework. The BEVTK was developed by the United Nations Economic Commission for Africa (UNECA) Sub-Regional Office for East Africa (SRO-EA). The report provides sound context relating to the Blue Economy in Seychelles, as well as the findings of the analysis relating to the economic, social and ecological dimensions of the Blue Economy.

Seychelles is a country comprising of 115 islands with a total land area of 455 km^2. Due to the scattered nature of these islands, the country boasts the second largest exclusive economic zone in Africa of 1,370 million km^2. Annual rainfall in the country is high with the main island of Mahé receiving in excess of 2,300mm per annum in the coastal belt and more at higher altitudes. The two primary pillars of the economy are tourism and fisheries, both of which are highly reliant on healthy marine and natural resources.

The economy dimension of Seychelles Blue Economy used national accounting data held by the National Bureau of Statistics. Findings from the report show that Seychelles' Blue Economy very conservatively, and at a primary level, comprises $433 million, or 27.4%, of GDP and 41% of Seychelles' formal employment (2018 data). These figures are likely to be an underrepresentation due to challenges with finding additional reliable, disaggregated economic data for the different industries and sectors participating in Seychelles' Blue Economy.

The social dimension used a number of different indices to return its result, which took the form of both a positive and a negative composite social indicator score. Data for this dimension was sourced both internationally and locally. International metrics such as the Human Development Index, Gini coefficient and Stable Seas Maritime Index were used, among others. Three local indicators were developed to provide more meaningful results for the country, including tertiary enrolments in Blue Economy oriented institutions or courses, and foreign employment proportions in the industrial and semi-industrial fishing sectors. The positive composite social indicator score for Seychelles was 70.24 and the negative composite social indicator score was 30.41.

Ecologically, Seychelles has an abundance of natural habitats and ecosystem services that its large EEZ delivers. The primary habitats focused on, and those with the most reliable data, were mangrove forests, seagrass beds and coral reefs. The ecosystem services associated with these habitats are valued at $40 billion.

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Abbreviations

ANA	Annual national accounts
ANHRD	Agency for National Human Resource Development
AU	African Union
AU-IBAR	AU Inter-African Bureau for Animal Resources
BE	Blue Economy
BEAP	Blue Economy Action Plan
BEVTK	UNECA Blue Economy valuation toolkit
CSOs	Civil society organizations
DBE	Department of Blue Economy
EEZ	Exclusive Economic Zone
GDP	Gross domestic product
GIZ	Geographic Information System
GNI	Gross national income
IOC	Indian Ocean Commission
ISIC	International Standard Industrial Classification
MPA	Marine protected area
MSP	Marine spatial planning/plan
NBS	National Bureau of Statistics
OA	Ocean Accounting
SeyCCAT	Seychelles Conservation and Climate Adaptation Trust
SFA	Seychelles Fishing Authority
SNA	System of National Accounts
ToR	Terms of Reference
UN	United Nations
UNDESA	UN Department of Economic and Social Affairs
UNECA	UN Economic Commission for Africa
UNEP	UN Environmental Programme
UNFCCC	UN Framework Convention on Climate Change

Chapter 1: Background and Scope

1.1. BACKGROUND

Societal use of the ocean has been ongoing for several hundreds of years. In the recent past, countries have become conscious of the ocean's value and of our reliance upon it. This consciousness has led to the growth of the concept of the Blue Economy.

The Blue Economy has become a widely debated concept, with many agreeing that it should include not just marine, but all aquatic resources. UNECA utilizes the expanded definition used by the Indian Ocean Commission (at right) (Indian Ocean Commission & UNECA, 2020). It developed primarily out of the green movement which saw the term 'green economy' grow in stature (UNEP et al., 2012). Many perceive the ocean to be a harmonious system in which organisms ensure that nothing is wasted; it is from this concept that ideas such as the circular economy found similes (Pauli, 2019). The Blue Economy concept reached its adoptive tipping point shortly after the 2012 United Nations Conference on Sustainable Development Rio+20. Whilst the term itself is devoid of a standard definition across sectors, countries and institutions, several themes, such as sustainability, equity and inter-generational benefit are common among most (FAO, 2018; Keen et al., 2018; United Nations, 2012; World Bank & UN DESA, 2017).

The Blue Economy, which spans several of the SDG goals, including SDG14 (Life Below Water) (Hudson, 2018; Wenhai et al., 2019), encompasses a broad range of sectors, industries and stakeholders across the public and private sector, all competing for the use of the same ecosystem (Burgess, Clemence, McDermott, Costello, & Gaines, 2018; World Bank & UN DESA, 2017). To achieve sustainable and equitable use, inter- and multi-disciplinary research and approaches are required for a successful Blue Economy (Wenhai et al., 2019). Seeing as the ocean is a global entity, this often requires cooperation and collaboration across nation-states (World Bank & UN DESA, 2017).

There has been marked international and regional interest in the Blue Economy and Ocean Accounting. Internationally, the UN has declared 2021-2030 as the 'Decade of Ocean Science for Sustainable Development' with the aim of fostering 'The Science we need for the Ocean we want'. The High-Level Panel for a Sustainable Ocean Economy was established in 2018 and includes outputs such as *National Accounting for the Ocean and Ocean Economy* (Fenichel et al, 2020) in its peer-reviewed *Blue Papers* series. The Global Ocean Accounting Partnership was developed to consolidate international efforts at Ocean Accounting. In the Caribbean, Ram *et al.* progressively produced a Caribbean Development Bank paper titled *Measuring the Blue Economy: The System of National Accounts and Use of Blue Economy Satellite Accounts* (Ram et al, 2019). The African Union recently developed the *Africa Blue Economy Strategy* (AU-IBAR, 2019) and its *Agenda 2063*

DEFINING THE BLUE ECONOMY

The **Blue Economy** relates to the sustainable use and the conservation of oceans and seas, coastlines and banks, lakes, rivers and groundwater – both marine and freshwater environments.

It comprises activities that organize in an integrated, fair and circular manner the production, distribution, trade and consumption of goods and services resulting from the exploitation of aquatic resources (fisheries, mining and petroleum, biotechnologies and alternative energies, etc.) or from the use of supports of aquatic environments (maritime transport, seaside tourism, etc.). These activities contribute to improving the health status of aquatic ecosystems by establishing protective and restorative measures.

As a result, the **Blue Economy** revolves around the valorization of socio-economic sectors and ecological components.

- Blue Economy Regional Action Plan, Indian Ocean Commission (IOC) (IOC and ECA SRO-EA, 2020)

(AU, 2015) to guide regional approaches to the BE, the Indian Ocean Commission developed the *Regional Action Plan for the Blue Economy* (IOC & UNECA, 2019) and the UNECA developed *Africa's Blue Economy: A policy handbook* (UNECA, 2016). Seychelles has been active in the BE space since 2013 with its *Seychelles Blue Economy: Strategic Policy Framework and Roadmap* (2019), *Seychelles Vision 2033* (2019), *Seychelles Blue Economy Action Plan* (2020) and intending to include Blue Carbon in its revised Nationally Determined Contribution to the UNFCCC, in conjunction with various transitional funding activities (Seychelles Debt-for-Nature Swap, Blue Bond, SWIOFish3).

The Blue Economy spans across many industries and sectors. This inherently creates complexity when attempting to understand the extent of its socio-economic context. Human reliance on Blue resources is not always monetary; indeed, some use the resources for artisanal purposes, for bartering and trade, whilst others enjoy the recreational and spiritual benefits associated with them. Well-being is a central tenet of the Blue Economy resulting in an urgent need to understand the socio-economics of the Blue Economy as well as how to measure changes, or progress, associated with it.

1.2. ABOUT SEYCHELLES

Seychelles is Africa's smallest country with a terrestrial area of 455km^2, approximately half of which is protected (Government of Seychelles, 2014). It has the smallest population of the continent of approximately 98,400 in 2020 (National Bureau of Statistics, 2020a) and consists of an archipelago of 115 islands, boasting Africa's second largest Exclusive Economic Zone (EEZ) at 1,370 million km^2. Tourism and fisheries are the primary sources of employment providing formal employment for at least 26% and 17% of the population respectively (Hindle, 2019). These sectors are also significant contributors to GDP with tourism contributing directly and indirectly 55% and fisheries constituting 20%, whilst fisheries are responsible for ~93% of the nation's exports (Hindle, 2019). Consequently, it is apparent how crucial a healthy marine environment is for the country's success. Additionally, it is understandably clear that the Seychellois are tightly connected with the marine environment.

Seychelles economy is particularly vulnerable due to its relatively isolated geographic location and its undiversified nature. The latter is a short coming that has required attention for many years (ASCLME, 2011). Its substantial reliance on fisheries and tourism make it vulnerable to exogenous shocks, as well as endogenous inefficiencies that may exist. The fisheries sector faces several challenges, a primary one being an inadequately trained and aging workforce, with few signs of succession (Government of Seychelles, 2019). In spite of this, the *Seychelles Fisheries Sector Policy and Strategy 2019* aims to uplift the sector and safeguard both its present labour force and future entrants. A specific emphasis is placed on the inclusivity of the industry through supporting gender equity and those of a vulnerable nature (Government of Seychelles, 2019). The strategy recognizes that to achieve these ambitions there needs to be capacity building, primarily through educational and training programmes. There are four policy statements in the strategy that, if implemented, are likely to result in a more resilient fisheries workforce that enjoys greater well-being[1].

Tourism faces similar challenges from an employment perspective. A high proportion of the jobs in the tourism sector are held by non-Seychellois[2], a factor that contributed in part to the development of a policy concerning foreign employment in 2020 (Central Bank of Seychelles, 2020). It has been noted that jobs are not necessarily scarce, yet the foreign element of the workforce remains (Government of Seychelles, 2018). Among the identified reasons for this are possible attitudinal shortcomings, unfavourable work hours, particularly for mothers who are integral to the family unit, and a lack of skill required for the role, or skills mismatch (Central Bank

[1] Policy 6: Seychellois stake-holding in the industrial fisheries sector; Policy 7: Employment, training, resourcing and human resource development; Policy 8 Strengthening Monitoring Control and Surveillance; Policy 9: Research and Innovation in the fisheries sector and aquaculture (Government of Seychelles, 2019).

[2] It is estimated that in the accommodation and food service industry, 27% of the workforce employed are foreigners (Government of Seychelles, 2018).

of Seychelles, 2020; Government of Seychelles, 2018). One knock on effect of high foreign labour numbers is often an outward migration of financial capital (Central Bank of Seychelles, 2020).

As a result of its undiversified economy and reliance on the two primary sectors, Seychelles is vulnerable to global economic downturns. This has been evident in both the 2008 financial crisis, which ultimately led to the country defaulting on loan repayments to international creditors (CIA, 2021), and more recently the Covid-19 pandemic in 2020 and 2021,with the country's economy suffering due to the ailing tourism sector. It is was estimated that global declines on tourism flows for the first half of 2020 caused a drop in global receipts from tourism of $460 billion, a loss purported to be three times that of the 2007-2008 financial crisis (OECD, 2021). Seychelles itself saw tourism numbers crash from a record 384,000 visitors in 2019 (National Bureau of Statistics, 2021) to a reduction of 70% when comparing 2020 with 2019 (National Bureau of Statistics, 2021). The consequences of the recent severe downturn in tourism include a resultant decrease in foreign exchange inflows, impacting on governments ability to service debt obligations in major foreign currencies, as well as negative implications for servicing balance of payment deficits and international infrastructure loans, such as the Port of Victoria Quay Extension project (Seychelles Ports Authority, 2019). Additionally, Seychelles' economy was projected to have a growth rate of negative 13% to negative 16% for the third quarter of 2020 after enjoying consistent growth in the 4% range since 2017 (Frederick & Ramrattan, 2020; OECD, 2021).

Aside from short-term shocks to economies, such as global recessions and pandemics affecting tourism, over exploitation of the nation's marine environment is possibly the greatest medium to long-term risk to Seychelles' economy. Currently the country's small-scale artisanal and sport fishing industries are open access, meaning there are few to no regulations on catch size, number of fish kept or number of vessels allowed in these fisheries. Thus, there is valid concern regarding the risk of the nation's fisheries. Fisheries at risk would lead to income losses for fishers and direct negative impacts on the tourism industry, having ramifications for the country's economy and the peoples' well-being. Food security would be highly compromised as most of the fish consumed is locally caught (Ministry of Finance Trade and Economic Planning, 2017). Further, there is concern regarding the management of natural resources being hampered by "insufficient financing, capacity, and legal and institutional frameworks" (Ministry of Finance Trade and Economic Planning, 2017).

Figure 1. Seychelles Blue Economy representation from Seychelles Blue Economy: Strategic Policy Framework and Roadmap 2018-2030 (Republic of Seychelles, 2018)

1.3. SEYCHELLES' BLUE ECONOMY DEPARTMENT

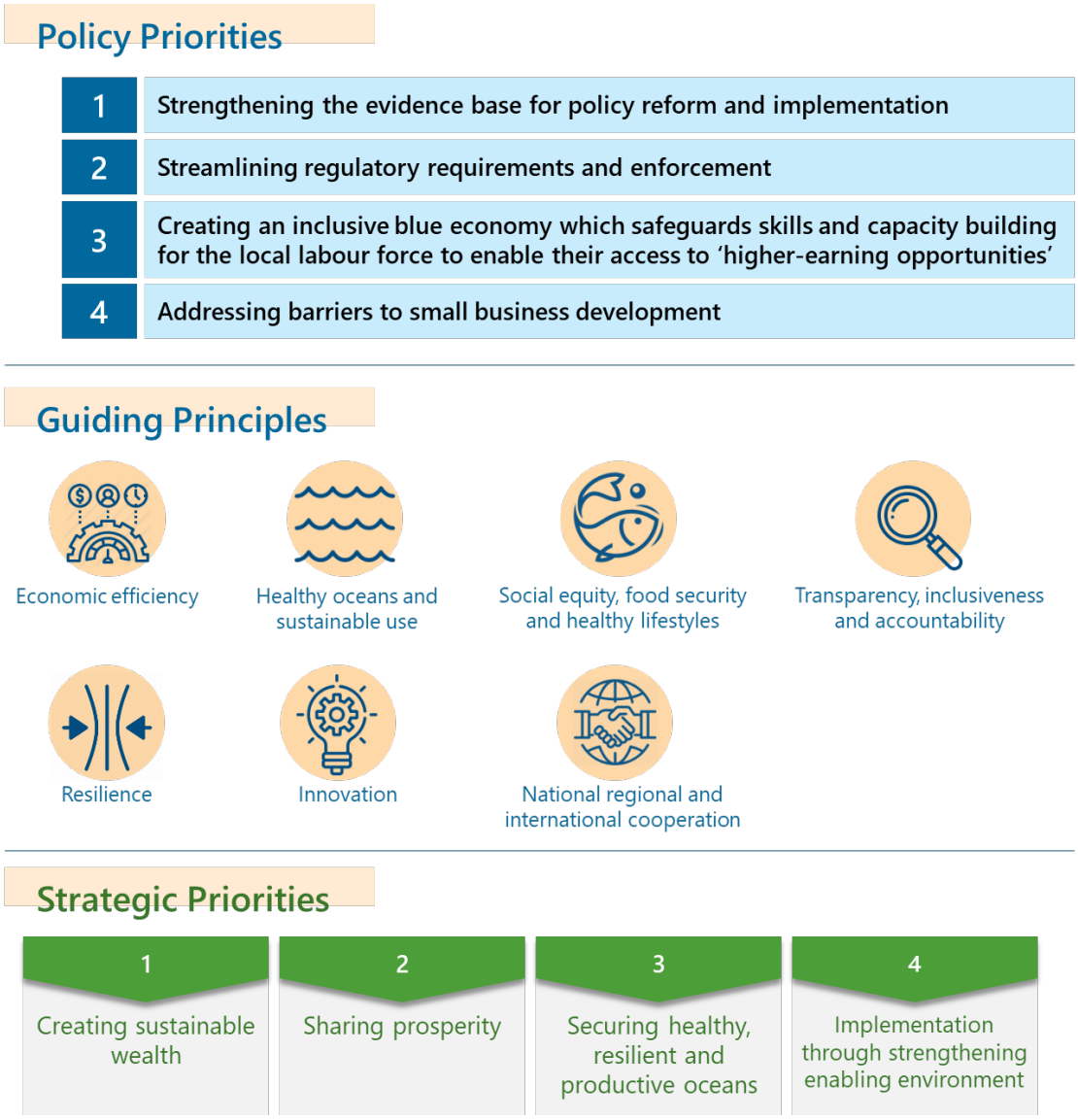
Seychelles was an early adopter of the Blue Economy concept, and indeed a regional, possibly even a world, leader. It has used innovative approaches to assist with the development of, and transition to, a Blue Economy, such as: a land-mark debt-for-nature swap (DNS), the establishment of the public-private trust fund Seychelles Conservation and Climate Adaptation Trust (SeyCCAT) to administer annual funding to Blue Economy oriented projects in Seychelles, the world's first 'blue' bond, and its national document *Seychelles Blue Economy: Strategic Policy Framework and Roadmap 2018-2030*, (Figure 1) hereinafter referred to as *The Roadmap* (Republic of Seychelles, 2018). The DNS and the blue bond have provided financial contributions, whilst *The Roadmap* document presents policy priorities, principles and strategic policies (or pillars) required for Seychelles to realise its Blue Economy.

The Roadmap identifies four policy priorities required to enable the development of Seychelles Blue Economy (Figure 2). The policy priorities are required to enable the realization of *The*

Roadmap's seven guiding principles and four strategic priorities, to ensure a successful Blue Economy.

The transition to a Blue Economy is not straightforward. It may require those actors within the space to be open-minded, or to exercise some form of adaptive capacity. This is in light of the possibility of "paradigm shifts" being required as users of the ocean and its resources move away from current exploitative and selfish resource use toward more innovative and shared prosperity approaches that align with ecological health (Republic of Seychelles, 2018).

Figure 2. The policy priorities, guiding principles and strategic priorities of Seychelles' Blue Economy



The first three of the seven guiding principles (Figure 2) of *The Roadmap* relate directly to the primary components of a Blue Economy, namely the economic, environmental and social

components. Principles one, two and three are supported by the remaining four principles which assist in creating a favourable enabling environment for Seychelles' Blue Economy to be realized. These last four principles often relate to more than one of the Blue Economy components. For example, principle four calls for transparency, inclusiveness and accountability. Seychelles marine spatial plan (MSP), a result of the DNS, considered economic, environmental and social implications during the declaration of the marine protected areas that now cover 30% of Seychelles EEZ. Principle five, simply named 'resilience' can also be seen to apply to multiple contexts. Having a healthy, biodiverse ocean and ecosystems improves the resilience of the environment, meaning it is likely to withstand, or recover from shocks, more successfully than a damaged, unhealthy or overexploited environment. Similarly, building a resilient population through education and skills development can encourage a stronger and more diverse workforce that is likely to adapt to shocks more successfully than one with a relatively homogenous skill set, or that is less educated. A resilient workforce in turn can contribute to a stronger economy that suffers less during economic hardships. In an island nation with high reliance on the marine environment, it must be noted that environmental resilience should be the primary focal point; it is the entity upon which Seychelles' economy and social well-being is based, providing food security and an aesthetic scene that attracts tourists, among the many other services housed by a marine environment as diverse as Seychelles'.

The *Roadmap* also proposes four strategic priorities (Figure 2) that, if fostered and acted upon, will ensure longevity of Seychelles' Blue Economy. The priorities are key requisites for action of, and investment in, the Blue Economy. The priorities complement the seven guiding principles whilst illustrating Seychelles' intent to adhere to the Blue Economy paradigms of economic prosperity that is inclusive, but not to the detriment of the marine environment.

In conjunction with the above, there is an understanding of the importance of natural capital and how it serves as a comparative advantage that the country needs to leverage (Government of Seychelles, 2017), particularly through the country's commitments in terms of responsible tourism to the UN World Tourism Organization and the Convention on Biological Diversity (Carolus, 2015). An aspect of the Blue Economy that requires additional investment though, in terms of monitoring and reporting, providing support and guidance on investments and opportunities, is the social component. Seychelles currently has a grants and investment mechanism for civil society, NGOs and government departments to apply to for support in conducting activities that assist the Seychelles society transition to a Blue Economy, as well as raising the adaptive capacity of the population. Despite the work of SeyCCAT, one of the implementing agencies, there is more work required to understand the society's perception of the Blue Economy, the opportunities it presents, as well as the potential value that is currently being unlocked by the Seychellois.

1.4. PHASE I – BLUE ECONOMY VALUATION TOOLKIT

The Blue Economy is a complex and highly interrelated concept. Defining parameters for measurements is difficult, as it requires in-depth understanding of the social and economic constructs of a country, as well as sound knowledge of the ecological resources that could be classified as contributing to the concept. From 2016, UNECA's Sub-Regional Office for Eastern Africa has promoted the Blue Economy, largely through policy and strategy development. This work included a policy handbook and support to countries and regional organizations, such as the Indian Ocean Commission. More recently, the office has supported efforts to value the Blue Economy and measure its potential, with a goal of facilitating informed policymaking and investment.

In 2020, UNECA commissioned the development of a Blue Economy Valuation Toolkit (BEVTK). The aim of this toolkit was to provide government officials and decision makers with a simple yet comprehensive estimate of the value of that country's Blue Economy, which includes the economic, social and ecological dimensions. Consultants Pierre Failler and Philippe Lallemand, who were responsible for creating the logic behind the excel-based tool, developed the BEVTK. UNECA's vision for the tool is for it to be used in countries throughout Africa and further afield. Phase I of the BEVTK project focused more closely on:

- Identification of Blue Economy industries
- Ease of obtaining, and the availability of, data
- Attempting to adjust values in line with the Blue Economy
- Using the data to make a first estimate of the economic, social and ecological values of the pilot country's Blue Economy
- Continued testing of the tool to criticise its user-friendliness and functionality

Knowledge of data and data type availability, of pertinent stakeholders and of lags expected in communication all contribute significantly to conducting assessments and establishing measurable parameters for a tool. In order for UNECA to deliver a sound and functional tool, the BEVTK needed to be piloted in conjunction with its development. In so doing, those piloting the tool would be able to provide feedback to the developers, whilst ascertaining whether the tool would indeed be functional and possible. To this end, UNECA had the BEVTK piloted in one land-locked (Rwanda), one coastal (Djibouti) and one island state (Seychelles).

The BEVTK is a comprehensive excel-based application that requires users, likely employees of a national Blue Economy department or a national statistics organisation, to input economic, social and ecological data into individual tables specific to each of the three pillars mentioned. The metrics that the tables include are pre-defined depending on whether the country in question is land-locked, coastal or an island. Metrics can be added to or removed from the pre-defined lists of the different tables. Once the tables are populated, summary statistics and charts are automatically created and can be viewed concurrently on the 'Dashboard' (Figure 7). This enables

decision makers to have quick access to meaningful, summarized outputs of the country's Blue Economy.

In the pilot case of Seychelles, some of the specific challenges faced in the testing of the BEVTK included[3]:

- Weak social data
- Difficulty with identification and definition of social indicators for the BEVTK
- Data access
- Lack of focused research agenda and data collection relating to Blue Economy metrics
- Lack of accurate discounting methodology

The Seychelles pilot study revealed a sound summary of the economic data in Seychelles Blue Economy as well as older and less reliable data for the ecological indicators. There was a paucity of social indices for reporting, with most of the data reliant on larger global databases that are not tailored to Blue Economy reporting. The piloting of the BEVTK required stakeholder engagement and data mining in order to achieve some degree of success. Close interaction was kept with Seychelles National Bureau of Statistics. The economic data that was available was sound, however it was highly aggregated making it difficult to provide accurate economic estimates. Whilst the ecological and social data collation and input were challenging and scarce, the process of testing the BEVTK, providing feedback to the lead consultants, error checking and understanding how to use the toolkit were valuable exercises as they resulted in a more robust product.

1.5. PHASE II – SCOPE OF WORK

Phase II of the BEVTK development goes into more depth regarding the socio-economics of the tool. Phase II was developed to undertake a comprehensive assessment of the socio-economic Blue Potential in Seychelles. The pilot assessment addressed the economic dimension sufficiently given the currently available national accounts. Notably, initiatives such as the National Bureau of Statistics' supply use tables, and tourism and fishery satellite accounts, are under development. As these data sources become available, estimates of the economic dimension of Seychelles' Blue Economy will become more accurate.

Unfortunately, it was not possible to overcome the data challenges with the ecological dimension. Projects that relate to ecosystem services valuation within the Seychelles' marine protected areas (MPAs) and the mapping of blue carbon ecosystems are underway, the results of which will assist with data provision. The coral reef strategic plan is under development and is likely to yield guidelines for the coherent collection of data from monitoring efforts by various organisations. Additionally, as a result of its Marine Spatial Plan, Seychelles has declared 30% of its EEZ as MPAs

[3] For elaboration of the challenges faced, see *Laing, SCS. 2021. Development of a socio-economic assessment of the Blue potential in Seychelles using the ECA Blue Economy valuation toolkit – Inception Report. UNECA-SRO-EA: Kigali.*

which is likely to lead to further research into the habitats, ecosystems and animals within and adjacent to these areas. These initiatives will assist with ecological value estimates. The ecological dimension remains a point for deeper collaboration with the government of Seychelles in the future.

Given the challenges with identifying and collecting social data in the Phase I trial, this dimension was prioritized in the current scope for Seychelles.

The assessment will be achieved through the following means:

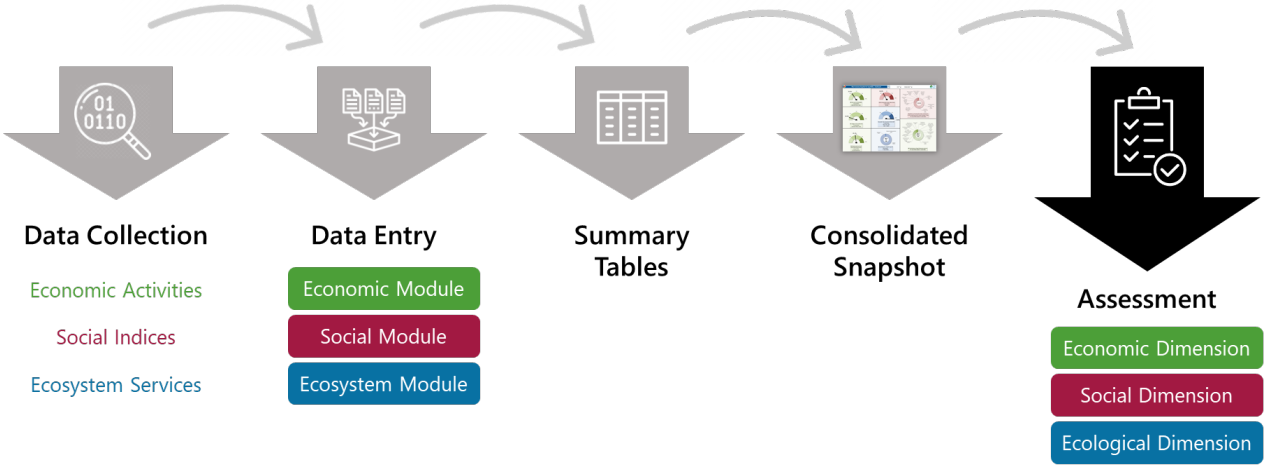
1. Conduct a stakeholder and literature review of the socio-economic data in Seychelles, narrowing these down to data that are applicable to the Blue Economy.
2. Identify where data gaps may exist in terms of metrics that could, or should, be reported on.
3. Compile a socio-economic assessment report of the Blue Potential in Seychelles that has been reviewed by key stakeholders and validated through a national webinar.

The scope of work is broad. The Blue Economy in Seychelles spans most economic industries and includes most of the country's socio-economic activities. Consequently, the number of stakeholders, both governmental and private sector, to be engaged with is high, creating an additional layer of complexity. This broad scope can result in certain stakeholders being omitted during the assessment. Nonetheless, the assessment will provide a sound reflection of the socio-economic blue potential in Seychelles.

Chapter 2: Methodology

The stages to developing this assessment generally follow the proposal outlined in the BEVTK Operational Manual (Figure 3). The BEVTK is organized around three modules which ultimately form the three dimensions of this assessment: economic, social and ecological.

Figure 3. High-Level Steps in Developing Assessment



2.1 ECONOMIC DATA AND MODULE

Being a small island developing state, most of the activities in Seychelles can be attributed to the BE. However, care should be taken not to overstate the value of the BE and ensure that there are not misallocations. As such, a conservative approach was used to value Seychelles' BE. Seychelles value added and GDP data for the year 2018 was used in the calculation of the economic dimension. The data sources used for the assessment are shown in Table 1. The GDP data, published by the National Bureau of Statistics (NBS) in its annual national accounts (ANA) publications, includes all industries that are present in the island state's formal economy, and includes the International Standard Industrial Classification of All Economic Activities (ISIC) codes associated with the activities.

Table 1. Data sources used to complete the economic dimension of the BEVTK

Data source	Data description	Statistics
NBS	2018 Annual National Accounts Statistics	Gross Value Added
	2020 Formal Employment and Earnings	Wages and employment

The specific industries and ISIC codes included in the BEVTK estimate of the economic dimension of Seychelles BE are shown in Table 2. The data published in Seychelles' ANA are at the highest level (level 1) of aggregation. This means the data within an ISIC industry in Seychelles is combined and cannot be broken down to more specific ISIC levels, of which there are four. As can be seen in Table 2, only Manufacturing is disaggregated to ISIC level 2. Consequently, identifying the relevant Blue Economy industries and ascribing the full value added of each industry from the ANA in the BEVTK would result in overstatement of the Blue Economy in Seychelles. As such, more detailed industry information is required to make more accurate estimates of Seychelles' BE, at least to ISIC level 2. Additionally, some industries have inputs from other industries, meaning that Blue Economy values may not be accounted for if an industry is omitted from the calculations

Table 2. Seychelles' Blue Economy industries included in the BEVTK estimate of the value of Seychelles' Blue Economy, including ISIC codes

Economic Activity by ISIC Category
A - Agriculture, forestry and fishing
C - Manufacturing
C10 - Manufacture of food products
C11 - Manufacture of beverages
E - Water supply; sewerage, waste management and remediation activities
F - Construction
G - Wholesale and retail trade; repair of motor vehicles and motorcycles
H - Transportation and storage
I - Accommodation and food service activities
K - Financial and insurance activities
M - Professional, scientific and technical activities
N - Administrative and support service activities
O - Public administration and defence; compulsory social security
P - Education
R - Arts, entertainment and recreation

Despite the need for disaggregated and accurate industry level data, the BEVTK was designed to accommodate the issue of aggregated data. Users can attribute the proportion of a specific industry, or ISIC code's, Blue Economy expenditure by entering the percent attributable in the BEVTK. This same percentage is applied to the number of people in the labour force for that industry The BEVTK also allows for a comment on the quality of the economic data used, stating whether the data is official data or some form of estimate. The result is a more accurate estimate of a country's BE.

In order to estimate the percent of each ISIC industry's value added to the Blue Economy in Seychelles, meetings with the NBS were held. This provided expert insight into the ANA and how

the industry data is collected and collated. Additionally, the full list of disaggregated Seychelles industries with their ISIC codes were scrutinized to understand which components pertain directly to its BE, the industries to be included, and what proportion of an industry would be attributable to Seychelles' BE.

2.2 SOCIAL DATA AND MODULE

Many countries' approaches to the Blue Economy have been extractive in nature, focusing more on economic gains, side-lining the importance of ecological and social sustainability that ensure the prosperity of the Blue Economy concept for future generations. Studies have been conducted examining the role of the social and ecological dimensions in the interrelated Blue Economy concept. An African case-study identified four 'full-spectrum sustainability categories' that represent the categories affected by activities that take place within the context of the Blue Economy (Table 3) (Okafor-Yarwood et al., 2020). Whilst this is not central to the methodology employed in this project, cognizance was made of the two categories that relate to socio-economics and human wellbeing. The broad level categories and their associated indicators provide a point of departure against which indicators identified for the BEVTK can be compared.

Table 3. Categories, sustainable objectives and example indicators that can be used to classify the effects of Blue Economy activities. Adapted from (Okafor-Yarwood et al., 2020)

Full-spectrum sustainability category	Sustainable objectives	Example indicators
Economic	Sustainable livelihoods	Livelihood index, financial empowerment, ownership
	Distribution of access and benefits	Equity, the inclusion of marginalized groups, women, youth and indigenous communities, ownership
Social and Cultural	Health and Wellbeing	Social factors, social development, quality of life
	Sustainable communities	Social capital, social structure
	Ethical practices	Rights of people, respect for indigenous practices and traditions

Two primary types of datasets were used for the socio-economic indicators: international datasets such as those from UN agencies, and data reported by institutions within Seychelles (see Table 4). The datasets used needed to be identified and specific indicators selected that would be relevant to the BEVTK in general, as well as providing Seychelles specific indicators. As such, the socio-economic assessment relied heavily on literature reviews and stakeholder engagement. Phase I indicators and literature of the project were reviewed, revealing a paucity of country specific and recent data. Consequently, more specific literature searches were conducted with additional focus on agencies that may house required data.

Stakeholder engagement presents opportunities to mine for additional projects and data that may be otherwise difficult to obtain. Having a broad network of stakeholders that represent governmental and non-governmental organisations as well as the private sector can be difficult to secure, but highly beneficial. When augmented with social departments and agencies, as well as organisations that transcend industries, assessments are strengthened further. Consequently, the Seychelles Chamber of Commerce and Industry, the Agency for National Human Resource Development, the Tertiary Education Commission, Citizen Engagement Platform Seychelles, Department of Blue Economy, Seychelles Fishing Authority and the Economic Planning Department were approached for input into the social module's data. The input provided by these institutions was strengthened through a national webinar where key stakeholders were able to comment on the indicators provided. This was achieved through discourse and polls released during the webinar. The result was better insight into indicators that would provide additional local relevance to the BEVTK.

The primary local datasets used were housed with the National Bureau of Statistics which is the primary data repository for economic statistics. It also houses social statistics which are less well represented. A summary of the socio-economic statistics held by NBS are in Appendix 5: Seychelles Economic Activities and Preliminary Socio-Economic Datasets (Table 18). Additional organisations such as Seychelles Fishing Authority (SFA) collect valuable data. SFA is responsible for collecting and reporting on all fisheries data, some of which is relayed to NBS for aggregated reporting in macroeconomic data reports. These and other smaller datasets held by agencies, government departments were used where applicable.

International datasets and big data portals have benefits for tools such as the BEVTK. One such benefit is that data can be drawn automatically from specific websites into the BEVTK. A shortcoming, though, is that for some countries this data is either only reported on intermittently or may be unreliable, for example by listing figures as current when they were captured in the past. Relevant datasets (see Table 4) were used in such a manner. Where aged data was returned by the datasets, more recent estimates were sought through literature searches.

Table 4. Data sources used for estimates of the social dimension in Seychelles' BEVTK

Data source	Data description	Statistics
FAO	Fishery and Aquaculture Review Country Profiles: The Republic of Seychelles (2019)	Per capita fish consumption
UNDP	Human development data (2019)	HDI, Gini coefficient, Literacy index, Education index
Transparency International	Corruption perception index (2020)	Corruption perception index
One Earth Future	Stable seas maritime security index (2020)	Blue Economy, Coastal Welfare, Fisheries, Illicit Trade, Maritime Enforcement, Piracy, Rule of Law

Data source	Data description	Statistics
NBS	Poverty and inequality in Seychelles (2021)	Gini coefficient
	Statistical abstract 2019-2020 (2020)	Enrolment in tertiary institutions with Blue Economy orientation
SFA	Employment study and capacity needs assessment for the fisheries sector in Seychelles (2021)	Seychellois employment in fishing sectors

In addition to the socio-economic indicators included in this study, a brief list of additional possible statistics has been included in Appendix 4: Potential socio-economic statistics for future inclusion in the BEVTK (Table 16) for future further development of the BEVTK.

2.3 ECOSYSTEM SERVICES/ ECOLOGICAL DATA AND MODULE

The three primary data sources used for the ecological dimension of the BEVTK were the Seychelles MSP, the Seychelles National Biodiversity Strategy and Action Plan 2015-2020[4] (NBSAP) and the Public Utilities Corporation's Annual Report (Table 5). Whilst the MSP provided only basic information that had to be interpreted for this project, the Nomination File[5] used identified many more ecosystem services and ecological features and events that will be of interest for a comprehensive BE ecological estimate in the future. The Seychelles National Biodiversity Strategy and Action Plan 2015-2020[6] was also an important source of ecological data, providing estimates of coral reef and mangrove forest areas.

Table 5. Data sources used for estimates of the ecological dimension in Seychelles' BEVTK

Data source	Data description	Statistics
Marine Spatial Plan	2019 Nomination File (2019)	Seagrass cover (km^2)
Government of Seychelles	Seychelles' National Biodiversity Strategy and Action Plan 2015-2020 (2014)	Mangrove cover (km^2) and coral reef extent (km^2)
Public Utilities Corporation	Annual report 2018 (2019)	Number of water courses, volume of dams

[4] Government of Seychelles. (2014). *Seychelles National Biodiversity Strategy and Action Plan 2015-2020*. Editors: John Nevill, Jacques Prescott, Nirmal Jivan Shah & Marie-May Jeremie, Victoria, Mahé.

[5] Ministry of Environment, Energy and Climate Change. (2019). *Nomination file to designate, and re-designate, areas for protected area status under the National Parks and Nature Conservancy Act (NPNCA), as amended (1982)*. MEECC: Victoria, Mahé. https://seymsp.com/outputs/phase-3/milestone-3-nomination-file/

[6] Government of Seychelles. (2014). *Seychelles National Biodiversity Strategy and Action Plan 2015-2020*. Editors: John Nevill, Jacques Prescott, Nirmal Jivan Shah & Marie-May Jeremie, Victoria, Mahé.

The seagrass data, sourced from the MSP, required calculations based on estimates of cover within each of the MPAs and the area covered by each MPA itself. The MSP seagrass data is based upon older (2004) data, which also provides a seagrass map for Seychelles EEZ, both within and outside of MPAs. Constraints did not allow for the analysis of GIS data to measure spatial extent outside of MPAs. The calculated estimate of seagrass cover is based on the best possible data at the time and does not include seagrass meadows that fall outside of the network of MPAs, i.e. in the remaining 70% of Seychelles EEZ.

Mangrove and coral reef area figures were also based upon the most recent and purportedly accurate data, having sourced the figures from national documents. However, the data would be older than 2014, again bringing into question its quality. No calculations were required for the reporting of these data.

The BEVTK does allow for the reporting of the health of ecosystem service or ecological data. This allows for the discounting of the value of services provided due to degraded ecosystems. Having this ability is useful, particularly in the case of Seychelles' coral reefs, as they have experienced extensive damage over time due to coral bleaching. Thus, the different services provided are compromised.

Chapter 3: Analytical Results and Discussion

In this chapter, the results of the BEVTK are initially presented briefly. Discussion surrounding the values is entered in more depth by dimension, providing the reader with greater insight into the process, shortcomings and opportunities that lie ahead.

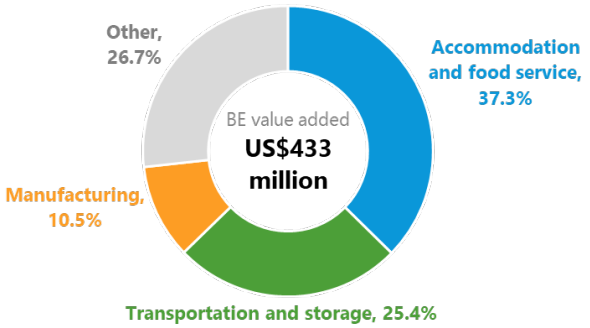
3.1. ECONOMIC DIMENSION

The results from the BEVTK show that the Blue Economy contributes substantially to Seychelles. The conservative economic estimate shows that, using value added figures from 2018, the BE in Seychelles comprises 27.4% of GDP (Figure 7), being valued at $433M (Figure 4, Table 6). The BE is estimated to be present in 13 of Seychelles 18 ISIC categories, meaning it is comprehensively represented in the country's formal economy. When considering specific contributions, the ISIC category I (Accommodation and food services) is the largest contributor to GVA at 37.3%, followed by category H (Transportation and storage – 25.4%) and category C (Manufacturing – 10.5%) (Figure 4, Table 6). Combined these industries are responsible for approximately 73% of Seychelles' BE GVA. The complete breakdown of ISIC category contributions is in Table 6 below, showing both GVA and percentage composition.

Table 6. Gross value added of each industry within Seychelles Blue Economy

Economic Activity by ISIC Section	GVA by sector generated by BE (USD)	As a % of Total GVA generated by BE
A - Agriculture, forestry and fishing	9,849,316	2.3%
C - Manufacturing	45,561,408	10.5%
E - Water supply; sewerage, waste management and remediation activities	1,505,133	0.4%
F - Construction	8,469,919	1.9%
G - Wholesale and retail trade; repair of motor vehicles	9,329,731	2.2%
H - Transportation and storage	110,080,593	25.4%
I - Accommodation and food service activities	161,752,028	37.3%
K - Financial and insurance activities	26,879,141	6.2%
M - Professional, scientific and technical activities	4,949,929	1.1%
N - Administrative and support service activities	29,594,791	6.8%
O - Public administration and defense; compulsory social security	22,681,779	5.2%
P - Education	1,363,680	0.3%
R - Arts, entertainment and recreation	1,130,391	0.2%
Grand Total	**433,147,840**	**100%**

Figure 4. Share of Blue Economy value added of key industries



The wages that the BE generates are approximately 8.3% of 2018 GNI ($139.6M - Figure 5, Table 7). The vast majority of these wages are estimated to originate from the accommodation and food services industry (50.7%), transportation and storage (19.5%) and administrative and support services (9.5%). Manufacturing is also a significant contributor at 8.7%.

Table 7. Wages attributed to industries within Seychelles Blue Economy

Economic Activity by ISIC Section	Total BE Wages (USD)	As a % of Total Wages generated by BE
I - Accommodation and food service activities	70,732,145	50.7%
H - Transportation and storage	27,278,522	19.5%
N - Administrative and support service activities	13,216,715	9.5%
C - Manufacturing	12,153,417	8.7%
O - Public administration and defense; compulsory social security	4,580,963	3.3%
K - Financial and insurance activities	3,693,678	2.7%
A - Agriculture, forestry and fishing	3,381,557	2.4%
F - Construction	1,730,810	1.2%
R - Arts, entertainment and recreation	1,496,204	1.1%
E - Water supply; sewerage, waste management and remediation activities	675,388	0.5%
M - Professional, scientific and technical activities	532,529	0.4%
P - Education	74,489	0.05%
G - Wholesale and retail trade; repair of motor vehicles	63,484	0.05%
Grand Total	**139,609,901**	**100%**

In terms of employment, the BE is responsible for approximately 41% of all formal employment in Seychelles (22,528 - Figure 6, Table 8). This figure is dominated by employees in the

accommodation and food services industry (40.6%), transportation and storage (14.8%), administration and support service activities (12.8%) and manufacturing (8.5%).

Figure 5. Share of BE wages by industry

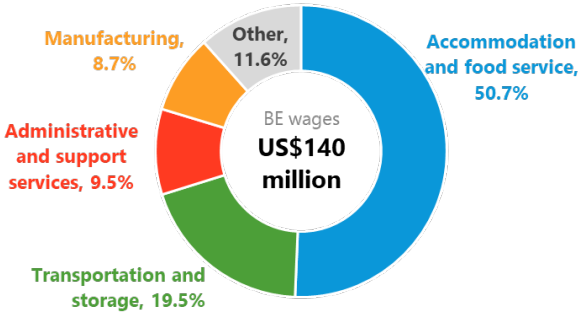
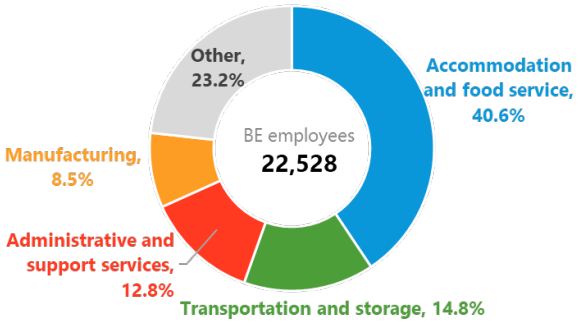


Figure 6. Share of BE employment by industry



The economic dimension results were accepted by stakeholders during the webinar held, with polls (Appendix 7: Results of the polls held during the national webinar) revealing that the majority (75%) of voting participants were happy with the estimated value, yet more than 80% indicated that they expected the BE value to be greater than 50% of Seychelles' GDP.

Table 8. Employment figures associated with Seychelles Blue Economy industries

Economic Activity by ISIC Section	Total Employment related to BE	Total Employment in Sector	As a % of Total Employment generated by BE
I - Accommodation and food service activities	9,149	9,336	40.6%
H - Transportation and storage	3,344	4,180	14.8%
N - Administrative and support service activities	2,891	3,614	12.8%
C - Manufacturing	1,911	3,613	8.5%
O - Public administration and defense; compulsory social security	1,552	6,209	6.9%
F - Construction	1,182	5,910	5.3%
K - Financial and insurance activities	908	1,817	4.0%
G - Wholesale and retail trade; repair of motor vehicles	435	4,352	1.9%
A - Agriculture, forestry and fishing	400	400	1.8%
R - Arts, entertainment and recreation	235	1,175	1.0%
M - Professional, scientific and technical activities	200	1,337	0.9%
E - Water supply; sewerage, waste management and remediation activities	183	612	0.8%
P - Education	138	2,769	0.6%
Grand Total	**22,528**	**45,324**	**100%**

Discussion of Economic Results

The economic value is the result of scrutiny of several publicly available data sources. Given that Seychelles is an island nation heavily reliant on its marine resources either through extraction or through aesthetics, there is concern that this figure is too conservative. Most economic activities in Seychelles have ties with the marine environment at some degree of separation, thus instead of considering secondary links and inflating the value, the conservative, direct link approach was used.

Aside from conventional shortcomings with GDP data, various gaps exist in the current SNA that are particularly applicable to the BE context. Informal economies and those with inadequate reporting exist within the nation, with much of this information not captured. The artisanal fishery is reputed to be small in direct value added to the economy, however it is significant in terms of employ and fleet size. Being a primarily cash-based economy, it is expected that there are activities and payments not captured in the formal economy. This includes the cash sales of fish and marine species at roadside landing sites that are only intermittently monitored. In the tourism and charter industry there is the presence of informal employment on various types of vessel in which labour is exchanged for cash and not bound by employment contracts. Tourism appears more formally regulated, though as the base of comparatively lower income tourists increases, gaps for unregistered or unregulated tour guides will emerge. These, and other gaps, elude formal national accounting and hence inclusion in BE estimates.

In spite of the conservative estimate presented, formal employment in the Blue Economy is quite high (~41%), with the majority of jobs unsurprisingly attributed to the accommodation and food services industry (40.6% - Figure 6, Table 8), which has close ties to tourism. This industry also has the highest contribution to GVA (37.3% - Figure 4, Table 6) and to wages (50.7% - Figure 5, Table 7). Closely tied to both the tourism and fishing industries is transport and storage, which formally employs 14.8% of people in the BE. This industry is also important for inter-island transfers of tourists, Seychellois and importantly, goods and produce. Consequently, it has high importance for the economies of Praslin and La Digue, as well as the outer islands. The accommodation and food services and transport and storage industries also appear to provide more lucrative remuneration in comparison to other industries in the BE as the proportion of employment they provide in the BE is significantly lower than the proportion of wages provided. This does not mean that wages are equitably distributed in the industries though.

On the whole, wages are poorly represented (8.3% of GNI) in the Blue Economy possibly indicating that many of the jobs are poorly remunerated or are oriented toward low skill levels. Seychelles aims to diversity its economy to become more robust, an aim that has been on the national agenda for several years. However, UNDP data shows that Seychelles commits just 0,2%[7] of GDP

[7] http://www.hdr.undp.org/en/countries/profiles/SYC

to research and development annually, a concerning statistic for a nation that has suffered severely at the hands of international economic shocks.

The accuracy of the economic component will be improved as future initiatives are completed, such as the SUTs and satellite accounts mentioned previously. Due to the sensitive nature of financial reporting, in particular in a small country with few entrants in some industries, disaggregated reporting of data is discouraged. Consequently, to create more accurate estimates of Seychelles BE, the BEVTK should be administered by personnel with access to disaggregated economic data. Institutions that could adopt this role include NBS, the Department of Blue Economy or the Economic Planning and Department.

3.2. SOCIAL DIMENSION

The social dimension reveals a highly literate (95.9%) and educated society (~10 years of schooling) with a high Human Development Index (HDI) (79.9) and relatively low inequality (Gini = 38.4). Almost all nationals have access to electricity (97%) and drinking water and sanitation (93%). The positive composite social indicator score is for Seychelles is 70.24 (Table 9) and the negative composite social indicator score is 30.41 (Table 10).

When considering the indicators specifically used within the BEVTK, the social dimension returns four tables. The first (Table 9) represents positive social indicators, or indicators that when their value is high the result is more beneficial to society. These indicators represent the positive composite social index value and include the HDI (79.9), and inequality adjusted HDI (73.4), the maritime security index (68.4) which comprises several indicators, and various education indicators. The education indicators are high for Seychelles, which has a literacy index of 75.2, an education index of 73.9, and a literacy rate of 95.9%. It also includes BE tertiary enrolment which is estimated at 16%.

Table 9. Positive composite social index value

Social category/dimension/ indicator	Social Indicator value	Social Indicator (region average)
H - Human Development & Inequality	**76.60**	**40.52**
H1 - Human Development	**79.85**	**42.37**
H11 - Human Development Index (HDI)	79.85	42.37
H2 - Human Inequality	**73.35**	**38.68**
H21 - Inequality-adjusted Human Development Index (IHDI)	73.35	38.68
M - Maritime Security	**68.41**	**56.27**
M4 - Illicit Trade	**60.00**	**53.89**
M401 - Illicit Trades Score	60.00	53.89
M5 - Maritime Enforcement	**40.11**	**35.26**

M501 - Maritime Enforcement Score	40.11	35.26
M6 - Piracy and Armed Robbery at Sea	**84.93**	**87.85**
M601 - Piracy and Armed Robbery at Sea Score	84.93	87.85
M7 - Rule Of Law	**73.53**	**43.69**
M701 - Rule Of Law Score	73.53	43.69
M2 - Coastal Welfare	**83.49**	**60.66**
M201 - Coastal Welfare Score	83.49	60.66
P - Poverty, Nutrition, Education	**66.98**	**44.41**
P2 - Education	**66.98**	**44.41**
P23 - Literacy index	75.20	44.41
P24 - Education Index	73.90	44.41
P22 - Literacy rate - adult (% >15 years)	95.90	*No data*
P29 - Proportion of tertiary enrolments in Blue Economy oriented programs (%)	16.00	*No data*
Composite Social Index value	**70.24**	**49.18**

The second table represents negative social indicators that can be quantifiably represented in an index (Table 10). The indicators that comprise the negative composite index in Seychelles include the youth unemployment rate (11.3%), the overall unemployment rate (3.3%) as well as the Gini coefficient (38.4) and employment by foreign nationals in the industrial purse seine (88.9%) and semi-industrial long-line fisheries (48.6%).

Table 10. Negative composite social index value

Social category/dimension/ indicator	Social Indicator value	Social Indicator (region average)
H - Human Development & Inequality	**30.41**	**31.57**
H1 - Human Development	**7.25**	**7.61**
H13 - Youth unemployment rate (% youth pop)	11.25	9.91
H14 - Overall unemployment rate (% Pop)	3.25	5.31
H2 - Human Inequality	**53.58**	**42.29**
H23 - Gini coefficient	38.40	42.29
H25 - Foreign workers employed in semi-industrial fishing sector (%)	48.60	*No data*
H26 - Foreign workers employed in industrial (purse-seine & longline) fishing sector (%)	88.90	*No data*
Composite Social Index value	**30.41**	**24.95**

Two additional tables show other social indicators that cannot be easily represented as part of an index's value. Indicators captured in Table 11 include Seychelles' per capita fish consumption value (58.9kg/capita/yr) as well as the mean years of schooling of females (9.9) and males (10.1).

Table 11. Other social indicators with positive outcomes

Social category/dimension/ indicator	Social Indicator value	Social Indicator (region average)
P - Poverty, Nutrition, Education		
P1 - Living Standards		
P12 - Fish, seafood supply quantity (kg/capita/yr)	58.90	57.40
P2 - Education		
P26 - Mean years of schooling, female (years)	9.90	4.42
P27 - Mean years of schooling, male (years)	10.10	5.88

The ratio of unemployed females versus unemployed males is captured in the final table (Table 12). This indicator shows that there is a higher proportion of males unemployed than females in Seychelles.

Table 12. Other social indicators with equity outcomes

Social category/dimension/ indicator	Social Indicator value	Social Indicator (region average)
H - Human Development & Inequality		
H1 - Human Development		
H15 - Overall unemployment rate (female to male ratio)	0.92*	1.09

*A value of <1 has a higher proportion of males unemployed, 1 has an equal ratio of unemployment, >1 has a higher proportion of female unemployed

Discussion of Social Results

The positive and negative composite social index tables (Table 9, Table 10), as well as the non-index indicators (Table 11, Table 12), serve to provide decision makers with a simple, colour-coded tool to understand how the different indicators are performing in Seychelles. Fundamentally, these indicators can assist with resource allocation in terms of staff, funding, strategic planning and policy decisions as favourable or unfavourable trends are observed. The values can also be compared with the regional averages, where available, enabling authorities to understand Seychelles' position within the western Indian Ocean. Having values higher than the regional average could present planners and managers with the opportunity to reach out to other nations or demonstrate the mechanisms that have led to Seychelles being a regional leader. Similarly, in the event of Seychelles scoring lower than regional averages, the country can reach out to more successful nations for knowledge transfer.

As can be seen from the results presented, Seychelles performs stronger than the regional average across almost all indicators. For the positive composite social index, the regional average is 49.18 whereas Seychelles has a far stronger score of 70.24. In spite of its successes in this realm, the

country has a relatively low enrolment in tertiary level BE programs (16%). This is an indicator that was developed for Seychelles which could be applied regionally, allowing for an understanding of how effective its transition to a sustainable BE is. The low value in turn reveals distinct opportunities for the country to focus on fostering BE education. Given time, this would return a youth and potential labour force with a stronger understanding of the components of the BE, as well as where likely opportunities may lie in the many sectors that comprise it. Measuring the enrolment of students in BE related industries could be the first step to showing how low this enrolment is, and uncover the possibility of becoming a regional lead, as the opportunity so readily presents itself. This indicator is new and will need refinement in terms of data collected to ensure its accuracy going forward.

The negative composite social index has a low score of 30.41. In the negative scenario, a lower score is viewed positively. Seychelles score is higher than the regional average of 24.95. This is likely due to a lack of data for foreign employment in national fishing fleets in regional reporting. In spite of Seychelles' value being low, including a relatively low Gini coefficient which indicates a sound level of equality in livelihoods, three values are of concern in this index. The youth unemployment rate stands at almost 12% (2020), practically four times the national unemployment rate. It is also higher than the regional average. Unemployed youth is cause for concern particularly in a nation where access to highly addictive drugs, such as heroin, is possible. Youth unemployment becomes a confusing issue when one considers the other two indicators of concern: the high level of foreign employment in the semi-industrial long-line fishing industry (48.6%) and the high level of foreign employment in the industrial fisheries (88.9%). These indicators should be alarm bells for Seychelles government as they are industries that could provide significant employment to the nation. Fisheries in Seychelles are a source of significant foreign earnings and have the capacity to be a relatively easy partial solution to unemployment issues. Having a high proportion of foreign labour in the industry translates to cash flows exiting the nation that could be patriated in the scenario of high local employment. Indicators, then, can raise flags and direct attention to where possible opportunities may lie, and where major shortcomings exist, enabling decision makers to react and make data driven decisions. The figures used for the proportion of foreign workers in the two fishing industries are based upon a recent report compiled for the Seychelles Fishing Authority. They may require further scrutiny to ensure their integrity.

Seychelles has a high reliance on seafood as a source of protein. This has conflicting benefits and costs. The benefit of this indicator is it illustrates the importance of natural resource health (fisheries) as a complement to human health. Abundant, well managed fisheries secure a natural food source for the nation that has a comparatively low carbon footprint and is not vulnerable to international economic shocks. At the other end of the spectrum is the understanding that if fisheries continue to suffer, so too will the livelihoods of the Seychellois as fish could become increasingly scarce and expensive with consumers relying more heavily on imported protein substitutes, not only increasing the carbon footprint of the nation, but also increasing its

vulnerability to international trade and the shocks that accompany it, *vis-à-vis* the Covid-19 pandemic.

In terms of unemployment equity, Seychelles a near even rate of female:male unemployment. Currently the scale is tipped toward males being more likely to be unemployed than females, a somewhat favourable outcome given international standards, as well as that of the region, where the average shows that it is more likely that female unemployment would trump male unemployment. Employment for women in any society is critical as they are the primarily the foundation of the family unit. Thus, having a low female unemployment rate can translate to greater support of dependents, upon whom future aspirations of a country rely.

3.3. ECOLOGICAL DIMENSION

The ecological dimension reveals substantial natural wealth associated with Seychelles' Blue Economy which is unsurprising given the high potential due to its large EEZ. The value captures three primary natural resources, namely coral reefs (1,690km^2), mangrove forests (25km^2) and seagrass meadows with estimated cover of 27,300km^2 within the country's MPA network. MPAs in Seychelles now span 30% of its EEZ. Although the coral reefs are highly degraded due to anthropogenic induced coral bleaching, they still serve to provide significant value through shoreline protection, tourism and for fisheries in several forms, though all to a lesser degree. Seychelles mangrove forests are not expansive due to the relatively small land mass; in spite of this there have been losses due to deforestation, land reclamation, altering and canalising of water courses and building pressure.

Nonetheless, they continue to deliver services including shoreline protection, water filtration, as a habitat for fish and estuarine species, as well as being carbon sinks. Seagrass meadows are expansive in Seychelles, though the mapping data is dated, and provide a myriad of services, the most valuable of which is the high carbon sequestration (storage) potential, meaning they have potential value in terms of carbon off-setting and trade. This makes them a critical habitat going forward. Seagrass meadows and mangrove forests are known as 'Blue Carbon' habitats. The combined value of the ecological dimension is approximately $40B (Table 13), or almost 100 times greater than Seychelles' GDP in 2018. There are several ongoing projects relating to the services provided by coastal and marine resources in Seychelles, discussed in this chapter, which will increase the accuracy of the estimates and further strengthen the valuation of the ecological component of the BE in time.

Table 13. Ecosystem services values associated with Seychelles Blue Economy

Ecosystem Classification/ Service	Estimated Value of Ecosystem Service (USD)	Ecosystem Service Contribution to the overall
M - Marine	**40,432,534,674**	**100.0%**
M1 - Marine shelf	**40,432,534,674**	**100.0%**
M1.1 - Seagrass meadows	40,073,599,878	99.1%
2 - Regulation & Maintenance (Biotic)	**40,073,599,878**	**99.1%**
2.2 - Regulation of physical, chemical, biological conditions	8,899,811,062	22.0%
2.2.1 - Regulation of baseline flows and extreme events	8,851,913,430	21.9%
2.2.6 - Atmospheric composition and conditions	47,897,632	0.1%
2.1 - Transformation of biochemical or physical inputs to ecosystems	31,173,788,816	77.1%
2.1.1 - Mediation of wastes or toxic substances of anthropogenic origin by living processes	31,173,788,816	77.1%
M1.3 - Photic coral reefs	358,934,796	0.9%
1 - Provisioning (Biotic)	**170,852,112**	**0.4%**
1.1 - Biomass	170,852,112	0.4%
1.1.6 - Wild animals (terrestrial and aquatic) for nutrition, materials or energy	170,852,112	0.4%
2 - Regulation & Maintenance (Biotic)	**188,082,684**	**0.5%**
2.2 - Regulation of physical, chemical, biological conditions	183,878,094	0.5%
2.2.1 - Regulation of baseline flows and extreme events	183,878,094	0.5%
2.1 - Transformation of biochemical or physical inputs to ecosystems	4,204,589	0.%
2.1.1 - Mediation of wastes or toxic substances of anthropogenic origin by living processes	4,204,589	0.0%
MFT - Transitional Terrestrial-Freshwater-Marine	**14,008,305**	**0.0%**
MFT1 - Brackish tidal	**14,008,305**	**0%**
MFT1.2 - Intertidal forests and shrublands	14,008,305	0%
2 - Regulation & Maintenance (Biotic)	**14,008,305**	**0%**
2.2 - Regulation of physical, chemical, biological conditions	10,168,364	0%
2.2.1 - Regulation of baseline flows and extreme events	9,850,374	0%
2.2.6 - Atmospheric composition and conditions	317,991	0%
2.1 - Transformation of biochemical or physical inputs to ecosystems	3,839,940	0%
2.1.1 - Mediation of wastes or toxic substances of anthropogenic origin by living processes	3,839,940	0%
Grand Total	**40,446,542,979**	**100%**

Discussion of Ecological Results

Seychelles is blessed with an abundance of natural capital and resources. Its natural beauty is the very reason it has such high allure with high-income international tourism, and its rich natural capital the very reason it is a significant actor regionally in tuna processing. However, natural capital, particularly extractable species, is innately reliant upon the habitats that support the life cycles of the organisms.

The values returned in the ecological assessment, being almost 100 times the country's GVA, indicate just how important ecological systems are, particularly for island nations. The values are based on the best available data at the time of writing. The mangrove forest and seagrass meadow values will be improved upon by 2022 due to ongoing projects that are discussed briefly below. Additionally, with the Coral Reef Policy and Strategic Action Plan due to be released in 2021, it is likely that new monitoring initiatives will be proposed which will improve on the cover and health estimates of the coral reefs.

Recently the country has taken steps toward further understanding the importance of, and managing, its marine natural resources. This is due in part to: the Seychelles Debt for Nature Swap, which required Seychelles to conduct a comprehensive EEZ-wide marine spatial plan (MSP) resulting in the designation of 30% of its EEZ as marine protected areas in March 2020; the SWIOFish3 program which is assisting Seychelles take steps toward transitioning to a more sustainable BE; the Seychelles Blue Bond supported by the World Bank and Global Environment Facility, a world first and aimed at a supporting the transition to a sustainable Blue Economy; an active Ministry of Agriculture, Climate Change and Environment (MACCE); and the establishment of a Department of Blue Economy, among others. These initiatives have resulted in several projects supporting research into the management, importance and value of marine ecological resources.

An ecosystem services project has been commissioned by the MACCE and SWIOFish3 which The Nature Conservancy is executing. This project is undertaking an ecosystem valuation of the MPAs and coastal resources, within a limited scope. Once complete, it is possible that the data could be used in future BEVTK estimates or refined to be more applicable. A shortcoming is that this project focuses on MPAs, excluding open access areas which cover 70% of Seychelles' EEZ.

Two projects focusing on blue carbon, the term used for carbon stored in marine habitats such as seagrass and mangrove ecosystems, are ongoing in Seychelles. Focusing on seagrass is a project by SeyCCAT, together with University of Oxford and University of Seychelles, which aims to estimate the volume of carbon stored by this ecosystem in Seychelles' EEZ. This project is being funded by Pew Charitable Trusts. The data that is produced by this project will refine the current estimate of seagrass cover within Seychelles EEZ, which is likely to be underestimated. The results will also allow for an accurate estimate of the value of carbon stored by the habitats, again refining the value currently used in the BEVTK. A second coastal blue carbon project is being conducted by the MACCE and the World Bank, which is mapping the mangroves of Seychelles EEZ as well as the carbon stored by these forests. This will allow the current mangrove estimates to be improved upon. Together the outputs of these projects will also be used in Seychelles' future Nationally Determined Contribution to the UNFCCC (NDC) calculations, as well as to establish whether blue carbon trading would be feasible by the country.

The United Nations Development Program's Biodiversity Finance Initiative (BIOFIN) conducted a series of investigations in Seychelles with a view to assist with implementing biodiversity financing, however Seychelles' graduation to high income status saw them lose the development assistance

of this program, as well as many others. Nonetheless, BIOFIN identified a series of possibilities for financing biodiversity protection and management[8].

High volumes of natural capital data is available in Seychelles. However, due to the number of independent organisations obtaining data is difficult, and it is not stored in a standardised format. As Seychelles' MSP transitions to the implementation phase and monitoring plans are developed, there will be increased data available for the ecological component of the Blue Economy. Additionally, an authority is expected to be created to centralise and manage the various data that come from baselines surveys, stock assessments, monitoring and other studies within Seychelles EEZ. Seychelles is currently debating whether to establish an independent entity to implement the MSP rules and regulations, as well as to develop scientific measures and data collection to support the monitoring of Seychelles' ocean space. Due to the financial impacts of the global pandemic, the original idea of having an independent entity from the start is unlikely, with the current favoured approach to be setting up a monitoring body under existing legislation. Nonetheless, having sound ecological data will result in increased awareness of the importance of such initiatives, particularly in a country such as Seychelles whose very existence is inextricably tied to the health and functioning of its natural resources

Going forward, the MSP initiative has identified many ecosystems within Seychelles EEZ, including sea mounts, canyons, important spawning sites, aggregation sites and more, all of which contribute to the ecological value of the Blue Economy. Consequently, there exists a thorough starting point of additional ecosystem services to be explored and valued to ensure a comprehensive ecological value of Seychelles Blue Economy. Having an ocean or natural capital accounting system would enable changes in ecological stocks to be measured over time and would simplify the input of ecological data into the BEVTK.

[8] BIOFIN. 2015. BIOFIN Seychelles: Policy and Institutional Review. UNDP. http://www.biodiversityfinance.org/index.php/knowledge-product/seychelles-policy-and-institutional-review

3.4. BLUE ECONOMY IN FIGURES

The BEVTK offers a dashboard that summarizes the blue economy in the country of study. For Seychelles, based on available data, the BE is:

27.4%

OF GDP IN 2020

This corresponds to US$433 million in value-added. 37% of this VA comes from accommodation and food service activities.

41%

OF TOTAL EMPLOYMENT

However, BE jobs contribute only 8.3% of total national wages (or US$140 million).

US$40 BILLION

MARINE ECOSYSTEM SERVICES

99% of the value of ecosystem services is attributed to seagrass meadows

70.24

POSITIVE COMPOSITE INDEX

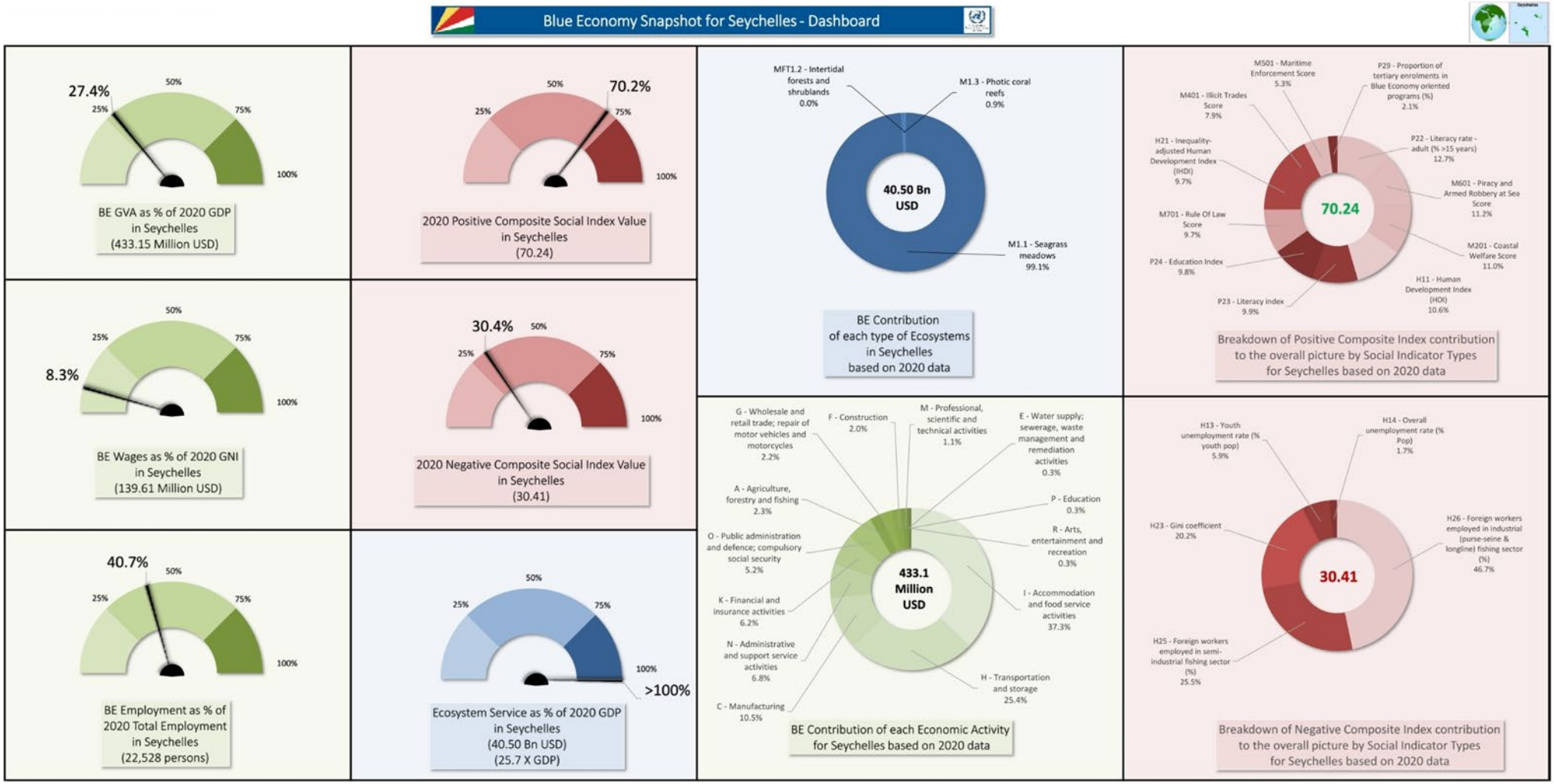
verses a 49.18 regional average

30.41

NEGATIVE COMPOSITE INDEX

verses a 24.95 regional average

Figure 7. The 'Dashboard' of Seychelles' Blue Economy Valuation Toolkit



3.4. SOCIO-ECONOMIC INITIATIVES WITH POTENTIAL TO IMPACT THE BLUE ECONOMY

The Seychelles economy, like many countries vulnerable to external shocks, has been under severe pressure since the onset of Covid-19. In the third quarter of 2020 Seychelles economy saw a contraction of 18.6% year-on-year, though there was slight growth relative to the second quarter of 2020 (National Bureau of Statistics, 2020b). The significant downturn in tourism during 2020 has been the primary contributor to the economic contraction. The year 2020 also saw the transition of power for the first time since independence in 1976 with the opposition party, Linyon Demoktratik Seselwa (LDS), coming into power. The LDS government under President Ramkalawan has been presented with a difficult task in terms of an economy under severe strain, and limited resources with which to mitigate the difficulties. International aid such as a World Bank loan of $15 million aimed at supporting health, social protection as well as the private sector will have brought much needed support. However, the debt burden that the country is facing has resulted in the country receiving support from the International Monetary Fund (IMF), a repeat of the aftermath of the 2008 global financial crisis. The concessionary loan issued by the IMF in 2021 is $105.96M and has the aim of assisting Seychelles to restructure and refine its economic structure to minimise its exposure to future exogenous shocks.

The new government appears to be active and focused. It is acting on several inefficiencies that exist within the country, such as the public sector wage bill and the labour force, which has also been insisted upon in the terms of the IMF loan due in part to inaction on this point in 2008. The government is streamlining agencies and departments to reduce redundancies. It is further aiming to reduce the number of foreign nationals employed in the government sector. The issuing of Gainful Occupation Permits is under strict review with only specific skills being considered. This signals governments belief in their labour force, a promising signal for the country's social wellbeing, provided any valuable skills lost are replaceable from the local workforce. These current actions counter data from 2019 which revealed high skills mismatches, and hence the need for businesses to look abroad for employment (Central Bank of Seychelles, 2020), an issue that may see the need to once again open up the labour market to international entrants. Business leaders indicated that the local labour market was unable to provide the skills necessary to complete their operations as required (Central Bank of Seychelles, 2020), in particular within the larger hotel establishments. This is further reinforced by the high level of foreign labour employed in the semi-industrial long line fishery (48.6%), traditionally a bastion of the Seychelles' fisheries, and the industrial fisheries (88.9%). Nonetheless, it is expected that there will be more job opportunities in the coming months, increasing the potential for employment of Seychellois in parts of the BE.

For the government's logical approach to decrease its reliance on the foreign labour force, the national labour force will have to embrace the working conditions and working hours of the different sectors. In the case of the semi-industrial long line fishery, it has been suggested that a reason for the low participation rate of Seychellois relates to conditions on board the vessels. The Blue Bond is a mechanism that can be used by actors in this industry to take out low interest loans and upgrade their vessels. However, this only likely to happen should there be government

support for local employment in the industry. With indicators in the BEVTK such as foreign employment in the fishery available to decision makers, it becomes easier for them to see the gaps for future Seychelles growth, the corollary of which is where current issues lie.

At the heart of potential in a labour force is education and will. In a continental outlook report, it was revealed that focus on skills development and entrepreneurship would assist in Seychelles in diversification of its economy, as well as more inclusive growth (African Development Bank et al., 2017). Several training facilities exist in Seychelles, known as 'Professional Centres' (PCs), labelled as tertiary institutions (Appendix 2, Table 15). There is a high diversity of programs available to Seychellois at the PCs. Three of the PCs, Seychelles Maritime Academy, The Guy Morel Institute and Seychelles Tourism Academy, as well as the University of Seychelles, provide skills specific to the BE. The indicator tracking BE-tertiary program enrolment shows that only 16% of tertiary enrolments are associated with such programs. Given the importance of fisheries and tourism, as well as their size relative to other sectors, there is the possibility that these PCs could be regional leads in training. Seychelles is a sought-after tourism destination with many highly rated international establishments, thus a significant opportunity exists for the country to host a cutting-edge tourism training institution. However, with the fishing industry struggling with continuity and trained Seychellois youth not being employed in the tourism sector, there appear to be gaps present. Two possible reasons include: top performers take their skills abroad, and; unfavourable working conditions, either due to abnormal hours and transport issues or due to harsh working environments. These gaps and the tertiary enrolment indicator demonstrate to decisionmakers that there is significant opportunity for growth in skills and education in Seychelles BE.

Entrepreneurship is considered to be an important means of unlocking diversification in Seychelles economy (African Development Bank et al., 2017). Despite Seychellois being considered as having an entrepreneurial attitude, entrepreneurship remains muted in the country. The Seychelles Conservation and Climate Adaptation Trust (SeyCCAT), a public-private trust fund that administers grant money from Seychelles debt for nature swap and the blue bond. These funds are required to be used specifically for projects relating to Seychelles Marine Spatial Plan (MSP). Annually, the trust fund is expected to disburse $700,000 of grant money to organisations or individuals who have blue economy projects that align with the trust's mandate. Since 2015, SeyCCAT has awarded 41 grants and disbursed over $2 million in funds. Enterprise Seychelles Agency (ESA) has recently been awarded a grant for a project that aims to train entrepreneurs and micro, small and medium enterprise (MSME) owners in the blue economy. An aim of the project is to engage with and support fishers and their wives, whilst providing financial management support which is a skill that is often lacking with artisanal fishers. Another initiative is The Guy Morel Institute's Blue Economy Accelerator program which aims at exposing youth to entrepreneurial opportunities that could exist in the Blue Economy. A possible future indicator that could be used to quantify the impact of such socio-economic projects funded by SeyCCAT would be to capture the value of SeyCCAT's socio-economic projects and express them as a proportion of the total value of projects funded each year. A shortcoming of this indicator could be the biases that arise if there are changes in funding distribution policies.

Chapter 4: National Webinar

A national webinar on "evaluating the Seychelles Blue Economy" was held on 21 April 2021.

The aim was to present initial findings of the socio-economic assessment report for review and feedback purposes. In total, there were 26 attendees (11 women and 15 men) including the organizers, presenters and consultants. Over 10 participants represented government agencies, civil society, academia, and IGOs based in Seychelles, including the Department of Blue Economy, National Bureau of Statistics and the Economic Planning Department.

4.1. Objective of the webinar

The objective of the national webinar was to provide an overview of the BEVTK and the values generated using it. In particular, the socio-economic indicators were to be presented and discussed, providing stakeholders with an opportunity to comment on the current proposed indicators and to register their concerns and suggestions. The event provided stakeholders with the opportunity to comment on:

- The delineation of the Blue Economy in Seychelles from an economic context
- The usefulness, or practicality, of the BEVTK
- How the BEVTK can be used to further Seychelles Blue Economy agenda
- What would be needed to complement the BEVTK to ensure robust and accurate reporting on Seychelles Blue Economy
- Ownership of the BEVTK by a specific organisation/s

Specific feedback and discussion were sought regarding the points below:

i. Whether the indicators included in the socio-economic assessment are representative of Seychelles' Blue Economy
ii. Whether other indicators should be considered to be a part of Seychelles' socio-economic indicators
iii. Whether the indicators identified, and any suggested by stakeholders during the webinar, can be collected and compiled accurately and cost effectively within a suitable time-frame
iv. Whether the results of the socio-economic indicators, and the BEVTK in general, are likely to be used by government or policy makers going forward

Stakeholder discourse was encouraged as this would only serve to strengthen the BEVTK, in turn creating a more robust and comprehensive product. Additionally, polls were used to assist in

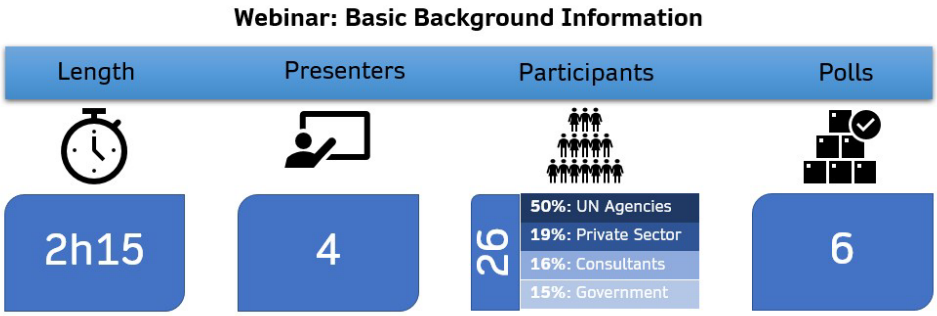
capturing feedback relating to the specific points presented above. In addition to providing comments during the webinar, participants were welcomed to provide comments on the preliminary report within two weeks, prior to the finalization of the report.

4.2. Structure and Execution of the Event

4.2.1. Presentations

Four initial presentations were delivered to provide the context of the series of consultancies to the attendees. The primary presentation, titled Presentation of the draft national socio-economic assessment of Blue potential in Seychelles, consisted of three distinct sections. The first part of the presentation provided the country context of the consultancy and probed why valuing a nation's Blue Economy is important, relating this to the Seychelles context. The second section presented the interim results of the work completed to-date for the consultancy for each of the three dimensions of the BEVTK, namely the economic, social and ecological. Between each of the dimensions, attendees were given the opportunity to engage with the presenter whilst, simultaneously, short polls were run to probe attendee attitudes. Finally, the third section of the presentation brought the material together and invited attendees to ask questions or to discuss aspects of the presentation.

Figure 8. Summary of basic details of the draft socio-economic assessment of the Blue potential in Seychelles national webinar



4.2.2. Polls

Six polls were run during the primary presentation to capture attendee perceptions on specific feedback sought by the consultant. The purpose of the polls was to augment written or verbal feedback provided by attendees and to provide those less likely to interact openly the chance to contribute. Two of the polls related to the economic dimension, two to the social dimension, one to the ecological dimension and one to the BEVTK in general. Support for the polls was adequate, though the last poll was released late and consequently had poor support.

4.2.3. Discussion points and Q&A

The presentation concluded with a summary of the BEVTK values and a discussion session. The BEVTK summary included the challenges faced and possible solutions, as well as the way forward upon completion of the webinar, encouraging participants to provide feedback on the draft report. The discussion provided attendees the opportunity to interact with the presenters and the project lead, as well as each other.

During the interactive session, the following topics were raised by attendees:

- Ownership of the BEVTK
- Assistance with data collection in terms of data gaps
- Regional roll-out of the tool and regional presentations of the tool

Several attendees raised the issue of ownership of the BEVTK. The decision as to which government entity should be responsible for the BEVTK requires deliberation at a higher level once the tool is complete. Staff of the Department of Blue Economy indicated that if they were to be the custodians, they would require further training and support for the use of the tool.

The UN Resident Coordinator's Office for Mauritius and Seychelles (UN RCO) engaged with the National Bureau of Statistics (NBS) and the consultancy team regarding its ability to facilitate support relating to data gaps in the future. The UN RCO indicated that they were aware of broader current UN projects to assist states with specific data collection where gaps and/or capacity is limited. This information and offer was well received by the NBS and consultant alike.

A query was raised by the UN RCO relating to regional roll-out of the tool, as well as presentations to other island states to illustrate the BEVTK and the current research and possibilities emerging in the Blue Economy realm. The project lead indicated that the tool was yet to be finalized, though regional roll out was part of the vision of the tool from the outset. Regarding presentations to other island states and interested parties, she indicated that this would also be feasible and that communication should be continued between UNECA SRO-EA and the UN RCO.

Additional discussion regarding the delineation of Seychelles Blue Economy and the estimated value was raised during the main presentation where a respondent queried the methodology behind the economic value. It was explained that the National Accounts were used to identify industries that were primary, or direct, contributors to the Blue Economy, as well as the full list of industries in Seychelles as provided by the NBS. With economic values only reported at the highest, most aggregated level, the estimated GVA was a coarse figure that was purposefully conservatively calculated. It was pointed out that with more detailed, or disaggregated, National Accounting data and using industries that were not primary, or direct contributors, to the Blue Economy, the value would increase.

4.2.4. Concluding remarks

Key technical government officials were present at the webinar, and they provided an initial validation of the report's findings. The interaction between the attendees and the presenters was sufficient. Beneficially, there was sound interaction between attendees themselves, where opportunities for possible future collaborations and support were identified. The polls were useful and provided insightful feedback for points that were not discussed in depth but were of interest to the consultant. Between the discussion and the polls, the objectives of the webinar were satisfactorily met.

Chapter 5: Conclusions and Recommendations

The Blue Economy concept is gaining substantial international traction. In order to understand how a country's Blue Economy is performing and progressing, it needs to be measured.

UNECA's BEVTK is a means of doing just that: measuring the economic contribution of the Blue Economy, whilst taking into account how socio-economic wellbeing in this context is changing, as well as how the natural environment is being affected through changes in ecological measures and values. The results of the BEVTK series of consultancies have revealed how Seychelles relies heavily on its Blue Economy, as well as clearly indicating the importance of ecological systems to the country's capital wealth. The BEVTK indicators, particularly those specific to the country, have illustrated opportunities for action in the Blue Economy space, particularly in education and employment. Fisheries are an important resource for food security, export and employment, the latter being exposed as a glaring shortcoming and opportunity for the island nation.

The BEVTK, both through its complete values and those that are missing, provides opportunities for Seychelles Blue Economy. The complete values serve to provide and initial estimate of the Blue Economy in Seychelles. The missing values on the other hand illustrate where opportunities lie for further research and work on Blue Economy.

The following recommendations can be made for the improvement of the BEVTK going forward:

- **Centralisation and assimilation** of ecological values as the management plans for the various MPAs within the MSP are created and enforced
- **Ocean and natural capital accounts** should be adopted by the country. This will assist with centralising data regarding natural stocks and flows, with comparison of changes over time, and with the locating of ecological values for the BEVTK
- **National collaborations** specifically between government departments, as well as government and NGOs and the private sector, where these don't already exist. Inter-departmental collaboration could assist in refining values, for example between the Department of Blue Economy, Department of Finance, NBS, Seychelles Central Bank and Seychelles Revenue Commission.
- **Collaboration with international agencies** such as UN departments and the World Bank. The relatively recent establishment of the UN RCO could provide more specific support in

terms of technical support and locating the proprietors of specific information. The World Bank could support in a similar manner.

- **Increase awareness of the Blue Economy**, which can be achieved at a high level through collaborations as suggested above, as well as through sensitisation campaigns, particularly around circular economy principles and initiatives
- **Custodianship of the BEVTK** is critical to the success of the toolkit going forward, with sound training and support on the tool

Additionally, having acknowledged the likely underrepresentation of the economic dimension, through the recommendations above additional efforts should be geared toward refining the data, particularly in reporting economic activity to higher ISIC levels. The methodology adopted should have robust reasoning yet be simple and replicable to ensure continued use of the BEVTK, a principle that should be applicable across all data computing and input associated with the tool.

References

African Development Bank, OECD, & UNDP. (2017). *African Economic Outlook 2017: Entrepreneurship and Industrialisation*.

ASCLME. (2011). *Coastal livelihoods in the Republic of Seychelles*. http://www.dlist.org/sites/default/files/doclib/Somalia Annex XI CLA final draft 22-11-2010.pdf

Burgess, M. G., Clemence, M., McDermott, G. R., Costello, C., & Gaines, S. D. (2018). Five rules for pragmatic blue growth. *Marine Policy*, *87*, 331–339. https://doi.org/10.1016/j.marpol.2016.12.005

Carolus, I. (2015). *Seychelles Marine Spatial Planning Legislative and Policy Review*.

Central Bank of Seychelles. (2020). *Central Bank of Seychelles Annual Report 2019*. https://doi.org/10.1097/01.nep.0000000000000631

CIA. (2021). *World Factbook: Seychelles*. The World Factbook. https://www.cia.gov/the-world-factbook/countries/seychelles/#economy

FAO. (2018). *Achieving Blue Growth: Building vibrant fisheries and aquaculture communities*. https://doi.org/10.1007/978-3-319-63498-2

Frederick, R., & Ramrattan, D. (2020). *Draft - Comparative analysis of the Blue Economy in Seychelles, Saint Lucia and The Bahamas using Satellite Accounts*.

Government of Seychelles. (2014). *Seychelles' National Biodiversity Strategy and Action Plan 2015-2020*.

Government of Seychelles. (2017). *Seychelles blue bond: transitioning to sustainable artisanal fisheries and strengthening value chain benefits through innovative finance and partnerships*. United Nations Ocean Conference. https://oceanconference.un.org/commitments/?id=16283

Government of Seychelles. (2018). *Seychelles Decent Work Country Programme 2019-2023*.

Government of Seychelles. (2019). *Seychelles Fisheries Sector Poilcy and Strategy 2019*.

Hindle, J. (2019). *Investing in the Blue Economy: How Should Impact Be Measured?*

Hudson, A. (2018). *Blue Economy: a sustainable ocean economic paradigm*. United Nations Development Programme. https://www.undp.org/content/undp/en/home/blog/2018/blue-economy-sustainable-ocean-economic-paradigm.html

Indian Ocean Commission, & UNECA. (2020). *Regional Action Plan for the Blue Economy*.

Keen, M. R., Schwarz, A. M., & Wini-Simeon, L. (2018). Towards defining the Blue Economy: Practical lessons from pacific ocean governance. *Marine Policy*, *88*, 333–341. https://doi.org/10.1016/j.marpol.2017.03.002

Ministry of Finance Trade and Economic Planning. (2017). *Third South West Indian Ocean Fisheries Governance and Shared Growth Project (SWIOFish3): Environmental and Social Management Framework for SWIOFish3 Project*.

National Bureau of Statistics. (2020a). *Population and Vital Statistics: Mid-Year Population Estimates 2020*.

National Bureau of Statistics. (2020b). *Quarterly National Accounts Statistics 2020-Q3* (Issue December).

National Bureau of Statistics. (2020c). *Statistical Abstract 2019-2020*.

National Bureau of Statistics. (2021). *Visitor Statistics 2020: December 2020*.

OECD. (2021). *COVID-19 pandemic: Towards a blue recovery in small island developing states*. https://read.oecd-ilibrary.org/view/?ref=1060_1060174-tnkmsj15ap&title=COVID-19-pandemic-Towards-a-blue-recovery-in-small-island-developing-states

Okafor-Yarwood, I., Kadagi, N. I., Miranda, N. A. F., Uku, J., Elegbede, I. O., & Adewumi, I. J. (2020). The blue economy-cultural livelihood-ecosystem conservation triangle: The African experience. *Frontiers in Marine Science*, *7*(586), 1–18. https://doi.org/10.3389/fmars.2020.00586

Pauli, G. (2019). *The Blue Economy: A Report to the Club of Rome*. The Blue Economy. https://www.theblueeconomy.org/

Republic of Seychelles. (2018). *Seychelles Blue Economy: Strategic Policy Framework and Roadmap Charting the future (2018-2030)*.

Seychelles Ports Authority. (2019). *Seychelles Ports Authority Strategic Plan 2019-2023*.

UNEP, FAO, IMO, UNDP, IUCN, & World Fish Centre. (2012). *Green Economy in a Blue World*.

United Nations. (2012). The Blue Economy Concept Paper. In *Rio +20 United Nations Conference on Sustainable Development*. https://doi.org/10.1057/s41301-016-0046-9

Wenhai, L., Cusack, C., Baker, M., Tao, W., Mingbao, C., Paige, K., Xiaofan, Z., Levin, L., Escobar, E., Amon, D., Yue, Y., Reitz, A., Sepp Neves, A. A., O'Rourke, E., Mannarini, G., Pearlman, J., Tinker, J., Horsburgh, K. J., Lehodey, P., … Yufeng, Y. (2019). Successful blue economy examples with an emphasis on international perspectives. *Frontiers in Marine Science*, *6*, 1–14. https://doi.org/10.3389/fmars.2019.00261

World Bank, & United Nations Department of Economic and Social Affairs. (2017). *The Potential of the Blue Economy: Increasing Long-term Benefits of the Sustainable Use of Marine Resources for Small Island Developing States and Coastal Least Developed Countries*. https://doi.org/10.2826/190498

Appendices

Appendix 1: World Bank's Components of the Blue Economy

Table 14. Components of the Blue Economy

Type of Activity	Ocean Service	Industry	Drivers of Growth
Harvest of living resources	Seafood	Fisheries	Food Security
		Aquaculture	Demand for Protein
	Marine biotechnology	Pharmaceuticals, chemicals	R&D for healthcare industry
Extraction of non-living resources, generation of new resources	Minerals	Seabed mining	Demand for minerals
	Energy	Oil and gas	Demand for alternative energy sources
		Renewables	
	Fresh water	Desalination	Demand for fresh water
Commerce and trade in and around the oceans	Transport and trade	Shipping	Growth in seaborne trade; International regulations
		Port infrastructure and services	
	Tourism and recreation	Tourism	Growth of global tourism
		Coastal Development	Coastal urbanization
			Domestic regulations
Response to ocean health challenges	Ocean monitoring and surveillance	Technology and R&D	R&D in ocean technologies
	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	

Source: World Bank (2016). Oceans 2030: Financing the Blue Economy for Sustainable Development (http://pubdocs.worldbank.org/en/446441473349079068/AMCOECC-Blue-Economy-Development-Framework.pdf)

Appendix 2: Seychelles' Professional Centers

Table 15. Seychelles Professional Centres and their parent Ministries

Seychelles Professional Centre		Ministry	Direct link to BE?
NIHSS	National Institute for Health and Social Studies	Ministry of Health	N
STA	Seychelles Tourism Academy	Ministry of Tourism	Y
SBSA	Seychelles Business Studies and Accounting	Ministry of Education and Human Resource Development	N
SIT	Seychelles Institute of Technology	Ministry of Education and Human Resource Development	N
SMA	Seychelles Maritime Academy	Ministry of Education and Human Resource Development	Y
SIAD	Seychelles Institute of Art and Design	Ministry of Education and Human Resource Development	N
SIAH	Seychelles Institute of Agriculture and Horticulture	Ministry of Education and Human Resource Development	N
SITE	The Seychelles Institute of Teacher Education	Ministry of Education and Human Resource Development	N
SIDOL	The Seychelles Institute of Distance & Open Learning	Ministry of Education and Human Resource Development	N
TGMI	The Guy Morel Institute	Ministry of Education and Human Resource Development	N
UniSey	University of Seychelles	Ministry of Education and Human Resource Development	Y/N

Source: https://www.tec.sc/tertiary-education-institutions

Appendix 3: Potential socio-economic statistics for future inclusion in the BEVTK

Table 16. Socio-economic statistics not included in the BEVTK that have potential as indicators of socio-economic Blue Potential

Category	Statistic	Measurement	Possible data source	Applicable to
Poverty, Nutrition, Education	Multidimensional Poverty Index	Reported statistic	NBS	BE wide
Human Development & Inequality	Proportion of fishing vessels with vessel monitoring systems, in total and by sector – Safety at sea	Proportion – vessels with monitoring systems of total vessels	SFA / Seychelles Maritime Safety Authority	Fisheries
	Catch per unit effort as a proxy for time away from family	Reported. Could also be a relative index showing change over time	SFA	Fisheries
	Dependency ratios	Proportion – those outside working population of working population	NBS	BE wide
	Proportion of Seychellois in middle and upper management in Tourism establishments	Proportion – Seychellois employed in higher level positions in the Tourism industry	NBS	Tourism

Appendix 4: Seychelles Economic Activities and Preliminary Socio-Economic Datasets

Table 17. Seychelles main economic activities and those that are part of the Blue Economy

Economic activity	Blue Economy activity
Agriculture	No
Aquaculture	Yes
Coastal Tourism	Yes
Curio Trade	Yes
Fisheries	Yes
Forestry	No
Mining	No
Shipping and Ports	Yes

Adapted from: UNEP-GEF-WIO-LaB Project (2008)

Table 18. Current socio-economic datasets held by NBS

Data	Reporting frequency	Latest release
Multidimensional Poverty Index		2020 – 2019 data
Poverty Profiling Report		2019: 2017/2018 data
Visitor Safety and Security Survey	Quarterly	Q4 2017 data
Crime, Justice and Security	Quarterly	Q3 2020 data
Unemployment statistics	Quarterly	Q3 2020 data
Population and Vital Statistics	Biannual	H1 2020 data
Population Distribution Maps		No date
Employment and Earnings	Quarterly	Q3 2020
Living Conditions Survey Report		2014: 2011 data
Household Budget Survey	Approx. every 5-7 years	2013
Food Insecurity Experience Scale	Ad hoc	2018: 2017 data
Population and Housing Census	Approx. every 10 years	2012: 2010 data
Labour Force Survey	Ad hoc	2013: 2011/2012 data

Source: National Bureau of Statistics website: https://nbs.gov.sc/

Table 19. Potential future data sources, in addition to current sources

Data source	Data description	Statistics	Data type	Possible availability
NBS	Tourism Satellite Account	Gross Value Added, employment	Economic	2021
NBS/ SFA	Fisheries Satellite Account	Wages, employment, gender equity	Economic and Social	2022
SFA	Various stock assessments	Health of fishery	Ecological and Social	

Appendix 5: Agenda for the national webinar held on 21 April 2021

This national consultation will be held virtually on 21 April 2021 with the following agenda:

Welcome and Introduction
Mama Keita, Director of UNECA Sub-Regional Office for Eastern Africa (SRO-EA)

Brief Overview - UNECA and the Blue Economy
Raquel Frederick, Associate Economic Affairs Officer

Overview of Series of Consultancies
Stuart Laing, National Consultant

Overview of Toolkit
Philippe Lallemand, Consultant

Presentation of Draft National Socio-Economic Assessment of Blue Potential
Stuart Laing, National Consultant

Q&A

The event and discussions will be moderated by Stuart Laing.

Appendix 6: List of attendees of the national webinar held 21 April 2021

Table 20. List of attendees of the national webinar

Name	Role	Affiliation
Adebiyi Odegbile	Attendee	UN
Alexander Mancham	Attendee	UN
Angelique Pouponneau	Attendee	Seychelles Conservation and Climate Adaptation Trust
Chrissant Barbe	Attendee	Department of Blue Economy
Christine Umutoni	Attendee	UN
Colm Kennedy	Attendee	UN
Daya Bragante	Attendee	UN
Didier Habimana	Attendee	UN
Economic Planning Seychelles	Attendee	Economic Planning Department
Emelang Leteane	Attendee	UNECA SRO-EA
Fabio Losa	Attendee	UN
Fatime Kante	Attendee	Department of Blue Economy
Jeffrey Milanette	Attendee	Innovative Partners Incubation
Jeremie Delage	Attendee	UN
Kevin Bistoquet	Attendee	National Bureau of Statistics
Laurene Manzi	Attendee	Vanguard Economics
Florence Loeve	Attendee	Africa Intelligence
Mads Knudsen	Attendee	Consultant
Mama Keita	Presenter	UNECA: Director SRO-EA
Oliver Bastienne	Attendee	Seychelles Chamber of Commerce and Industry
Philippe Lallemand	Presenter	Consultant
Pierre Fallavier	Attendee	UN: Resident Coordinator's Office - Mauritius and Seychelles
Raquel Frederick	Organizer	UNECA SRO-EA: Project Manager
Sebastien Vauzelle	Attendee	UN
Stuart Laing	Presenter	Consultant
Zahra Omar	Attendee	Consultant

Appendix 7: Results of the polls held during the national webinar

Figure 9. Poll results for Seychelles Blue Economy GVA figure

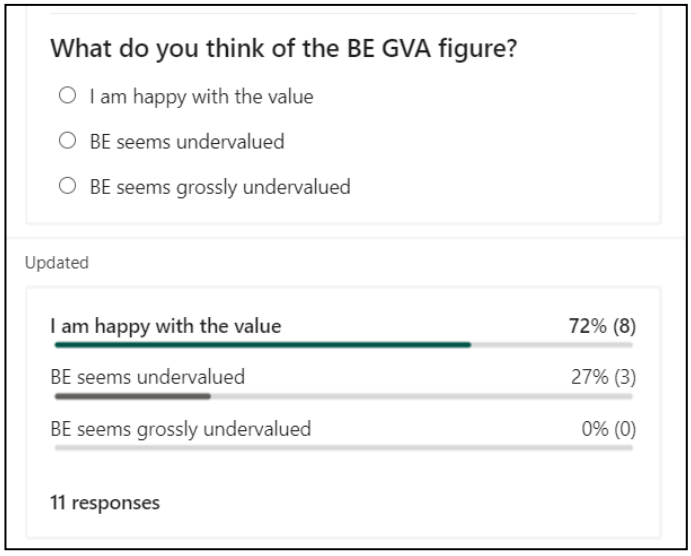


Figure 10. Poll results for Seychelles' Blue Economy expected proportion of

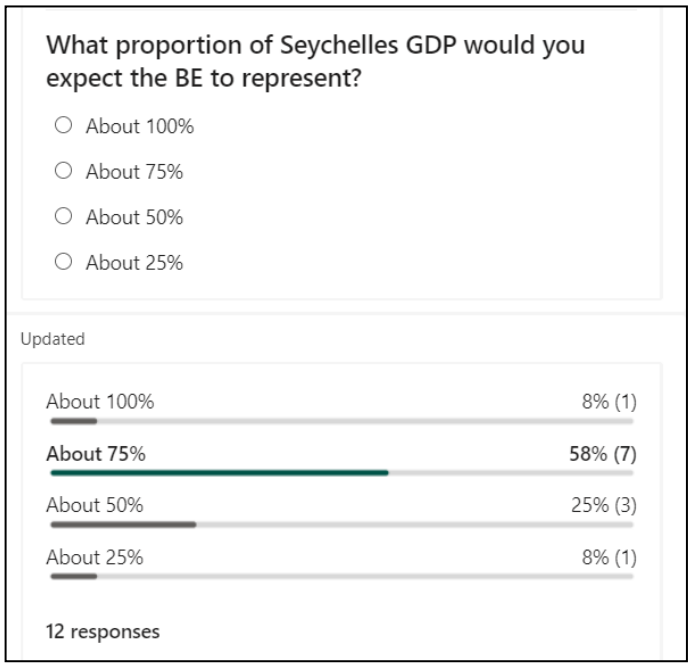


Figure 11. Poll results for the number of social indicators

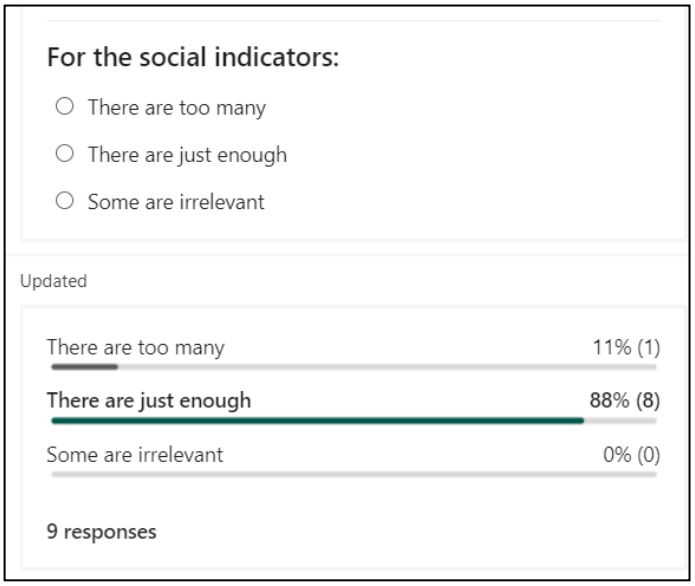


Figure 12. Poll results for which Seychelles indicators should be included in the BEVTK

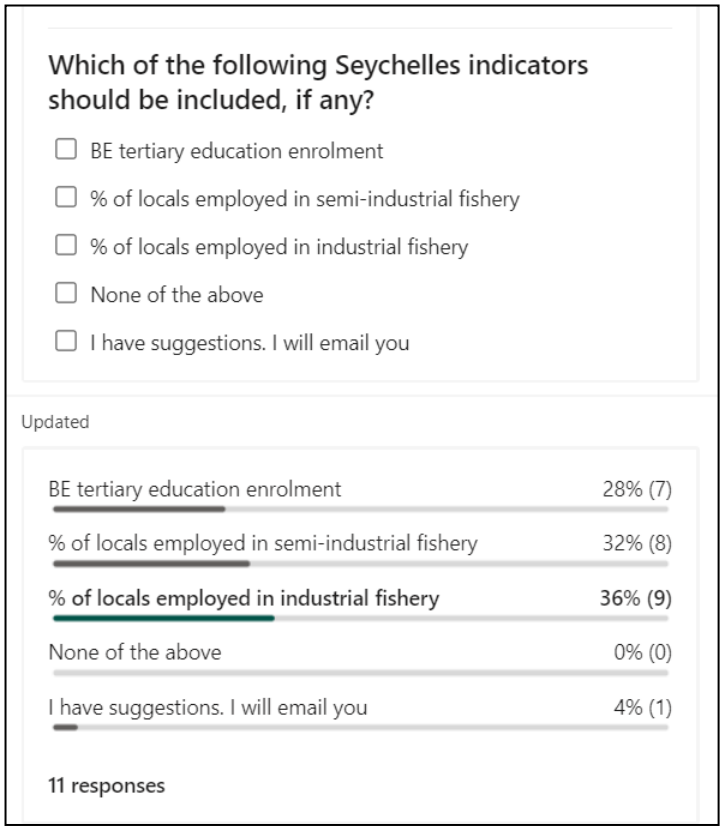


Figure 13. Poll results for estimated ecosystem values

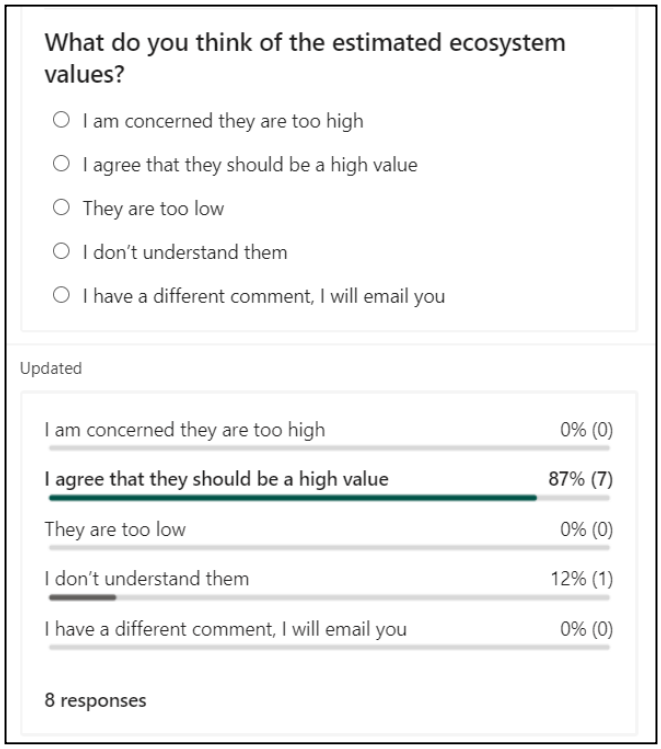


Figure 14. Poll results for whether respondent would use the BEVTK's outputs