Testing of a Blue Economy Valuation Toolkit

Final expanded report

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Abbreviations

Abbreviations	
AU	African Union
BE	Blue Economy
BEVT	Blue Economy valuation toolkit
ECA	Economic Commission for Africa
EEZ	Exclusive Economic Zone
IOC	Indian Ocean Commission
IOTC	Indian Ocean Tuna Commission
LDS	Linyon Demokratik Seselwa
MPA	Marine Protected Area
MSP	Marine Spatial Plan
NA	National Accounts
NBS	National Bureau of Statistics
OA	Ocean Accounting
SeyCCAT	Seychelles Conservation and Climate Adaptation Trust
SFA	Seychelles Fishing Authority
SNA	System of National Accounts
SWIOFish3	World Bank Third South West Indian Ocean Fisheries Governance and Shared Growth Project
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
US	United Seychelles

Purpose of report

The purpose of this final, expanded report is to build upon the previous report, *Review of Seychelles' System of National Accounts*, with information gained during the piloting of the Blue Economy valuation toolkit (BEVTK). The objective is to compile findings and recommendations for the BEVTK. The following topics will be expounded to achieve the objectives of the report:

- Information gathered from stakeholders
- Estimation of figures used in the toolkit
- Shortcomings or obstacles encountered
- Recommendations for improvement

Using the above details in conjunction with the interim report results in a thorough report which earmarks the forward trajectory for the BEVTK. The above topics are presented in Section 2 of the report.

Section 1: Review of Seychelles' System of National Accounts

Background

Seychelles began its transition to the UN System of National Accounts (SNA) in 2007[1], just prior to defaulting on interest payments on a $230M Eurobond due to its foreign exchange reserves having been exhausted[2]. The version of the SNA the island state initially adopted was the SNA 1993 revision. By 2013 Seychelles had transitioned to a market based economy, with the assistance of the International Monetary Fund. Since then, Seychelles' National Bureau of Statistics (NBS) has captured accounts from most sectors of the economy, coding them with the International Standard of Industry Classification (ISIC Revision 4)[3], and enabling comparison of data internationally. Seychelles SNA calculates GDP using both production and expenditure approaches[4]. From a reporting perspective, NBS is currently transitioning from SNA 1993 to SNA 2008, a process that is expected to be completed by 2020.

Seychelles was an early adopter of the Blue Economy concept, being an advocate since the UN Conference on Sustainable Development, Rio+20, in June 2012. The government established a Blue Economy Department in 2015, which forms part of the Ministry of Finance, Trade and the Blue Economy, with the department being under the portfolio of the Vice-President[5]. In October 2020, the

[1] https://www.nbs.gov.sc/statistics/national-accounts
[2] https://www.cia.gov/library/publications/the-world-factbook/geos/se.html
[3] https://www.nbs.gov.sc/statistics/national-accounts
[4] National Bureau of Statistics. 2019. *Statistical Bulletin: 2018 Annual National Accounts Statistics*. Victoria, Mahé. https://www.nbs.gov.sc/downloads/ana-2018/viewdocument
[5] Republic of Seychelles. 2019. *Seychelles Blue Economy: Strategic Policy Framework and Roadmap Charting the future (2018-2030)*. The Commonwealth Secretariat. http://www.seychellesconsulate.org.hk/download/Blue_Economy_Road_Map.pdf

country held peaceful general elections which resulted in the ruling party of 43 years, United Seychelles (US), being replaced by the opposition party, Linyon Demokratik Seselwa (LDS). The new President, Wavel Ramkalawan, has been sworn in to the presidency. It is anticipated that there will be cabinet shuffles that will ensue.

The *Seychelles Blue Economy: Strategic Policy Framework and Roadmap* (2018-2030) (*"Roadmap")* provides insight into Seychelles' approach towards realizing a sustainable BE, of which intergenerational benefit and environmental wellbeing are key components. The country's approach is based on seven BE principles, which are communicated through four strategic pillars. The seven BE principles are:

1. Economic efficiency
2. Healthy oceans and sustainable use
3. Social equity, food security, and healthy lifestyles
4. Transparency, inclusiveness and accountability
5. Resilience
6. Innovation
7. National, regional and international cooperation

The four strategic pillars that Seychelles has earmarked to assist in delivering, or transitioning to, a BE are:

1. Creating sustainable wealth
2. Sharing prosperity
3. Securing healthy, resilient and productive oceans
4. Implementation through strengthening the enabling environment

Together the BE principles and strategic pillars, or priorities, have been conceived to guide and direct present and future endeavours for Seychelles BE vision to be realized[6]. Accounting for the BE will be integral to monitoring the progress toward a sustainable BE. Such measures will assist in monitoring and managing resources and resource allocation, identifying where these can be rebalanced or more efficiently allotted. However, in order to account for BE activities there needs to be an understanding of what data currently exists, what extra data is needed, and which data need to be built upon.

The small island developing state has been highly successful in attracting funding for its transition to a sustainable blue economy, which is currently primarily aimed at transitioning the fishing industry, particularly the artisanal component, through diversification and better management of the resources. Investment in the Blue Economy has come from: the Seychelles Debt for Nature Swap which resulted in the protection of 30% of Seychelles EEZ and grant funds for BE innovation, disbursed by the Seychelles Conservation and Climate Adaptation Trust (SeyCCAT)[7]; Seychelles innovative and first of its kind Blue Bond with proceeds to be used specifically for improvements in priority fisheries governance, expanding the current marine protected areas (MPAs) and the development of the Blue Economy[8]; development

[6] Ibid.
[7] Hindle, J. 2019. Investing in the Blue Economy: How should impact be measured? Imperial College Business School. https://imperialcollegelondon.app.box.com/s/yjlasicw8jf9vtcpldakdhacqr8ujxcq
[8] Roth, N., Thiele, T. & von Unger, M. 2019. Blue Bonds: Financing Resilience of Coastal Ecosystems – Key points for enhancing finance action. IUCN. https://www.4climate.com/dev/wp-content/uploads/2019/04/Blue-Bonds_final.pdf

funding through the World Bank Group's Third South West Indian Ocean Fisheries Governance and Shared Growth Project (SWIOFish3) with funding and guarantees from the Global Environment Facility, the International Bank for Reconstruction and Development and Seychelles Blue Bond[9]; an independent public-private trust fund, SeyCCAT, which disburses the grant money received from the Debt for Nature Swap and Blue Bond, as well as attracting philanthropic funds and additional grant funding and capital, among other initiatives.

Seychelles economy, particularly its two primary industries tourism and fisheries, is heavily dependent on the health and quality of its marine natural capital[10]. Traditionally, the management of coastal and marine ecosystems have been compromised by "insufficient financing, capacity, and legal and institutional frameworks"[11]. Together with the *Roadmap* and recent BE momentum, it is expected that Seychelles will transcend previous drawbacks to emerge with a sound, sustainable BE that, due to the BEVT, is measurable and reportable.

Feedback on the System of National Accounts (SNA)

The capturing of, and accounting for, blue economy activities is in its infancy in Seychelles. Similar to other countries, Seychelles' current SNA does not account for stocks and flows of natural capital, nor does it account for activities that are solely applicable to the Blue Economy. Currently the annual national accounts (NA) that are distributed in the public domain are restricted to ISIC level 1, the broadest category of NA. With higher level categories come increased detail, enabling more accurate and detailed reporting. Such data does exist in some instances, allowing for more accurate estimates for the BEVT. However, in countries with small economies, some industries only contain a handful of economic agents. The consequence of publishing detailed statistics under such circumstances being that sensitive information could be deduced by competitors, putting agents at risk.

NBS is developing a supply-use table (SUT), which has been completed but is currently undergoing validation. The SUTs are expected to improve the accuracy of value added and GDP estimates, as well as providing a more accurate overview of the economy in terms of industry players and structure. Having access to such data is expected to improve BE estimates somewhat. SUTs also play an important part in the creation of input-output tables. Together these tools can report on non-traditional measures such as carbon footprints and jobs in specific industries. Such detail and previously unconventional measures are increasingly important and form essential parts of a country's BE.

The consultant will be having a further meeting with NBS during the first week of November to ascertain whether the SUT will indeed assist with the BEVT and to what extent.

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[9] 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*. Victoria, Mahé. http://www.finance.gov.sc/uploads/resources/170504%20SWIOFish3%20-%20Final%20ESMF.pdf

[10] 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*. Victoria, Mahé. http://www.finance.gov.sc/uploads/resources/170504%20SWIOFish3%20-%20Final%20ESMF.pdf

[11] Ibid.

Economic data captured

NBS sources its data from administrative data sources. In prior years, data had been sourced from specific establishments, however due to low response rates, high costs associated with such data collection and possibly poor reporting, this avenue has been terminated[12]. As a result, the primary data sources that NBS uses are presented in Table 1 below.

Table 1: Data sources and details thereof captured by NBS and used for annual NA reporting[13]

Data source	Detail	Shortcoming
Value Added Tax – Seychelles Revenue Commission (SRC)	Computerised and classified. Produces estimates of output	Coverage limits as VAT only applies to certain specified activities. Issues with using VAT for output estimates on volume basis for certain manufacturing activities
Private Sector Financials	Provided by companies to SRC	Data only from 2014 onwards
Direct Financial Data	Government finance statistics and fiscal reports – Ministry of Finance Income and expense statements for Commercial Banks – Central Bank of Seychelles Financial statements for market parastatals and selected large private companies Operations of major companies in Seychelles International Trade Zone - Financial Service Authority	
National Bureau of Statistics data sources	Employment and earning, merchandise trade, production surveys, tourism, household budget surveys, censuses	

Being a small island developing state, most of the activities in Seychelles can be attributable to the BE. However, care should be taken not to overstate the value of the BE and ensure that there are not misallocations. Seychelles value added and GDP data for the years 2013 – 2018 are presented in Table 2 below. The table shows all the industries that are present in the island state, as well as the ISIC code associated with the activities. As has been discussed previously, the data presented below is at the highest level (level 1) of aggregation. Consequently, identifying the relevant BE industries and ascribing the relevant value added to the BEVT would result in overstatement of the BE in Seychelles. The result being that more detailed industry information is required to make more accurate estimates, at least to

[12] National Bureau of Statistics. 2019. *Statistical Bulletin: 2018 Annual National Accounts Statistics*. Victoria, Mahé. https://www.nbs.gov.sc/downloads/ana-2018/viewdocument
[13] Ibid.

ISIC level 2. Additionally, some industries have inputs from other industries, meaning that BE values may not be accounted for if a particular industry is omitted from the BE calculations

Table 2: Seychelles Gross Domestic Product by Industry at Current Market Prices – Production Account (SCR million)[14]

		2013	2014	2015	2016	2017	2018
SIC	Industry	(F)	(P)	(P)	(P)	(P)	(P)
A01	Agriculture	215.2	222.7	223.2	227.3	236.9	277.8
A03	Fishing	212.0	183.0	152.0	154.8	154.4	159.8
C10	Manufacture of food	496.9	465.5	358.4	374.1	524.0	716.7
C11-12	Manufacture of beverages and tobacco	372.3	355.3	398.3	388.0	390.9	418.4
C23	Manufacture of concrete, rock products, glass etc	75.0	79.5	102.0	99.7	81.1	91.6
C13-22,24-33	Manufacturing, other	211.3	212.6	238.8	231.6	238.0	261.7
D	Electricity, gas, steam and air conditioning supply	335.2	347.6	420.4	433.8	415.5	386.9
E	Water supply; sewerage, waste management and remediation activities	74.0	76.3	75.0	80.4	79.6	81.4
F	Construction	456.7	543.8	575.3	551.0	580.9	687.1
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	1,102.5	1,103.1	1,268.0	1,343.4	1,455.8	1,513.7
H	Transportation and storage	1,393.7	1,604.9	2,057.3	2,111.0	2,147.3	2,232.5
I	Accommodation and food service activities	2,219.1	2,277.0	2,291.8	2,369.5	2,550.1	2,677.9
J	Information and communication	737.4	886.7	910.6	955.5	1,099.9	1,160.8
K	Financial and insurance activities	621.4	599.7	797.4	899.5	872.3	872.2
L01	Real estate activities	1,029.7	1,051.4	1,016.7	1,054.3	1,102.8	1,113.6
L02	Owner occupied dwellings	1,435.9	1,463.0	1,494.7	1,523.0	1,958.2	2,063.9
M	Professional, scientific and technical activities	388.7	439.8	479.8	498.9	496.4	535.4
N	Administrative and support service activities	413.2	439.7	497.3	521.1	574.1	600.2
O	Public administration and defence; compulsory social security	1,013.0	1,099.5	1,234.2	1,279.2	1,362.5	1,472.0
P	Education	360.9	369.1	392.2	405.2	415.1	442.5
Q	Human health and social work activities	272.1	295.9	309.7	317.9	354.0	387.8
R	Arts, entertainment and recreation	96.7	105.1	95.2	96.8	100.4	91.7
S	Other service activities	82.6	97.4	94.6	100.6	101.9	97.2
	less intermediate FISIM	(223.7)	(207.7)	(283.1)	(328.1)	(324.9)	(360.9)
All Industries	Value added at basic prices	13,391.7	14,110.9	15,199.7	15,688.6	16,967.3	17,981.7
	Taxes less Subsidies on products	2,622.8	3,008.3	3,140.2	3,313.8	3,839.1	4082.08
	GDP at current market prices	16,014.5	17,119.2	18,339.8	19,002.4	20,806.3	22,063.8

An example of how extra detail can assist in making BE estimates is found in Table 3 where more detailed tourism accounts are presented for Seychelles. This table is not without its shortcomings too, of which NBS and other stakeholders are aware; as such a tourism satellite account (TSA) is currently being developed which is likely to be complete by 2021.

[14] Ibid

Table 3: Value added by Tourism related industry for Seychelles at current prices (SCR million)[15]

SIC	Industry	2013 (F)	2014 (P)	2015 (P)	2016 (P)	2017 (P)	2018 (P)
G	Wholesale and retail trade; repair of motor vehicles and motor	28.9	30.8	32.7	35.4	35.0	35.8
H	Transportation and storage	417.8	446.2	502.9	554.9	580.2	582.7
I	Accommodation and food service activities	945.8	958.2	965.4	980.5	1,038.9	1,063.6
N	Administrative and support service activities	173.0	177.4	193.4	206.6	185.1	187.7
R	Arts, entertainment and recreation	4.6	4.7	4.1	4.1	4.2	3.9
	Gross Value Added (GVA)- Tourism related activities	1,570.1	1,617.3	1,698.6	1,781.5	1,843.4	1,873.7
	Taxes on Products	192.5	202.2	212.1	222.7	234.6	241.3
	Total GDP - Tourism related activities	**1,762.6**	**1,819.5**	**1,910.7**	**2,004.1**	**2,078.0**	**2,115.0**
	Total GDP at constant market prices	**7,357.0**	**7,688.4**	**8,068.0**	**8,436.2**	**8,805.3**	**9,135.8**
	Tourism related contribution (%)	**24.0%**	**23.7%**	**23.7%**	**23.8%**	**23.6%**	**23.2%**

Part of the logic upon which the BEVT is based originates from previous work done by the European Commission (EC) (2017) in Reunion[16]. The consultant shared the template from the EC project with NBS for the Bureau staff to advise on which of the activities identified in Reunions instance could be applicable to Seychelles. Additionally, NBS identified their source data for each of the 'sectors' identified. The activities mentioned in the table are at ISIC level 4 equivalent, to give an illustration of the detail that can be captured. The results of this exercise can be found in Table 4 below.

Table 4: Blue Economy activities in Seychelles according to NBS with source of data, adapted from Insee La Réunion

Group	Sector	Activities (4-digit NACE codes; French code NAF rev. 2 and APET based on NACE codes)	Sources
Living resources	Fisheries and aquaculture	A 03.11 Marine fishing (production)	Seychelles Fishing Authority (SFA)
		A 03.21 Marine aquaculture (production)	Seychelles Fishing Authority (SFA)
		A 03.22 Freshwater aquaculture (production) - non maritime activity	Seychelles Fishing Authority (SFA)
		C 10.20 Processing and preserving of fish, crustaceans and molluscs	Indian Ocean Tuna (IOT)
		C 10.41 Manufacture of oils and fats	Indian Ocean Tuna (IOT)
		C 10.85 Prepared meals and dishes	
		C 10.91 Prepared feeds for farm animals	Ferox feed
	Blue biotechnology	M 72.11 Research and experimental development on biotechnology	SFA
Non-living resources	Extraction of oil and gas	B 06.10 Extraction of crude petroleum	Petro Seychelles
		B 06.20 Extraction of natural gas	Petro Seychelles
		B 09.10 Support activities for petroleum and natural gas extraction	Petro Seychelles/SEYPEC

[15] Ibid

[16] European Commission. 2017. *Realising the potential of the Outermost Regions for sustainable blue growth: Annex 6 to the Final Report – The blue economy in Reunion.* European Commission, Brussels.

	Extraction of aggregates	B 08.12 Operation of gravel and sand pits; mining of clays and kaolin	UCPS/CCCL/South East Crushing
		B 08.11 Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate	UCPS/CCCL/South East Crushing
		B 09.90 Support activities for other mining and quarrying	UCPS/CCCL/South East Crushing
		B 08.99 Other mining and quarrying	UCPS/CCCL/South East Crushing
		C 10.84 Manufacture of condiments and seasonings	
	Seabed mining	B 07.10 Mining of iron ores	Currently not applicable in Seychelles
	Desalination	E 36.00 Natural water; water treatment and supply services	Public Utility Corporation (PUC)
Shipping	Maritime transport	H 50.10 Sea and coastal passenger water transport (ferry share)	Cat Coco
		H 50.20 Sea and coastal freight water transport	Seychelles Port Authority (SPA)
		N 77.34 Rental and leasing services of water transport equipment	
	Ports (including dredging)	H 52.10 Warehousing and storage services (5210A and 5210B) - maritime activity only	Seychelles Port Authority (SPA)
		H 52.22 Service activities incidental to water transportation	Seychelles Port Authority (SPA)
		H 52.24 Cargo handling - 52.24A - cargo handling at port only	Seychelles Port Authority (SPA)
		F 42.91 Construction of water projects	Public Utility Corporation (PUC)
Shipbuilding	Shipbuilding (including leisure boats and water sport equipment)	C 28.11 Engines and turbines, except aircraft, vehicle and cycle engines	
		C 30.11 Building of ships and floating structures	
		C 30.12 Building of pleasure and sporting boats	
	Ship repair	C 33.15 Repair and maintenance of ships and boats	Mazorchi, Seychelles Electronics Maritime Com. Ltd
		E 38.31 Dismantling of wrecks	
Tourism	Coastal tourism	I 55 Accommodation (5510Z, 5520Z and 5590Z)	Tourism establishments
		I 56 Food and beverage service activities (5610A, 5610B, 5610C,5621Z,5629A,5629B and 5630Z)	
		H 51 Air transport (4 % of 5110Z - consortium estimate of arrival of non-residents in accomod.)	AIR SEYCHELLES
	Cruise tourism	H 50.10 Sea and coastal passenger water transport (cruise share)	Seychelles Port Authority (SPA)
Renewable energy	Wind energy (maritime origin only)	D 35.11 Production of electricity (offshore wind farms only)	Public Utility Corporation (PUC)
		D 35.12 Transmission services of electricity	Public Utility Corporation (PUC)
	Other renewable (maritime origin only)	D 35.11 Production of electricity	Public Utility Corporation (PUC)
		D 35.12 Transmission services of electricity	Public Utility Corporation (PUC)

Economic data gaps

Aside from conventional shortcomings with GDP data, various gaps exist in the current SNA that are particularly applicable to the BE context. The artisanal fishery is reputed to be small in direct value added to the economy, however it is large in terms of labour and fleet size. Being a primarily cash based economy, it is expected that there are activities and payments that are not captured in the formal economy. This includes the cash sales of fish and marine species at road side landing sites that are only intermittently monitored.

It is likely that more gaps will emerge during the remainder of the consultancy.

Natural capital information

Seychelles is blessed with an abundance of natural capital and resources. Recently the country has become increasingly aware of the importance of understanding and managing these resources. This is in part due to: the Seychelles Debt for Nature Swap, which required Seychelles to conduct a comprehensive EEZ-wide marine spatial plan (MSP), which has since resulted in Seychelles designated 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; an active Ministry of Energy, Environment and Climate Change; and the establishment of a Department of Blue Economy, among others.

The MSP is the foundation of creating a successful BE. An inclusive, well-debated MSP can see sound resource allocation and best case scenario in trade-off making where necessary, though there will always be losers. Seychelles MSP has been an in-depth, stakeholder oriented project that has combined sound science with public perception and opinion. However, an MSP is only useful if it is implementable, and results in monitoring, evaluation and enforcement. Seychelles is currently establishing 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. This entity, the Seychelles Ocean Authority, is to be reviewed by parliament with the intention for it to be active no later than 2025[17][18].

The MEECC and SWIOFish3 have commissioned a consultant, The Nature Conservancy, to conduct a project undertaking an ecosystem valuation of the MPAs and coastal resources. Such information could assist the BEVT in the future, providing a starting point for natural ecosystem and natural capital values. A shortcoming is that this project focuses on MPAs, excluding open access areas.

SeyCCAT, together with University of Oxford and University of Seychelles is conducting a coastal blue carbon project focusing on estimates of the carbon stored by seagrass in Seychelles' EEZ. This project is being funded by Pew Charitable Trusts. A second coastal blue carbon project is being conducted by the MEECC and the World Bank, which seeks to map the mangroves of Seychelles EEZ as well as the carbon stored by these forests. Together the outputs of these projects will be able to be used in its revised

[17] Seychelles Ocean Authority Bill. 2020. *Draft Seychelles Ocean Authority Bill.* Mahé, Seychelles.
[18] http://www.seychellesnewsagency.com/articles/13790/Seychelles+Marine+Spatial+Plan+eyes+creation+of+new+independent+ocean+authority

Nationally Determined Contribution (NDC) calculations, as well as to establish whether blue carbon trading would be feasible by the country. These data are not yet available but will be important for the BEVT once available, particularly as they delicately cross all three aspects of a BE – social, environmental and economic.

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[19].

Natural capital and ecosystem data is going to be challenging to include in the BEVT, however it 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.

Social data

Seychelles NBS has relatively sound household data. NBS conducted a mapping exercise where all households were geo-referenced with details regarding the household head and demographics of the household. This information has been stored in a geographical information system (GIS) to enable more representative household surveys and efficient data capture. It also enables improved accuracy during census data collection, with the next census to take place in 2021[20].

NBS collects a variety of social statistics, including Poverty profiling, multidimensional poverty index, unemployment statistics, visitor safety and security, Crime, Justice and Security (CJS), as well as household surveys. In addition, biannual population estimates and vital statistics are produced including employment figures.

Seychelles collects and compiles regular visitor statistics with figures updated on the NBS website monthly, but formally released less frequently. The statistics captured include arrival information, country of residence, and purpose of visit as well as anticipated expenditure. NBS also collects quarterly statistics on hotels, guesthouses and self-catering apartments across Seychelles' three largest islands, providing bed nights and occupancy rates.

The Fisheries Satellite Account (FSA) that was developed failed to include the artisanal fishery[21]. This fishery is important not only economically, but in a social context for livelihoods and with fishing having been a way of life for many generations of Seychellois. The artisanal fishery provides employment, provides job creation through repairs, maintenance and the purchase of gears. Many islanders rely on

[19] BIOFIN. 2015. BIOFIN Seychelles: Policy and Institutional Review. UNDP. http://www.biodiversityfinance.org/index.php/knowledge-product/seychelles-policy-and-institutional-review
[20] https://www.nbs.gov.sc/statistics/census-and-survey
[21] Tsuji, S. 2019. Progress Report of the IOTC-OFCF Collaborative Project, Phase V. Overseas Fishery Cooperation Foundation of Japan. https://www.iotc.org/sites/default/files/documents/2019/11/IOTC-2019-WPDCS15-INF03.pdf

the artisanal fishers for their catch as a source of protein, with Seychellois being one of the highest consumers of fish globally. The artisanal fishery also has an environmental impact that needs to be measured through exploitation of stocks and habitat destruction.

Going forward in NBS data collection, there exists an opportunity to classify industries as being BE oriented, then ascribing a proportion of the industry to the BE and to use this information to create BE employment statistics.

Past and present Blue Economy accounting-linked initiatives

Seychelles has and is conducting several projects to better understand the economic importance of its industries; some of the projects are in line with progress toward Blue Economy accounting. A fisheries satellite account (FSA)[22] has been piloted and currently a tourism satellite account (TSA) is being developed[23]. The UNDP BIOFIN program made initial steps towards biodiversity financing. The Seychelles Fishing Authority (SFA) has strategic management initiatives aimed at enhancing the management and reporting of fisheries, such as the Fisheries Economics Intelligence Unit which has been under development since 2015, the Fisheries Economic and Information Division[24], as well as Seychelles being party to the Fisheries Transparency Initiative and the Extractive Industries Transparency Initiative.

[22] Tsuji, S. 2019. Progress Report of the IOTC-OFCF Collaborative Project, Phase V. Overseas Fishery Cooperation Foundation of Japan. https://www.iotc.org/sites/default/files/documents/2019/11/IOTC-2019-WPDCS15-INF03.pdf

[23] https://www.unwto.org/africa/news/2019-07-10/mission-develop-tourism-satellite-account-kicks-start-seychelles

[24] Lallemand, P. 2015. Supporting the improvement of marine fisheries governance and management in Seychelles: Economic study on major trends in the tuna industry and its impact on the Seychelles economy over the 5 year period, 2009-2013. Smart Fish: Indian Ocean Commission. http://www.fao.org/3/a-bl764e.pdf

Section 2: Findings and recommendations

Section 2 describes the results during the latter part of the consultancy, including stakeholder engagement, and discusses the accuracy of the figures found for the testing of the BEVTK. It also identifies challenges faced in securing the economic, social and ecological data required for the toolkit. Lastly, recommendations for the future of the BEVTK are presented along with closing remarks relating to the consultancy.

Data sources

The final data sources used for the BEVTK can be found in Table 5 below. It was important to identify the most reliable sources of data, which are listed in the table. The identification of these data sources was as a result of literature and desktop surveys as well as stakeholder interactions.

The NBS was the primary data source, supporting economic, employment and wage data, all of which were used to inform the economic component of the BE. Whilst NBS does house social data, little was used in the BEVTK due to the inability to apportion such data and indicators to the BE. The MSP was a source of ecological data that was used for the piloting of the BEVTK tool. Whilst the MSP provided only basic information that had to be interpreted for this project, the Nomination File[25] 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[26] was also an important source of ecological data, providing estimates of coral reef and mangrove forest areas. UNDP and World Bank sources were the primary providers of social metric estimates for the social composite indicator of the BEVTK. Identify sources of reliable data, key stakeholders

Table 5: Data sources used for the completion of the BEVTK

Data source	Data description	Statistics	Data type
National Bureau of Statistics	2018 Annual National Accounts Statistics	Gross Value Added	Economic
National Bureau of Statistics	2020 Formal Employment and Earnings	Wages and employment	Economic
Marine Spatial Plan	2019 Nomination File	Seagrass cover (km^2)	Ecological
Government of Seychelles	Seychelles' National Biodiversity Strategy and Action Plan 2015-2020	Mangrove cover (km^2) and coral reef extent (km^2)	Ecological
UNDP	New Global Multidimensional Poverty Index 2018	MPI	Social

[25] 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/

[26] 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.

World Bank	World Development Indicators	Human Development Index, Gini coefficient, Corruption Perception Index	Social

Information gathered from stakeholders

In addition to the above mentioned data sources, this section details meetings held with stakeholders which served to further clarify data sources, identify additional stakeholders to engage with, as well as anecdotal information that could be of use to the consultant. The stakeholder interaction is divided into the three components of the BE, namely economic, ecological and social

Economic

Department of Blue Economy

Personnel: PS Kenneth Racombo, Francesca Adrienne, Mawess Gabriel

1. PS Kenneth Racombo put the consultant in contact with the communications manager, Mawess Gabriel, who was tasked with assisting to facilitate interactions with stakeholders

National Bureau of Statistics

Personnel: CEO Laura Ah-Time, Kevin Bistoquet, Deano Louise, Aubrey Fock-Tave

1. There were two formal meetings with NBS, as well as additional interactions.
2. NBS is currently developing Supply Use Tables (SUTs) which were expected to be ready by 15 October, however they are still not accessible as of 9 December 2020. SUTs make it easier to accurately determine the GVA that different industries contribute to the BE.
3. The FSA was discussed with NBS confirming that the account has not been updated since the first attempt to create it, but there is allegedly work being done on it.
4. The TSA is being developed in conjunction with Department of Tourism and UN World Tourism Organisation. This account is likely to contain Input-Output (I/O) tables, which can reconcile demand and supply in the tourism sector. A TSA will provide more accurate reporting of BE related GVA as well as wages and employment.
5. Seychelles SNA reporting is high level, or highly aggregated. In some instances there is more detailed information to level 2 and possibly level 3. However, sharing of these data is sensitive.
6. NBS confirmed that it would be possible to obtain excel files of National Accounts and other relevant data.
7. It was acknowledged that NBS struggle with data collection, with some being too informal, there being a secondary cash economy and not all economic activities being captured.
8. Detailed statistics are usually held with companies and organisations, with NBS relying on such reporting for it to provide GVA and GDP figures, among others.

William Zarine: Local consultant for GOPA consulting Group and Department of Blue Economy

1. Mr Zarine was on a project where he was to consider a monitoring and evaluation format for the Blue Economy in Seychelles, with a view to creating more effective implementation.

2. As a part of this project, he was requested by the Department of Blue Economy to investigate the value of the Blue Economy in Seychelles
    a. This was to be a 'static', once-off value
    b. This was to only consider the economic value and would not consider the BE in its entirety, i.e. the social and ecological values.
3. It was agreed that the consultant and Mr Zarine would share information regarding BE values, where appropriate.

Jean-Paul Adam: Director: Technology, Climate Change and Natural Resources Management, UN ECA

1. Mr Adam maintained that it would be possible to access company data in some instances, using these data to corroborate NBS information, or fill in gaps where these exist.
2. It was alleged that SFA data collection is not robust, much of the smaller scale data is ad hoc.
3. VAT revenues could be used for industries where actors are missing. In order for this to work one would need to know more about which actors' information is being captured in the SNA and which are not.
4. There are opportunities that exist in the fisheries industry that can create value added to Seychelles' BE. Such possibilities could include more efficient extraction of fish oils, seaweed exploitation and the possibility of biotechnology being a future industry.
5. International agreements can affect the export of fish products, depending on environmental factors such as stock assessments.

Ecological

Jan Robinson: Project Manager, SWIOFISH3

1. Dr Jan Robinson provided an overview of fishery oriented ecological studies that have taken place, such as past research cruises, status of reef fish by Lancaster University researchers, ecosystem service valuation to be conducted by The Nature Conservancy and SFA demersal stock assessments.
2. Dr Robinson was also able to clarify that the FSA was being worked on and could be available by 2021 or 2022, whilst a fisheries social accounting matrix (SAM) was also being developed.

Helena Sims: Project Manager, Seychelles Marine Spatial Planning Initiative

1. Ms Sims suggested the inclusion of information held by Seychelles Petroleum relating to license blocks in the EEZ that companies have for possible exploration, held by SeyPec. This would also be economic information if exploited.

Jeanne Mortimer: Scientist, Island Conservation Society

1. Dr Mortimer stated that monitoring has been taking place for years in the outer islands.
2. A recent Government of Seychelles-UNDP-Global Environment Facility (GoS-UNDP-GEF) project, the Outer Islands Project, has included habitat mapping of sand, coral and seagrass for selected islands.
3. Additional monitoring information captured in this project included monitoring of seabirds, giant trevally, coral reefs, turtles, and other species.

Social

National Bureau of Statistics

Personnel: Kevin Bistoquet, Deano Louise, Aubrey Fock-Tave

1. The NBS staff and the consultant spoke about suggested social metrics that could be considered for Seychelles' BE. In many instances such data would either be absent or require adaptation to be usable in the social composite index.
2. Piracy was considered, with an economic component being the cost of monitoring. Ports Authority may have information on this aspect. Piracy was rife in Seychelles waters circa 2014 at which time many leisure and industrial vessels were advised to not venture far from the Mahé plateau, impacting the country socially through job losses.
3. Drug use, particularly heroin, is most likely to have its source in the BE. Information is held in NBS's household budget survey. Contacting the narcotics bureau would yield further information.
4. Prostitution was identified as being a possible social cost associated with the BE, particularly through interaction with sailors and foreigners. It was unclear which department would be best to contact regarding this information.
5. Poverty alleviation could be linked to the BE and be possible by providing job creation, volunteer work and education programs linked to BE initiatives.
6. Community engagement was another social metric that could be linked to the BE. This could be difficult measure due to the wide range of non-centralised data that would be necessary for estimation.
7. Gender equality and mainstreaming are important to the BE according to international definitions, aligning too with SDG 5. One possibility for measuring the result of this would be to compare changes in employment and earnings over time. Gender based violence should also be considered, however linking this to the BE could be challenging.

Poverty Alleviation Department (PAD)

Personnel: Michael Savy

1. Seychelles adopted the Multidimensional Poverty Index (MPI), developed by University of Oxford researchers, after a simple poverty index failed to provide accurate results.
2. The PAD conducts research whilst analysing and informing policy. They conduct household questionnaires. This could be useful in the event that surveys oriented toward the BE need to be conducted.

Estimation of figures used in the BEVTK

The data extracted from the sources identified in Table 5 above was used to populate the BEVTK. In many instances, however, the data required elements of discounting to reflect each particular activity's relevance to, or reliance upon, the BE. This section presents how the data was manipulated for the BE and discusses the reliability of the data. The information is divided by the economic, ecological and social components of the BE.

Economic

The economic data was extracted from NBS' 2018 Annual National Accounts Statistics[27] report and aligned with the detailed classification of economic activities held on NBS' website, which lists all economic activities recognized in Seychelles by customized ISIC code. This was the most recent annual data available. The 2018 NA document provided the GVA figures required to complete the BEVTK. Wage and employment data was fetched from NBS' 2020 Formal Employment and Earnings[28], which included 2018 figures.

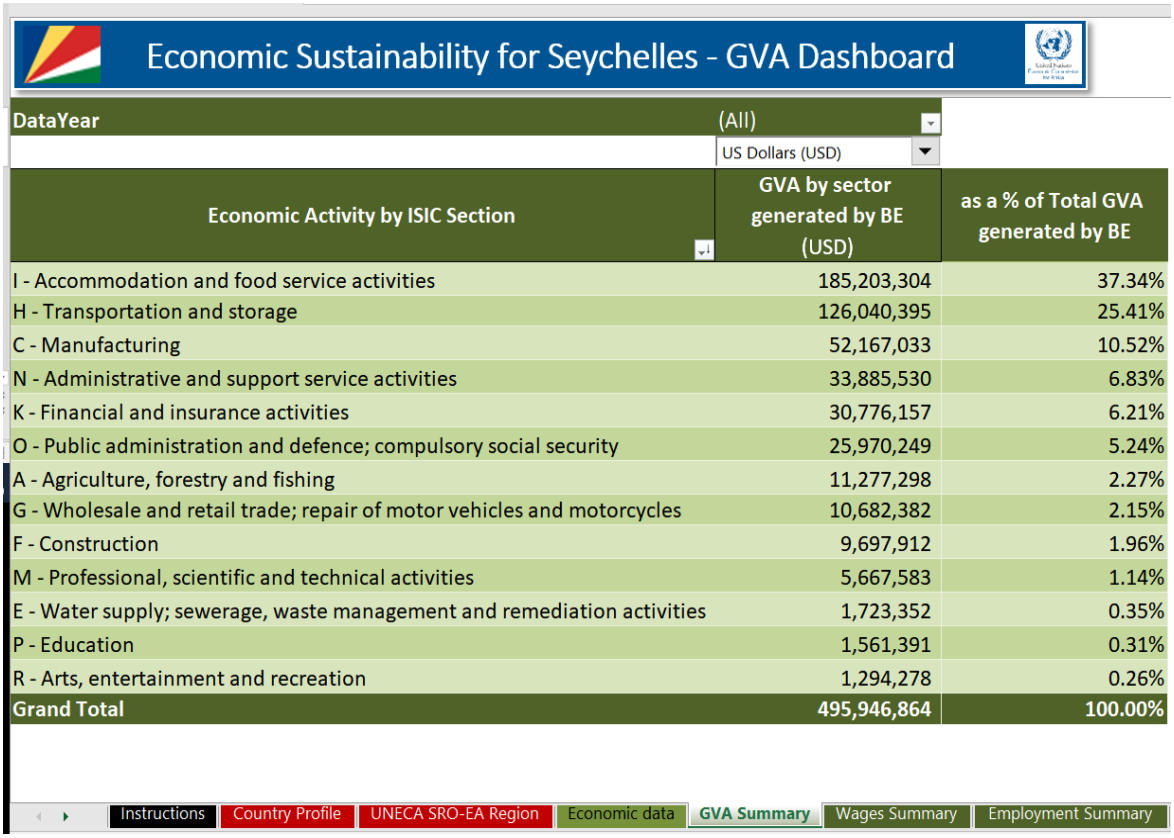
As has been discussed, the data was highly aggregated, making referral to the list of recognized economic activities important in determining what BE activities may be present. Economic data was discounted according to estimates of each industry's reliance on the BE. In certain instances this was relatively straight forward, but for others it was more challenging. The ISIC code A03 represents fishing activities, which required no discounting. However, for many of the other ISIC code sections this was not the case, making discounting necessary. For example, to calculate that BE GVA of ISIC code O (Public Administration and Defense), public documents were used to establish which government departments would be oriented to the BE and what their respective budgets were. This was combined with a slightly deflated figure for Defense activities (O8422) to calculate the percentage of the total GVA of ISIC code O attributable to the BE. Such logic to estimate industry specific GVA was not always possible though, meaning many of the figures reported were 'best guess' estimates, with varying levels of confidence. The intention was to ensure that the estimates were conservative. For example, ISIC code I (Accommodation and food service activities) comprised primarily of tourism values. The 2018 NA figures included a more detailed tourism table of figures which were used to discount the industries total GVA value realistically, i.e. making sure that the value was not less than the reported tourism value, and not much higher either. For other ISIC codes, such as F and K (Figure 1), estimates were less accurate. Below are images displaying the current output from the BEVTK (Figure 1 and Figure 2).

Reliability of the economic data

The reliability of the economic data itself is an issue that has already been raised in this document. Whilst GVA data is available and reported annually, there are constraints associated with the data, such as the existence of secondary and cash economies. These are particularly prevalent in the BE, such as the artisanal fishing sector and through those being employed as deckhands or similar.

[27] National Bureau of Statistics. (2019). *2018 Annual National Accounts Statistics*. NBS: Victoria, Mahé. https://www.nbs.gov.sc/downloads/ana-2018/viewdocument

[28] National Bureau of Statistics. (2020). *2020 Formal Employment and Earnings*. NBS: Victoria, Mahé. https://www.nbs.gov.sc/downloads/employment-earnings-2020-q2/viewdocument



Economic Sustainability for Seychelles - GVA Dashboard

DataYear (All)

US Dollars (USD)

Economic Activity by ISIC Section	GVA by sector generated by BE (USD)	as a % of Total GVA generated by BE
I - Accommodation and food service activities	185,203,304	37.34%
H - Transportation and storage	126,040,395	25.41%
C - Manufacturing	52,167,033	10.52%
N - Administrative and support service activities	33,885,530	6.83%
K - Financial and insurance activities	30,776,157	6.21%
O - Public administration and defence; compulsory social security	25,970,249	5.24%
A - Agriculture, forestry and fishing	11,277,298	2.27%
G - Wholesale and retail trade; repair of motor vehicles and motorcycles	10,682,382	2.15%
F - Construction	9,697,912	1.96%
M - Professional, scientific and technical activities	5,667,583	1.14%
E - Water supply; sewerage, waste management and remediation activities	1,723,352	0.35%
P - Education	1,561,391	0.31%
R - Arts, entertainment and recreation	1,294,278	0.26%
Grand Total	**495,946,864**	**100.00%**

Instructions | Country Profile | UNECA SRO-EA Region | Economic data | GVA Summary | Wages Summary | Employment Summary

Figure 1: Table displaying the GVA of each industry in Seychelles BE

In terms of discounting, the estimates employed were as accurate as possible given the constraints present, however a more thorough estimate, or verification of the figures, should be conducted to ascertain a level of validity of the figures. NBS has indicated its willingness to assist, however recent communication[29] has yielded no results or replies. Validation, or more accurate estimation, would be possible once all actors in captured in the NA are known. This information was meant to be provided to the consultant but never materialized. Such information would improve estimations but would still require further work to be done. It would be important to ensure that this process was not a regular component of the data collection of the BEVTK to ensure minimal input costs.

[29] The last month of the consultancy, since approximately 7 November

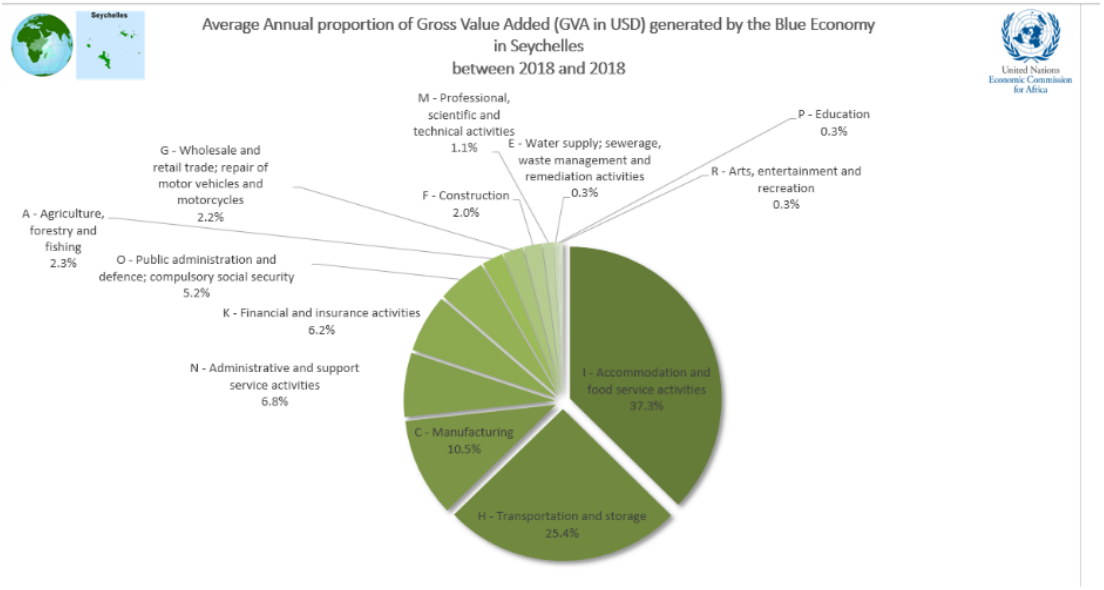


Figure 2: Pie chart representing the percentage contribution of each industry to Seychelles BE by GVA

Ecological

The sources of ecological data used were mentioned in Table 5 above. 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 in and out of MPAs. Constraints did not allow for the analyzing of GIS data to measure spatial extent outside of MPAs. The estimate provided was 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 supposedly 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 been damaged extensively over time due to coral bleaching. Thus the different services provided would be affected. The tabular output of the BEVTK is shown in Figure 3 below.

Administrators of the MSP were supportive and adamant that they would provide estimates of seagrass, coral and mangrove extent used in the MSP, however in spite of follow-up emails being sent, no figures have been forthcoming.

It should be noted that the MSP initiative 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 BE. Consequently, there exists a thorough starting point of ecosystem services to be explored and valued to ensure a comprehensive ecological value of Seychelles BE.

Ecosystem Services for Seychelles - Dashboard

(USD) Ecosystem Classification/ Service	Estimated Value of Ecosystem Service	Ecosystem Service Contribution to the overall
3 - Marine - Neritic	**48,047,938,882**	**100.0%**
3.08 - Coral reef		
3.08.1 - Outer Reef Channel	839,011,701	1.7%
1 - Provisioning (Biotic)	**506,490,988**	**1.1%**
1.1 - Biomass	506,490,988	1.1%
2 - Regulation & Maintenance (Biotic)	**332,520,713**	**0.7%**
2.2 - Regulation of physical, chemical, biological conditions	317,978,794	0.7%
2.1 - Transformation of biochemical or physical inputs to ecosystems	14,541,919	0.0%
3.09 - Seagrass		
(blank)	47,208,927,181	98.2%
1 - Provisioning (Biotic)	**63,515,559**	**0.1%**
1.1 - Biomass	63,515,559	0.1%
2 - Regulation & Maintenance (Biotic)	**47,145,411,621**	**98.1%**
2.2 - Regulation of physical, chemical, biological conditions	10,470,365,955	21.8%
2.1 - Transformation of biochemical or physical inputs to ecosystems	36,675,045,666	76.3%
6 - Marine - Intertidal	**20,855,596**	**0.0%**
6.07 - Mangrove Submerged Roots		
(blank)	20,855,596	0.0%
1 - Provisioning (Biotic)	**1,476,044**	**0.0%**
1.1 - Biomass	1,476,044	0.0%
2 - Regulation & Maintenance (Biotic)	**19,379,552**	**0.0%**
2.2 - Regulation of physical, chemical, biological conditions	14,067,252	0.0%
2.1 - Transformation of biochemical or physical inputs to ecosystems	5,312,300	0.0%
Grand Total	**48,068,794,478**	**100.0%**

Figure 3: Table displaying the estimated value of the contribution of each ecosystem service to Seychelles' BE

Reliability of the ecological data

The reliability of the ecological data used is assumed to be high, however, given the age of the data the reliability is somewhat affected. As has been mentioned, the three ecosystems that have been estimated thus far are all being studied in depth in the coming year, thus reliable, accurate and valid data will be available by the end of 2021. Additionally, more in-depth ecosystem service valuation work is being conducted for Seychelles MPAs which will provide more accurate local estimates of value.

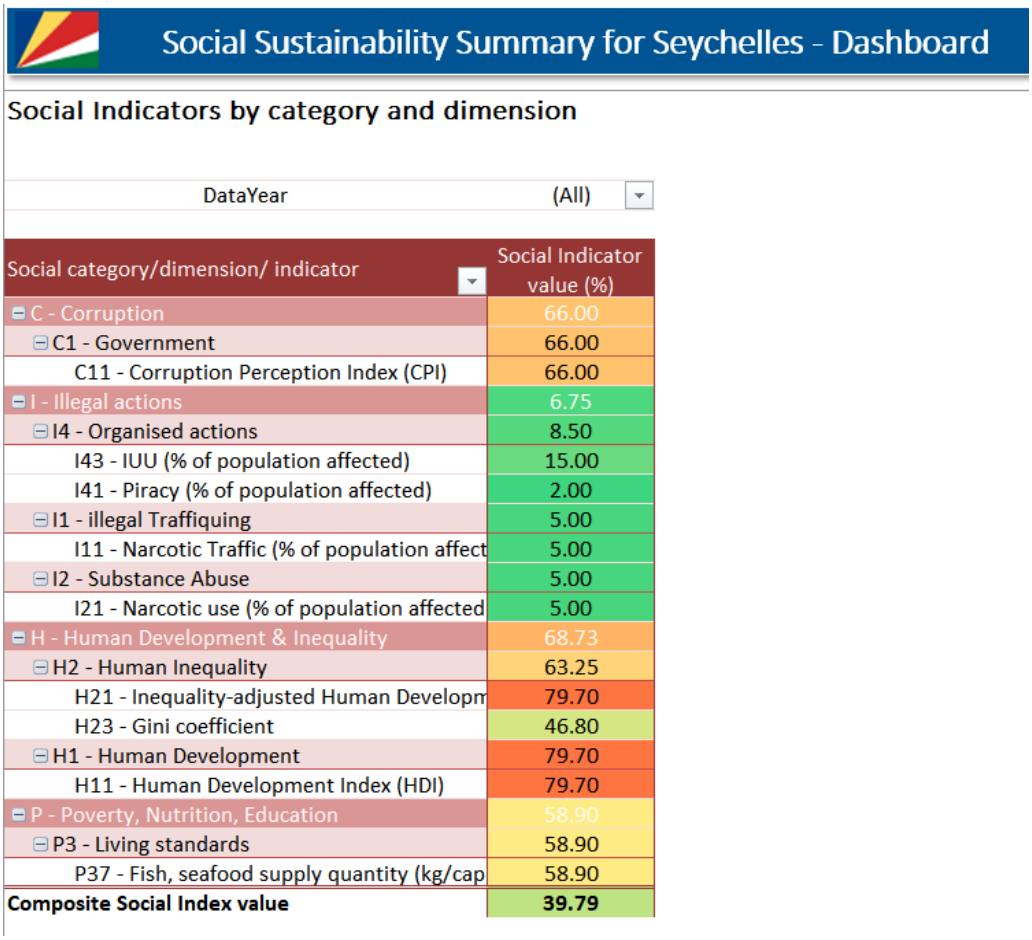
The per-unit monetary values applied to the Seychelles data are data transfer values from a study conducted in another Indian Ocean island state, Mayotte[30]. The action of applying values from one location to another is known as 'benefit transfer'. It is useful and assists in providing estimates in the absence of local data. However, benefit transfer can also be inaccurate. As such, the identification of the

[30] Trégarot, E., Failler, P. and Maréchal, J-P. (2017). Evaluation of coastal and marine ecosystem services of Mayotte: Indirect use values of coral reefs and associated ecosystems. *International Journal of Biodiversity Science, Ecosystem Services and Management 13*(3): 19-34.

ecosystem services of Seychelles' BE also provides opportunity for further research to be conducted locally to provide in-situ estimates of ecosystem service values.

Social

There was little locally sourced social data. An estimate of the effect of narcotic trade was made, as it is assumed that most of the drugs arriving in Seychelles do so through porous marine borders as opposed to air travel. This metric was calculated by estimating the number of heroin addicts as a proportion of the population. The remaining information was extracted from global databases mentioned in Table 5.



Social Sustainability Summary for Seychelles - Dashboard

Social Indicators by category and dimension

DataYear	(All)

Social category/dimension/ indicator	Social Indicator value (%)
C - Corruption	66.00
C1 - Government	66.00
C11 - Corruption Perception Index (CPI)	66.00
I - Illegal actions	6.75
I4 - Organised actions	8.50
I43 - IUU (% of population affected)	15.00
I41 - Piracy (% of population affected)	2.00
I1 - illegal Traffiquing	5.00
I11 - Narcotic Traffic (% of population affect	5.00
I2 - Substance Abuse	5.00
I21 - Narcotic use (% of population affected	5.00
H - Human Development & Inequality	68.73
H2 - Human Inequality	63.25
H21 - Inequality-adjusted Human Developm	79.70
H23 - Gini coefficient	46.80
H1 - Human Development	79.70
H11 - Human Development Index (HDI)	79.70
P - Poverty, Nutrition, Education	58.90
P3 - Living standards	58.90
P37 - Fish, seafood supply quantity (kg/cap	58.90
Composite Social Index value	**39.79**

Figure 4: Table displaying an example of social metrics contributing to Seychelles' BE social indicators

There is distinct scope to include more accurate local data, for instance piracy and IUU activities, as well as cultural identity and food security associated with the artisanal fishery. Care should be taken to ensure that the indicators sought are BE oriented and measurable at low cost. Examples of how the social data is output from in the BEVTK are shown in Figure 4 and Figure 5.

Reliability of the social data

The social data is based upon international databases, giving them an element of credibility. Discounting of values for the BE is difficult and was not attempted. However, with Seychelles being a small island state, livelihoods are closely linked to the BE. As such, whilst discounting would be necessary in some instances, the reliability of the data would still be quite high in the face of limited discounting taking place.

Opportunities exist to examine more closely the social data that exists and means of discounting this for the BE. Surveys are used by social agencies and departments; including BE oriented questions in such surveys would be a cost effective way of gaining more accurate social data.

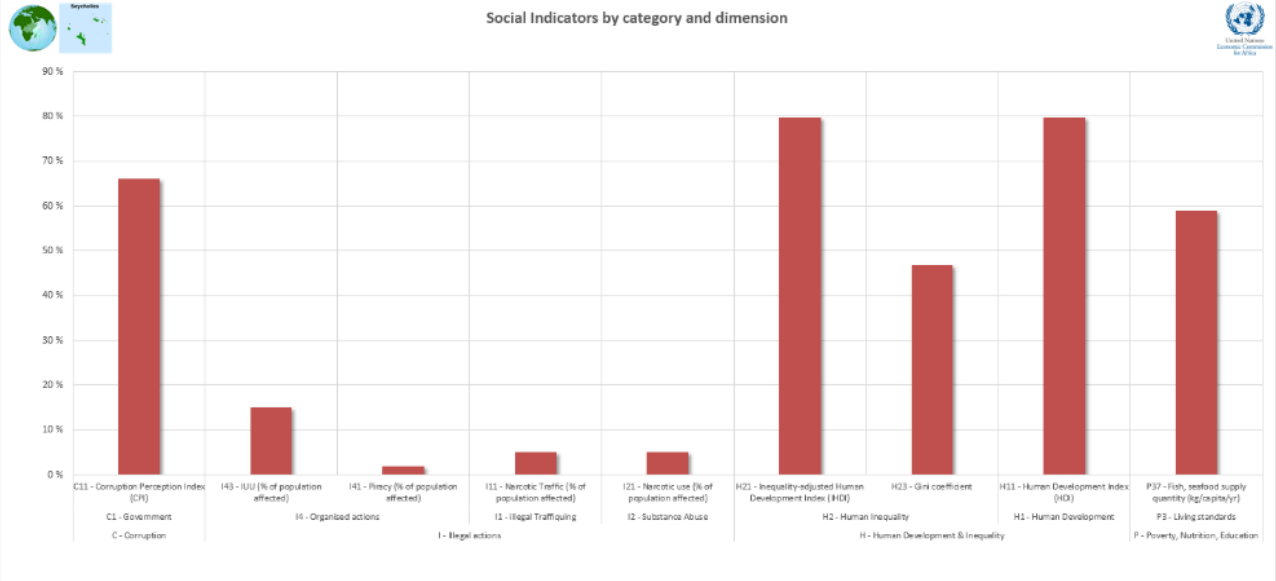


Figure 5: Bar graph illustrating the relative scores of the preliminary social metrics of Seychelles' BE

Total value

The BEVTK developers created a summary page that collates and visually represents the figures of the three comprising parts of the BE, namely economic, ecological and social data. This summary draws on reported figures entered in the BEVTK, with users have no ability to alter the data represented in the summary page, unless they alter the data entered for the individual parts of the BE. An example of Seychelles BE summary can be found in Figure 6. This image shows that the BE in Seychelles comprises 30.6% of 2018 GDP, being valued at $495M. The wages that the BE generates are approximately 10.4% of 2018 GNI and the BE is responsible for approximately 45% of all jobs. The ecological summary shows that the values of ecosystem services are approximately $48B, or almost 30 times greater than Seychelles' GDP in 2018. The summary data also breaks down the social data included in the Composite Social Index value, which is 33.95, as well as pie charts showing the contribution of the different economic and social activities to the BE.

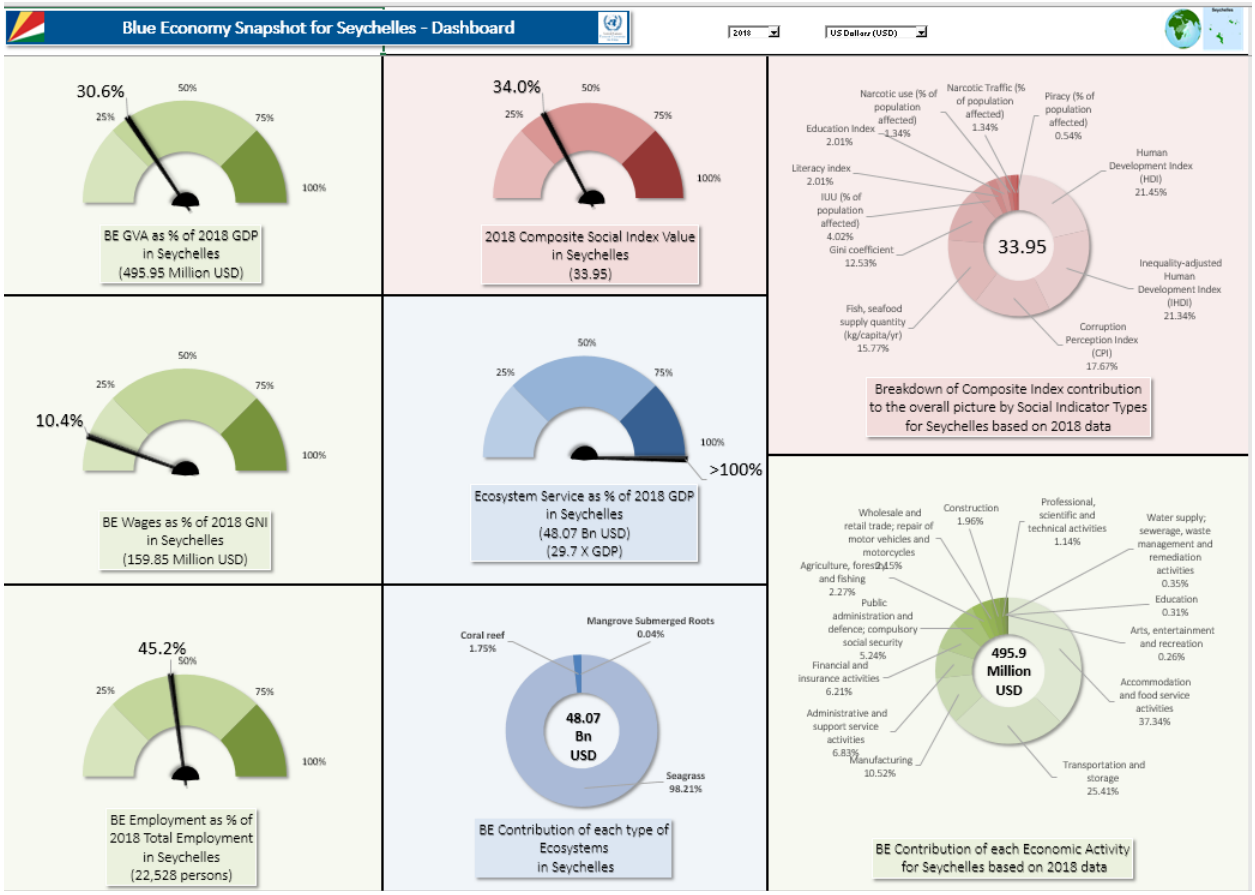


Figure 6: BEVTK summary statistics for Seychelles' BE

Reliability of the total value data

The summary data is based on reported data that was entered by the consultant, as such any errors in the summary data are likely input errors. However, the BEVTK does draw on online sources and relies on pivot tables, thus if the data entered is correct, there is the likelihood that the toolkit may need to be refreshed to update pivot tables, charts and online value connections.

Shortcomings or obstacles encountered

The following section outlines the issues faced with the data collection or validity for the BEVTK. It is reported upon economic, ecological and social data.

Economic data

The greatest drawback faced was the highly aggregated nature of the NA data. Aggregated data creates inaccurate estimates of BE figures. Aggregated data requires that estimates are made for an industries contribution a country's BE, whereas disaggregated data allows for more accurate identification of BE

activities, and lower margin for error when estimates need to be made. More detailed NA information does exist in Seychelles, however due to data confidentiality such data was not accessible. The fact that this data exists indicates that more accurate BE estimates can be made, however this would have to be conducted by NBS themselves, or by a third party with a form of confidentiality agreement. NBS was supportive in the process, however the support waned significantly during the consultancy, in spite of employees seemingly enthusiastic to assist. Nonetheless, NBS is a small organization that is involved in a wide array of projects, which often leads to capacity constraints.

The SNA of Seychelles itself is inherently vulnerable to inaccuracies as it relies on reporting from other institutions and organisations, with little primary data collection taking place. Additionally, activities do go unreported, such as cash based sales of services and ad hoc employment in various activities to mention just two.

Having aggregated data impacted upon the ability to make accurate BE estimates. Finding the various actors in an industry would be a time consuming task and accessing their financial information would be challenging. Even if this were possible, if this were required to complete the data collection for the BEVTK annually it is likely that it would not be adopted by agencies or governments due to the high costs involved with data collection.

Ecological data

Seychelles is rich in natural capital. It is also fortunate to have many organisations, both governmental and non-governmental, conducting monitoring and research activities relating to the country's natural capital. However, this leads to organisations doing similar work but with no standardized method, nor a central data management repository. Data collected in Seychelles is not centralized and is difficult to locate and obtain.

There are initiatives currently underway to conduct mapping and valuation exercises of ecosystem services. However, it appears as if there is a need for a national research agenda to guide projects toward purposeful data collection.

Much of the data in Seychelles is dated. There also appears to be a lack of long term data collection which would assist with noting change over time. Such initiatives will be important for the country going forward in order to accurately report on BE ecological values.

Ecological monitoring and management is critical to a nations BE. Missing or unconsolidated data are aspects that need to be addressed urgently, firstly to understand change over time, secondly to understand ecological interactions, and thirdly to estimate more accurate BE values.

Social data

The social data for the BEVTK was the poorest element of the pilot project. It was challenging to define which social indicators to use in the toolkit, as well as whether these existed in the country. Whether

specific social indicators existed or not, surveys would be required in most instances to accurately link data to the BE.

Accessing social data has similar constraints to the ecological data in that it appears to not be held centrally, making locating and accessing social statistics difficult. NBS does house some social statistics, however other statistics held by, for example the PAD, are hard to locate. Information on drug seizures and use, for instance, requires interaction with several agencies and departments. This could again impact on the adoption of the BEVTK if data collection were to become too onerous.

Recommendations and closing remarks

The following recommendations have been identified to assist the improvement and success of the BEVTK going forward. Some of the suggestions will be possible, others will require buy in from other stakeholders and government departments.

- **Custodian:** It is critical that a custodian of the BEVTK be identified and trained. The custodian should be confident in dealing with at least one of the primary data types (i.e. economic, ecological, and social). The custodian should either house the data or have sound inter-sectoral communication and data access, as the data collection will require assistance from other sectors. Suggested custodians include NBS, Department of Blue Economy, Seychelles Ocean Authority (still to be created).
- **Data sources:** Ease of access to data is critical to the long term success of the BEVTK. Data that has been collected in the pilot project should be disclosed to ensure the custodian understands where data sources are, and what needs to be done to gather the data.
- **Ease of entry and replicability:** Following on from the above, the data access and data entry need to be easy and easily replicable to ensure the continuity of the BEVTK.
- **Ease of use:** Ensuring that the BEVTK is easy to use will be critical to its success. This ties into the above mentioned recommendations, and with the correct training there is a greater likelihood of the BEVTK's success.
- **Research agenda and data collection with a purpose:** Seychelles needs to establish a research agenda that fills the gaps in the data required to complete the BEVTK. Such an agenda should prioritise projects, ensuring that projects delivering more critical or important data are the first to commence. This research agenda should be linked to the NBSAP, SeyCCAT grant themes and other research priority documents, and coordinated by a single body to ensure that the agenda is being driven. Such a coordinating body would be the Department of Blue Economy. Collecting data with a purpose enables agencies to be more focused in their data collection and project creation.
- **Accurate discounting methodology:** Discounting of data for the BE was the trickiest part of the consultancy. Establishing a methodology for conducting such discounting would be beneficial. However, it should be noted that the methodology should be adaptable, as the discounting is likely to change depending on each scenario.
- **Awareness:** To ensure success of the BEVTK, stakeholders need to be made aware of it. This should be done once the BEVTK is at an advanced stage (i.e. now). Currently, the consultant has

made several stakeholders aware of the BEVTK as well as showing its interface to several. If adopted, or supported, by critical stakeholders, there is vastly increased likelihood of its success.

Table 6: Potential future data sources, in addition to current sources

Data source	Data description	Statistics	Data type	Possible availability
National Bureau of Statistics	Tourism Satellite Account	Gross Value Added, employment	Economic	2021
National Bureau of Statistics/ Seychelles Fishing Authority	Fisheries Satellite Account	Wages, employment, gender equity	Economic and Social	2022
Indian Ocean Tuna Commission	Tuna and shark fisheries	Stock assessment	Ecological	
Marine Spatial Plan	Ecological data	Refined ecological data	Ecological	
Department of Biodiversity	Ecosystem service valuation	Per unit values for various ecosystem services within MPAs	Ecological	2021
Seychelles Fishing Authority	Various stock assessments	Health of fishery	Ecological and Social	
Department of Environment	Various projects to inform ecosystem health	Underlying ecosystem health	Ecological	

In spite of the positive progress Seychelles has made in terms of satellite accounts and ecological research, many of the projects mentioned are either yet to be realized, or conducted on an ad-hoc basis with little continuity. Additionally, aside from the BEVTK and formal economic accounts, many gaps still exist in capturing the impact of the BE, and little progress has been made toward establishing a sound natural capital accounting system which should capture changes in stocks and flows of natural capital and ecosystem services, as well as monitoring the underlying health of the habitats that support the natural capital. More in-depth work is required going forward.

The BEVTK was shown to several stakeholders and presented at a UN ECA Ad Hoc Expert Group Meeting on 23 November 2020. It has been well received and complemented for its in-depth nature and comprehensive approach.

Appendix 1: Stakeholder List

Table 7: Stakeholder engagement list

Name	Surname	Role	Organisation	Primary Interaction
Alain	De Comarmond	Principal Secretary	Department of Environment	Informal meeting
Angelique	Pouponneau	CEO	Seychelles Conservation and Climate Adaptation Trust	Informal meeting
Anne	Lafortune	Principal Secretary	Department of Tourism	Email
Francesca	Adrienne	Director General	Maritime Boundary, Department of the Blue Economy	Email, Informal meeting
Helena	Sims	Project Manager	Seychelles Marine Spatial Planning Initiative	Informal meeting
Jan	Robinson	Project Manager	SWIOFish3	Meeting
Jean-Paul	Adam	Director	Technology, Climate Change and Natural Resources Management, UN ECA	Meeting
Jeanne	Mortimer	Scientist	Island Conservation Society	Informal meeting
John	Nevill	Independent Consultant		Informal meeting
Justin	Prosper	Director	Climate Science and Data Management, Department of Climate Change	Email
Kenneth	Racombo	Principal Secretary	Department of the Blue Economy	Email
Kevin	Bistoquet	Principal Statistician	National Bureau of Statistics	Meeting
Laura	Ah-Time	CEO	National Bureau of Statistics	Meeting
Mawess	Gabriel	Communications	Department of the Blue Economy	Phone
William	Zarine	Independent Consultant		Meeting