SUSTAINABLE, BLUE, CIRCULAR AND CLIMATE RESILIENT ECONOMY FRAMEWORK AND ISLAND CATEGORIES

Defining the Elements of Blue & Circular Growth for Island Sustainability and creation of a Sustainable Islands Facility (SIF)

Validation Workshop – Barbados

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Factor
Ideas for change

CONTENTS

BACKGROUND AND CONTEXT: ANALYSIS

- **Islands face unique sustainable development challenges**
  - Resource constraints (materials, water, energy and food)
  - Isolated, small and vulnerable economies
  - High vulnerability to climate change

- **Caribbean islands are not an exception**
  - Dependence on tourism and other marine resources (oil and gas)
  - Dependence on imported fossil fuels and finished goods
  - Climate Change: Water Stress, Extreme Weather Events, Sea Level Rise

BACKGROUND AND CONTEXT: OBJECTIVES

SUSTAINABLE BLUE, CIRCULAR & CLIMATE RESILIENT ECONOMIES

- Intentionally designed to create positive benefits. It is designed to create and sustain a restorative, regenerative and resilient island with positive, beneficial outcomes
- It creates economic, environmental and social abundance from the land and surrounding ocean, shared equitably for the benefit of all species
- Safely cycling materials perpetually as technical and biological nutrients, powered by clean renewable energy, valuing clean water and celebrating diversity

SUSTAINABLE BLUE, CIRCULAR & CLIMATE RESILIENT PROJECTS

- Deliberately designed to (1) create safe cycles for biological and technical materials, (2) use renewable energy, (3) be efficient and effective in terms of energy and materials, (4) preserve and restore natural capital, (5) return water resources in equal or better condition than when sourced, (6) use marine resources sustainably and (7) increase climate resilience
- Benefits/impact assessment: meet SDGs, reduce GHG emissions, improve climate change resilience

BACKGROUND AND CONTEXT: BENEFITS

Positive impact on specific SDGs

Positive impact on broad SDGs

SBCCR FRAMEWORK ELEMENTS AND INDICATORS

SUSTAINABLE ISLAND GROWTH

BLUE ECONOMY

- EEZ size
- Trade and Tourism
- Living resources
- Non-living resources
- Restoration

CIRCULAR ECONOMY

- Materials
- "Waste"
- Freshwater
- Wastewater
- Clean Energy

CLIMATE RESILIENCE

- Water
- Health
- Ecosystem services
- Human habitat
- Infrastructure

- 10 indicators per element, based on the quality and consistency of the source
- Due to a lack of data, some aspects are better represented than others

BLUE ECONOMY INDICATORS

- **EEZ size:** 1 indicator (#1)
- **Trade and Tourism:** 2 indicators (#2 and #3)
- **Living resources:** 3 indicators on fisheries (#4 to #6), data gap on bio-technologies
- **Non-living resources:** 0 indicators (data gap)
- **Ecosystem protection and restoration:** 4 indicators (#7 to #10)

	Indicator	Units	Source
Size			
1	***EEZ area per capita***	km2 per capita	Marine Plan
Trade and Tourism			
2	***Tourists arrivals per capita***	Person	World Bank
3	***Liner shipping connectivity index***	max value = 100	World Bank
Living resources			
4	***Ocean Health Index – Fisheries***	Rating (1-100)	SDG -Ocean Health Index
5	***Fish stocks overexploited or collapsed***	%	SDG -Sea Around Us & EPI
6	***Bycatch***	Tons (x 1000)	Sea Around Us
Ecosystem protection and resotration			
7	***Blue Carbon Storage***	Rating (1-100)	SDG -Ocean Health Index
8	***Protected areas***	%	SDG - BirdLife International
9	***Ocean Health Index – Biodiversity***	Rating (1-100)	SDG -Ocean Health Index
10	***Ocean Health Index - Clean waters***	Rating (1-100)	SDG -Ocean Health Index

CIRCULAR ECONOMY INDICATORS

- **Materials and materials reutilization:** 4 "linear" indicators (#1 to #4) such us Domestic Material Consumption, Material Footprint, Municipal Solid Waste and Electronic Waste
- **Water:** 3 indicators (#5 to #7)
- **Energy:** 3 indicators (#8 to #10)

	Indicator	Units	Source
	Circular Economy		
Materials and Material Reutilization			
1	***DMC per capita***	Tons	Global Material Flows
2	***MF per capita***	Tons	Global Material Flows
3	***MSW per capita***	Tons	World Bank
4	***E-waste***	Tons	SDG - UNU-IAS
Water			
5	***Water consumption per capita***	m^3	World Bank
6	***Freshwater withdrawal***	%	SDG- FAO
7	***Anthropogenic wastewater treated***	%	SDG -EPI
Energy			
8	***Electricity per capita***	kWh	SE4ALL
9	***Renewable proportion in final energy consumption***	%	World Bank
10	***CO_2 emissions from energy per capita***	tCO_2/capita	SDG- Oak Ridge Laboratory

CLIMATE VULNERABILITY INDICATORS

- 10 indicators from ND-GAIN (Notre Dame Global Adaptation Index)
- 7 climate exposure indicators, 2 climate sensitivity indicators (#7 and #9), 1 adaptative component indicator (#10)
- Lack of readily available information on extreme weather events and disaster waste

	Indicator	Units	Source
	Climate Vulnerability		
Water			
1	***Projected change of annual runoff [E]***	Score 0-1	ND GAIN
2	***Projected change of annual groundwater recharge [E]***	Score 0-1	ND GAIN
Health			
3	***Projected change of length of transmission season of vector-borne diseases [E]***	Score 0-1	ND GAIN
Ecosystem Services			
4	***Projected change of marine biodiversity [E]***	Score 0-1	ND GAIN
Human Habitat			
5	***Projected change of warm period [E]***	Score 0-1	ND GAIN
6	***Projected change of flood hazard [E]***	Score 0-1	ND GAIN
Infrastructure			
7	***Dependence on imported energy [S]***	Score 0-1	ND GAIN
8	***Projection of Sea Level Rise impacts [E]***	Score 0-1	ND GAIN
9	***Population living under 5m above sea level [S]***	Score 0-1	ND GAIN
10	***Disaster preparedness [A]***	Score 0-1	ND GAIN

ISLAND DEFINITION AND SCOPE

Island ≠ a piece of land surrounded by water, but one/several islands functioning as a whole

Island States (4)

- Barbados
- Jamaica
- Haiti
- Dominican Republic

Islands belonging to island states (4)

- New Providence, Bahamas
- Family Islands, Bahamas
- Trinidad, Trinidad and Tobago
- Tobago, Trinidad and Tobago

Islands belonging to mainland states (5)

- Caye Caulker, Belize
- Bay Islands, Honduras
- San Blas Archipielago, Panamá
- Bocas del Toro, Panamá
- Corn Islands, Nicaragua

AVAILABILITY OF DATA

No.	Indicator	Unit	New Providence Island	Family Islands	Barbados	Caye Caulker	Dominican Republic	Haiti	Bay Islands	Jamaica	Corn Islands	Bocas del Toro	San Blas	Trinidad	Tobago
BLUE ECONOMY INDICATORS															
1	Linear shipping connectivity index	max value = 100	27.67	27.67	4.92	7.80	24.55	6.31	9.96	20.05	8.84	53.42	53.42	17.39	17.39
2	Tourists arrivals per capita	tourists	15.17	15.28	2.08	74.31	0.53	0.05	19.93	0.74	0.04	2.17	2.00	0.32	1.79
3	Blue Carbon Storage	Rating (0-100)	100.00	100.00	27.00	39.00	86.00	96.00	89.00	99.00	10.00	43.00	43.00	95.00	95.00
4	EEZ area per capita	km2/capita	4.19	4.19	0.65	0.10	0.03	0.01	0.02	0.09	0.02	0.08	0.08	0.06	0.06
5	Protected areas	%	9.96	9.96	0.00	27.73	51.73	0.00	29.01	30.55	0.00	33.89	33.89	4.83	4.83
6	Ocean Health Index - Biodiversity	Rating (0-100)	91.27	91.27	91.12	45.00	93.20	83.71	55.00	86.54	80.79	83.33	83.33	93.69	93.69
7	Ocean Health Index - Clean waters	Rating (0-100)	63.73	63.73	65.46	45.00	51.87	43.36	55.00	44.05	64.89	64.93	64.93	62.58	62.58
8	Ocean Health Index - Fisheries	Rating (0-100)	65.13	65.13	14.29	45.00	49.27	39.84	55.00	22.89	26.19	52.35	52.35	24.77	24.77
9	Fish stocks overexploited or collapsed	%	29.10	29.10	52.20	0.00	3.95	11.98	21.71	74.04	35.04	40.59	40.59	31.43	31.43
10	Bycatch	Tons (x 1000)	0.69	0.69	0.24	0.00	0.00	0.02	0.44	0.17	0.00	0.00	0.00	4.22	4.22
CIRCULAR ECONOMY INDICATORS															
ATERIALS															
1	DMC per capita	tons	3.069	3.069	2.307	11.787	5.816	1.650	5.291	6.507	6.748	7.770	7.770	20.006	20.006
2	MF per capita	tons	19.18	19.18	11.06	7.626	6.06	1.13	3.47	7.61	3.91	7.56	7.56	5.49	5.49
3	MSW per capita	tons	0.682	0.682	0.623	0.002	0.386	0.213	0.237	0.365	0.266	0.371	0.371	0.548	0.548
4	E-waste	tons	0.019	0.019	0.013	0.000	0.005	0.001	0.000	0.006	0.002	0.000	0.000	0.009	0.009
WATER															
Equity	Access to drinking water (% of population)	%	100%	100%	100%	97%	83%	31%	80%	85%	100%	80%	0%	100%	100%
Equity	ccess to basic sanitation services (% of populatior	%	100%	100%	100%	87.16%	94%	64%	92%	93%	25%	75%	0%	100%	100%
5	Water consumption per capita	m3	286.15	286.15	242.60	568.2	653.70	382.50	134.00	184.00	224.00	147.50	147.50	177.50	324.610
6	Level of Stress (freshwater withdrawal)	proportion of available	0.00	0.00	87.50	0.69	43.73	15.64	2.49	11.34	1.35	1.05	1.05	12.33	13
7	Anthropogenic wastewater treated %	%	7.71%	7.71%	2.28%	2.28%	40.42%	0.00%	0.00%	12.00%	0.00%	13.3%	0.00%	6.80%	6.80%
NERGY															
Equity	Access to electricity (% population)	%	100.0%	100.0%	100.0%	90%	98.5%	37.9%	84.7%	97.1%	92.5%	62%	32%	100.0%	100.0%
8	Electricity per capita	kWh	4,296.68	4,296.68	3,035.13	1,957.93	1,578.15	38.97	630.14	1,055.52	580.48	2,062.76	2,062.76	7,134.03	335.545
9	Renewable proportion in final energy consumptior	%	1.21%	1.21%	2.79%	0%	16.48%	76.07%	0.0%	16.77%	0%	0%	25%	0.28%	0.28%
10	CO2 emissions from energy per capita	tCO2/capita	6.32	6.32	4.49	4.162	2.07	0.27	1.08	2.59	0.799	1.126	2.254	2.35	2.35
CLIMATE EXPOSURE															
CLIMATE CHANGE ADAPTATION															
1	Change of annual runoff	Score 0-1	0.000	0.000	0.390	0.305	0.411	0.385	0.450	0.390	0.616	0.438	0.438	0.622	0.622
2	Change of annual groundwater recharge	Score 0-1	0.155	0.155	0.181	0.204	0.179	0.200	0.244	0.217	0.218	0.285	0.285	0.033	0.033
3	Change of length of transmission season of vecto	Score 0-1	0.658	0.658	0.658	0.657	0.659	0.631	0.662	0.658	0.658	0.659	0.659	0.658	0.658
4	Change of marine biodiversity	Score 0-1	0.497	0.497	0.358	0.406	0.461	0.407	0.395	0.521	0.912	0.497	0.497	0.317	0.317
5	Change of flood hazard	Score 0-1	0.621	0.621	0.164	0.403	0.380	0.446	0.464	0.554	0.430	0.556	0.556	0.362	0.362
6	Projected SLR impacts	Score 0-1	1.000	1.000	0.508	0.624	0.142	0.179	0.238	0.329	0.253	0.140	0.140	0.272	0.272
7	Population living under 5m above sea level	Score 0-1	1.000	1.000	0.041	1.000	0.071	0.107	0.052	0.208	0.049	0.173	0.173	0.167	0.167
8	Disaster preparedness	Score 0-1	0.390	0.390	0.226	0.390	0.425	0.663	0.513	0.288	0.213	0.388	0.388	0.400	0.400
9	Projected change of warm periods	Score 0-1	0.347	0.347	0.381	0.279	0.518	0.518	0.337	0.406	0.306	0.336	0.336	0.396	0.396
10	Dependence on imported energy	Score 0-1	0.766	0.766	0.766	0.766	0.958	0.751	0.850	0.943	0.811	0.939	0.939	0.352	0.352

- Surveys prepared and missions organized to Corn Islands, Bay Islands, Bocas del Toro and San Blas)
- **Good data** in Island States
- **Limited data** in islands belonging to Island States or mainland States

METHODOLOGY TO BUILD A SBCCR INDEX

Step 1 – reescalation

$$y = \frac{\chi - \min(\chi)}{\max(\chi) - \min(\chi)} + 1$$

Where **X** is the value to that is being rescaled; **Max (X)** is the maximum value across island territories; and **Min (X)** is the minimum value across island territories.

Step 2 – aggregation

$$I_c = \prod_{i=1}^{n} X_{ij}^{w_j}$$

Where $\mathbf{I_c}$ is the composite for a given island territory, $\mathbf{X_{ij}}$ is the observed value i for variable j, and **wj** is the weight allocated to each indicator.

Examples of composites

$$BE\ Index = \frac{EEZ * TA * BC * CI * BD * CW}{OE * BY}$$

Where **EEZ** is the EEZ zone per capita, **TA** is tourist arrivals per capita, **BC** is blue carbon storage index, **CI** is the connectivity index, **BD** is the biodiversity index, **CW** is the clean waters index, **OE** is the % of fish stocks overexploited, and **BY** is the amount of bycatch.

$$CE\ Index = \frac{WC * EC * Wastewater\ \% * AW * AS * AE}{MF * MSW * E_{Waste} * GHG}$$

Where **WC** is pc water consumption, **EC** is pc electricity consumption, **Wastewater %** is human wastewater treated, **AW** is access to water, **AS** is access to sanitation, **AE** is access to electricity, **MF** is the material footprint pc, **MSW** is the municipal solid waste pc, **E Waste** is the electronic waste pc, **GHG** are energy-related CO_2 pc emission

RESULTS

- **Blue Index :** driven by fisheries and ecosystem protection
- **Circular Index:** GDP improves "access" indicators, but compromises "waste" indicators
- **Vulnerability Index:** driven by climate change exposure
- **SBCCR Index:** reescalation, aggregation, equal weighting

BLUE, CIRCULAR, VULNERABILITY AND SBCCR INDEXES

	Blue Index	Circular Index	Vulnerab Index	Blue Index	Circular Index	Vulnerab Index	SBCCR Index
New Providence Island	16.36	0.78	5.91	2.00	1.05	2.00	1.05
Family Islands	16.38	0.78	5.91	2.00	1.05	2.00	1.05
Barbados	3.05	1.21	3.76	1.04	1.10	1.08	1.07
Caye Caulker	3.07	5.96	5.03	1.04	1.69	1.62	1.08
Dominican Republic	6.85	8.52	4.20	1.32	2.00	1.27	2.07
Haiti	3.09	2.55	4.29	1.05	1.27	1.30	1.02
Bay Islands	3.40	3.57	4.20	1.07	1.39	1.27	1.17
Jamaica	2.46	2.66	4.60	1.00	1.28	1.44	0.89
Corn Islands	2.52	2.93	4.47	1.00	1.31	1.38	0.96
Bocas del Toro	6.52	2.61	4.41	1.29	1.27	1.36	1.21
San Blas	6.51	0.37	4.41	1.29	1.00	1.36	0.95
Trinidad	3.26	2.34	3.58	1.06	1.24	1.00	1.31
Tobago	3.32	5.77	3.58	1.06	1.66	1.00	1.77

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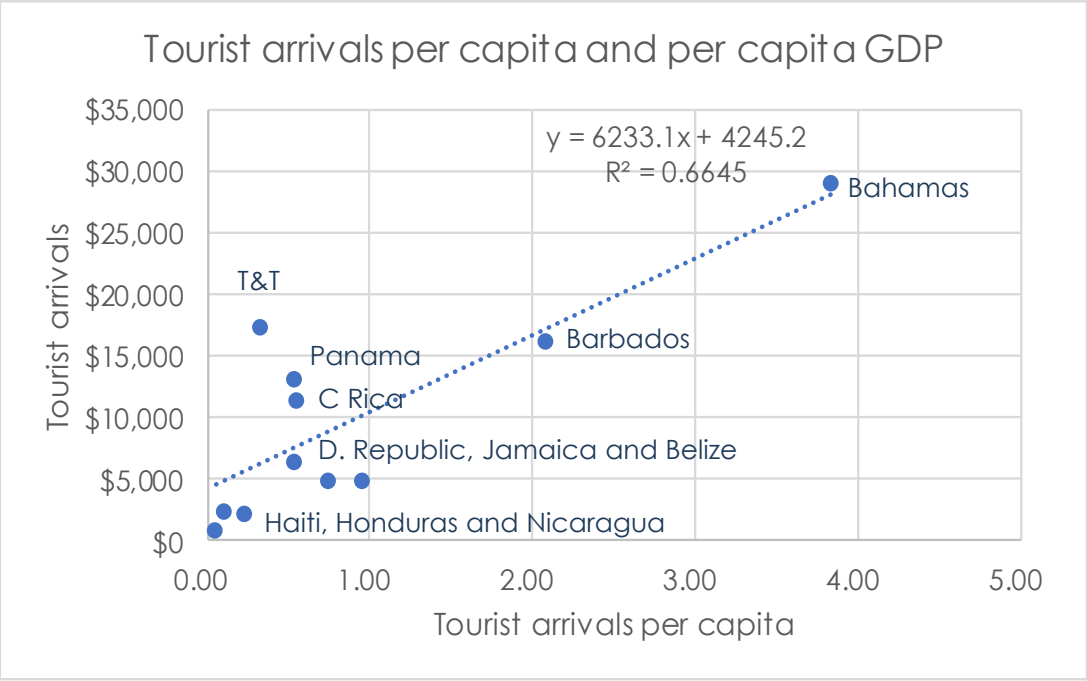
GDP DRIVERS

- **GDP and Tourism are correlated**

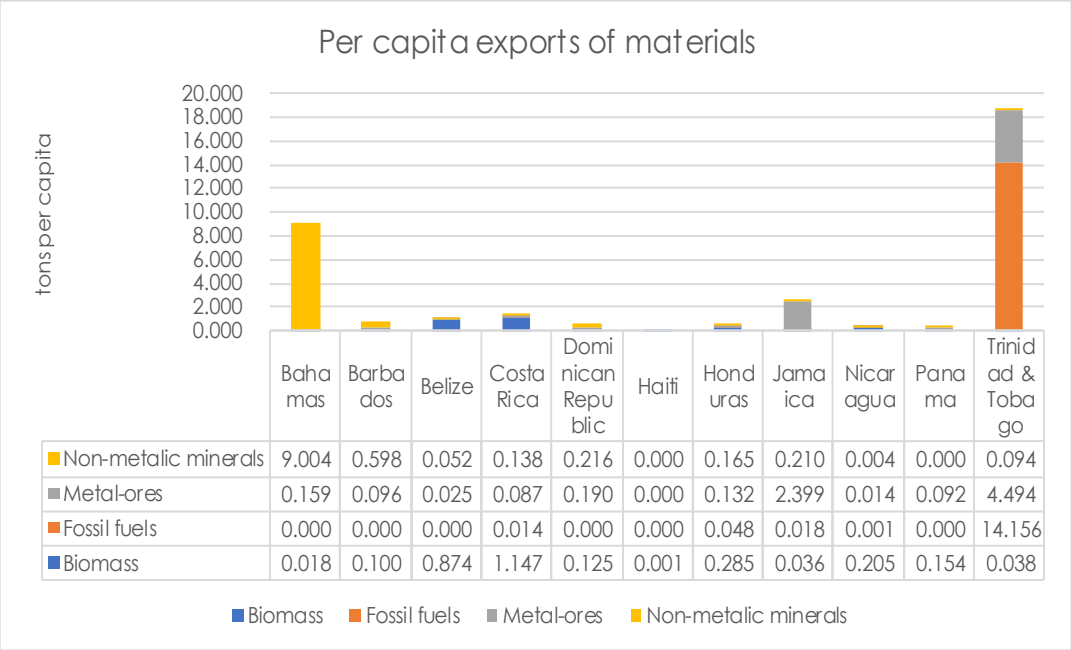


Note: country level analysis

- **Data sources:** World Bank
- Outliers include Trinidad and Tobago (oil and gas) and Panama (financial and transportation services)
- **Results:** coefficient of determination of 0.66 and of 0.91 excluding the 2 outliers

GDP DRIVERS

- **GDP and Extractive Industries are not correlated**



	Bahamas	Barbados	Belize	Costa Rica	Dominican Republic	Haiti	Honduras	Jamaica	Nicaragua	Panama	Trinidad & Tobago
Non-metalic minerals	9.004	0.598	0.052	0.138	0.216	0.000	0.165	0.210	0.004	0.000	0.094
Metal-ores	0.159	0.096	0.025	0.087	0.190	0.000	0.132	2.399	0.014	0.092	4.494
Fossil fuels	0.000	0.000	0.000	0.014	0.000	0.000	0.048	0.018	0.001	0.000	14.156
Biomass	0.018	0.100	0.874	1.147	0.125	0.001	0.285	0.036	0.205	0.154	0.038

Note: country level analysis (e.g. biomass data in Belize)

- **Data sources:** World Bank and UN's Global Material Flows Database
- Biggest material exports include non-metallic minerals in Bahamas (aragonite), metal ores in Jamaica (bauxite) and fossil fuels in Trinidad and Tobago
- **Results:** coefficient of determination of 0.36

INDICATORS TO BUILD ISLAND CATEGORIES

- Island categories based on sustainability criteria and governance, economic, social and environmental indicators
- Selection of indicators used to build SDGs

	Indicator	Values	Source
Governance			
1	***Government Efficiency***	Score 0-7	SDG 16 – World Economic Forum (2018)
2	***Property Rights***	Score 0-7	SDG 16 – World Economic Forum (2018)
3	***Corruption Perception Index***	Score 0-100	SDG 16 – Transparency International
Economic			
1	***GDP per capita***	Nominal USD	World Bank Data Lab (2018)
2	***Government Health and Education Spending***	%	SDG 17 – WHO (2018), UNESCO (2018)
3	***Poverty headcount ratio (% population below 1.90 USD/day(***	%	SDG 1 – World Bank Data Lab (2018)
Social			
1	***Healthy life expectancy at birth***	Years	SDG 3 – WHO (2018)
2	***Mean years of schooling***	Years	SDG 4 – UNESCO (2018)
3	***Unemployment rate***	%	SDG 8 – ILO (2018)
Environmental			
1	***Municipal Solid Waste***	kg/year/capita	SDG 12 – World Bank (2012)
2	***Energy-related CO_2 emissions per capita***	t CO_2/capita	SDG 13 – Oak Ridge N Lab (2018)
3	***Climate change vulnerability***	Score 0-1	SDG 13 – Hague Center SS (2018)
4	***Mean Protected Marine Sites***	%	SDG 14 – Birdlife et al (2018)

METHODOLOGY, DATA AND (COUNTRY LEVEL) RESULTS

- Very limited data, so country profiles were prepared
- Data were rescaled and aggregated to obtain a (country) sustainability profle

Category		Country										
		Bahamas	Barbados	Belize	Costa Rica	Dominican Republic	Haiti	Honduras	Jamaica	Nicaragua	Panama	Trinidad and Tobago
Governance	G1	0.52	1.00	0.53	0.81	0.22	0.00	0.33	0.83	0.22	0.69	0.62
	G2	0.65	0.97	0.49	1.00	0.59	0.00	0.55	0.87	0.37	1.00	0.69
	G3	0.93	1.00	0.43	0.80	0.15	0.00	0.15	0.48	0.09	0.33	0.41
Social	S1	0.78	0.75	0.41	1.00	0.65	0.00	0.69	0.79	0.70	0.89	0.48
	S2	1.00	0.93	0.93	0.61	0.44	0.00	0.18	0.77	0.23	0.82	1.00
	S3	0.15	0.45	0.67	0.57	0.89	0.00	1.00	0.16	1.00	0.88	0.96
	S4	0.72	0.72	0.42	1.00	0.99	0.00	0.26	0.98	0.90	0.98	0.99
Economic	EC1	0.91	0.93	0.51	1.00	0.98	0.00	0.23	0.97	0.85	0.97	0.99
	EC2	0.16	0.38	0.17	0.68	0.88	0.00	0.27	0.21	0.60	1.00	0.41
	EC3	0.58	0.78	0.59	1.00	0.00	0.58	0.88	0.51	0.47	0.44	0.58
Environmental	EV1	0.33	0.00	0.41	0.74	0.78	0.82	0.72	1.00	0.80	0.77	0.69
	EV2	0.82	0.88	0.97	0.96	0.95	1.00	0.98	0.93	0.98	0.94	0.00
	EV3	0.57	0.57	0.00	0.80	0.88	0.47	0.36	0.32	0.34	0.93	1.00
	EV4	0.09	0.54	0.39	0.85	0.80	0.54	1.00	0.44	0.82	0.49	0.00
Average		**0.59**	**0.71**	**0.49**	**0.84**	**0.66**	**0.24**	**0.54**	**0.66**	**0.60**	**0.80**	**0.63**

Poor quality data (mainland)

Poor quality data (Island States)

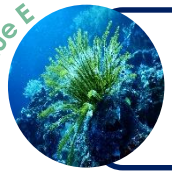
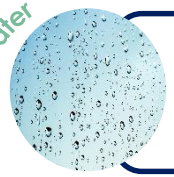
ISLAND CATEGORIES AND PRIORITIES

- Based on qualitative observations, 13 islands can be classified in 3 different groups
- Each group would have different sustainability agendas, but sustainable tourism and building climate resilience remain a common denominator

	Group 1	Group 2	Group 3
Island	• Haiti • Corn Islands (NIC) • Bay Islands (HND) • **Caye Caulker (BLZ)** • **Family Islands (BHS)** • **Tobago (TTO)** • **San Blas (PAN)**	• Trinidad (TTO) • Jamaica • Dominican Republic	• Barbados • N Providence (BHS)
Economic Activities	• Tourism • Subsistence	• Tourism • Extractive industries	• Tourism • Financial services
Sustainable Blue and Circular and Climate Resilient Economy Agenda	• Development of basic infrastructure • Sustainable Tourism • Climate resilience	• Circular Industry • Sustainable Tourism • Cilmate resilience	• Blue Economy • Sustainable Tourism • Climate resilience

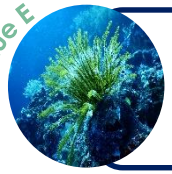
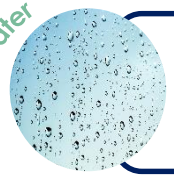
GROUP 1 ISLAND EXAMPLE: BAY ISLANDS

- **Island profile:** 229 km^2, 70,000 pop., 800,000 tourists p.a., free tourist zone
- **SBCCR focus:** Sustainable Tourism and development of basic infrastructure
- **Current status and potential SBCCR interventions**

Blue E 	• Intensive tourism activities • Cruise ship quadrupled since 2000 • Infrastructure development in West/South Roatan	• Spatial planning • Green and climate resilient infrastructure • Capacity building for tourism industry
Water 	• Freshwater stress in Roatan and Utila • Unsuccessful treatment plants, septic tanks dumping to the ocean	• Reverse Osmosis plants • Rainwater harvesting
Energy 	• High and inconsistent energy costs, fossil-based electricity generation	• Clean energy projects • Green buildings and infrastructure
Materials 	• No organized waste management • Limited recycling • Waste burning	• Improve waste collection • New landfills • Regulation/ban on imports

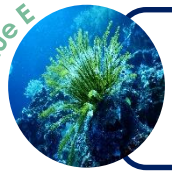
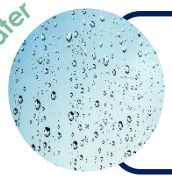
GROUP 2 ISLAND EXAMPLE: TRINIDAD

- **Island profile:** 4,748 km^2, 1,265,000 pop., 16,000 USD pc, O&G (45% of GDP)
- **SBCCR focus:** clean energy transition, circular industry, diversification
- **Current status and potential SBCCR interventions**

Blue E 	• Limited tourism and fishing activity • "Blue Economy" centered around on offshore oil and gas	• Spatial planning • Address biodiversity loss • Reduce pollution in the coastal environment
Water 	• Low fresh water withdrawal (12.5%) • Poor levels of wastewater service	• Implement wastewater treatment and sanitation • Wastewater nutrients cycling projects
Energy 	• 99% of power is fossil-based and subsidized; high per capita emissions (34.2 t CO_2); no renewables	• Clean energy projects (solar, offshore wind) • Demand side management in built infrastructure (LED bulbs, PV)
Materials 	• Oil & Gas extraction (23 t per capita) and exports (14 t); ammonia, methanol and steel production	• Circular economy investments • Improve waste collection • Regulation/ban on imports (styrofoam)

GROUP 3 ISLAND EXAMPLE: BARBADOS

- **Island profile:** 439 km^2, 285,000 pop.; 16,000 GDP pc, 600,000 tourist arrivals
- **SBCCR focus:** blue economy development, water investments
- **Current status and potential SBCCR interventions**

Blue E 	• Fishing 0.1% of GDP despite big EEZ • Limited aquaculture production • 52% of total catch in EEZ overexploited	• Sustainable fishing (tuna, swordfish), aquaculture (finfish sea moss), seafood processing • Integrated coastal zone management
Water 	• Water stress (87.5% of freshwater withdrawal) • Varying sewage disposal (2 plants operated by BWA)	• Leakage control • Address non-revenue water and low fees
Energy 	• Regional renewable energy leader (solar water heaters, EV, etc.)	• Ocean energy: offshore wind, OTEC, SWAC • Circularity into traditional renewable energy deployment (safe cycling of materials, no waste, etc.)
Materials 	• Net exporter of materials (MF > DMC) • MSW doubled in 10 years, 1.73 t • 70% diverted from landfill	• Reverse logistics for material management • Redesign of procurement guidelines • Limiting the use of materials

CONCLUDING REMARKS

- Sustainable growth in islands means promoting blue, circular and climate resilient economies
- A framework to track progress is technically possible; however collecting data at island level is a challenge
- Caribbean Islands may be grouped based on their sustainability profiles
- Group1 islands like Bay Islands can develop basic infrastructure and regulate tourism
- Group 2 islands like Trinidad can accelerate their energy transition, modernize its industry and diversify its economy
- Group 3 islands like Barbados can tap into the opportunities of the Blue Economy

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