6 CLEAN WATER AND SANITATION

Global Water Partnership Caribbean

THE STATISTICAL INSTITUTE OF JAMAICA

SDG 6 Monitoring Guide for Caribbean SIDS

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List of Abbreviations and Acronyms

BPOA - Barbados Plan of Action

CCA- Central Coordinating Agency

FAO- Food and Agriculture Organization of the United Nations

GLASS- UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water

GWP-C- Global Water Partnership Caribbean

GEMI – Inter-agency initiative composed of the (UNECE), United Nations Environment Programme (UN Environment), the (UN-Habitat), UNICEF, the (FAO), the United Nations Educational, Scientific and Cultural Organization (UNESCO), (WHO) and the World Meteorological Organization (WMO).

JMP – Joint Monitoring Programme

MDGs- Millennium Development Goals

MDAs- Ministries, Departments and Agencies

NSO- National Statistical Office.

OC- Oversight Committee

OECD- Organization for Economic Co-operation and Development

STATIN- Statistical Institute of Jamaica

SDGs- Sustainable Development Goals

SIDS- Small Island Developing States

SAMOA - SIDS Accelerated Modalities of Action

UNICEF- United Nations Children's Fund

UN-HABITAT- United Nations Human Settlements Programme

UN – United Nations

UNEP- United Nation Environmental Programme

UNECE- United Nations Economic Commission for Europe

WASH - Water, Sanitation and Hygiene

WHO- World Health Organization

Introduction

Sustainable Development Goals (SDGs)

Sustainable development is now a key concept in all global developmental initiatives. Current societal needs and subsequent interaction with natural resources has placed most countries on a downward spiral of environmental degradation, destined to impact all sectors of society. This issue is amplified in the small island developing states (SIDS) of the Caribbean. The unique features such as small size, geographical location, limited natural resources, low economic status aligned with ambitious developmental agendas limits significant implementation of sustainable development concepts (Eudoxie and Roopnarine, 2017). The United Nations in an attempt to address global challenges introduced 8 Millennium Development Goals (MDGs) that all 193 UN Member States agreed to try to achieve by the year 2015. The MDGs had specific targets and indicators, but upon revision it was agreed that they were not comprehensive or universal and did not sufficiently address the three key pillars (Social, Economic and Environmental) of sustainability (Malik, 2014).

In 2015, 17 integrated and indivisible goals were introduced by the United Nations to build on the achievements of the MDGs. They addressed the limitations of the MDGs and are considered broader, deeper and far more ambitious in scope and are geared towards achieving global sustainable development (Purvis, Mao and Robinson 2019). These 17 Sustainable Development Goals (SDGs) consists of 169 global targets, relating to development outcomes and means of implementation, for the period 2015–2030. These goals are strategically designed to balance the social, economic and environmental dimensions of sustainable development. The 2030 Agenda further seeks to realize the human rights of all, and to achieve gender equality and empowerment of all women and girls. This ambitious universal agenda is intended to be implemented by all countries and all stakeholders, acting in collaborative partnership

All member states of the UN general assembly are actively attempting to implement as many aspects as possible with the support of various UN and Global Funding/Donor agencies. In many cases implementation of these goals requires significant modifications to national policies, reallocation of resources and ultimately cultural transitions away from archaic practices that are categorically unsustainable. Additional guidance built into the sustainability theme have been mandated in the Sendai Framework (successor instrument to the Hyogo Framework for Action (HFA, 2005-2015). For Caribbean SIDS further initiatives were instituted to accommodate their unique circumstances. The Barbados Programme of Action (BPOA-1994) complimented by the Mauritius Strategy of Implementation (MSI-2005), the Small Islands Developing States Accelerated Modality of Action (SAMOA, Pathway- 2014) and the Escazú Agreement (EA-2019) are all geared to advance SIDS of the Caribbean towards achieving the SDGs. While these conventions provide excellent guidelines towards achieving the SDGs, there are key gaps that need to be addressed on a local level particularly in terms of monitoring methodologies.

The document focuses on addressing the issues in the Caribbean region attached to monitoring goal 6 of the SDGs (commonly referred to as SDG 6), which focuses on clean water and sanitation (sustainable water resources management). This goal consisted of 8 targets measurable in the form of 11 core indicators.

Jamaica participated as a pilot country in the United Nations-Water Integrated Monitoring Initiative for SDG 6 and as such has made progressive strides in monitoring and reporting clean water and sanitation data. The Jamaican context was therefore used as the baseline for developing this manual. Existing institutional frameworks, monitoring systems and processes in Jamaica were examined and built upon where necessary to develop a monitoring guide that can be used as a regional model for monitoring SDG 6 in the Caribbean.

Overview of SDG 6 (Clean Water and Sanitation)

The 2030 Agenda recognizes that development and economic prosperity depend on the sustainable management of freshwater resources and ecosystems. As such all SDGs are interconnected and interrelated, SDG 6 is no exception. Water is needed for agriculture, energy, domestic purposes, tourism and industrial production. These uses are often highly interconnected and potentially conflicting. SDG 6 attempts to address issues attached to all these uses in a holistic manner, with targets and monitoring schemes associated with water quality, use, access, affordability as well as ecosystem and anthropogenic influencers (Table 1). The clean water and sanitation goal provides the impetus necessary to comprehensively assess factors that contribute to the condition of global freshwater quality and quantity as an initial step towards clean water and sanitation for all by 2030. The monitoring methodologies are critical towards achieving this target. Once implemented it provides baseline information, enabling countries to identify and itemize the current state of their water resources. The UN framework for monitoring and reporting facilitates global comparisons to be made, enabling individual countries to better understand their status on a global scale.

Table 1: SDG 6 Targets and Core Indicators

Target SDG 6	Indicators
6.1 Drinking Water By 2030, achieve universal and equitable access to safe and affordable drinking water for all	**6.1.1-** Proportion of population using safely managed drinking water services
6.2 Sanitation and Hygiene By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations	**6.2.1-** Proportion of population using safely managed sanitation services, including a handwashing facility with soap and water
6.3 Water Quality and Wastewater By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	**6.3.1-** Proportion of wastewater safely treated **6.3.2-** Proportion of bodies of water with good ambient water quality
6.4 Water use and scarcity By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity	**6.4.1-** Change in water use efficiency over time **6.4.2-** Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
6.5 Water Resources Management By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate	**6.5.1-** Degree of integrated water resources management implementation (0- 100) **6.5.2-** Proportion of transboundary basin area with an operational arrangement for water cooperation
6.6 Water Related Ecosystems By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes	**6.6.1-** Change in the extent of water-related ecosystems over time
6a International cooperation and capacity-building By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programs, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies	**6.a.1-** Amount of water- and sanitation-related official development assistance that is part of a government coordinated spending plan

Target SDG 6	Indicators
6b Stakeholder participation Support and strengthen the participation of local communities in improving water and sanitation management	6.b.1-Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management

Challenges – Caribbean Context

Climate change impacts are often reflected in alterations in water availability causing extremes with high and low rainfall periods. These extremes also impact water quality and alterations can be both temporal and spatial. In the Caribbean the intensity and frequency of both extremes have increased in the last decade, dry seasons have been littered with periods of extreme drought while the rainy seasons have had unfamiliar torrential downpours resulting in both flash and riverine flooding in many Caribbean Countries (Eudoxie and Roopnarine, 2017). Consequently, water management is a key factor in alleviating risks related to famine, disease epidemics, migration, inequalities (within and amongst countries) and natural disasters.

Cutting across so many sectors, water is instrumental in the implementation of cohesive solutions. Unfortunately, water resources are commonly developed and managed by different government agencies and within different sectors which can foster a lack of coordination and a fractional perspective of the state of the resource. In the Caribbean SIDS, additional factors further complicate the management of water resources. These factors include:

- fragile economies
- limited land space
- cultural rigidity – resistance to change
- vulnerability to extreme events
- colonial hegemony (tied to cultural rigidity)
- limited financial and human resources.

As such, the approach for water management and strategies towards achieving SDG 6 must be slightly different from other regions. Mechanisms must be put in place to recognize the increased vulnerability of these islands. This was acknowledged in the SAMOA Pathway (2014) and the Escazú Agreement (2019). The former addressing the issues of vulnerability of Caribbean SIDS and the needs for accelerated efforts and the latter addressing issues attached to environmental justice, information access and public participation in decision making. According to the 2018 Sustainable Development Goal 6 Synthesis Report on Water and Sanitation (United Nations, 2018), major knowledge gaps exist among countries with less than 50 percent having the required data to track the progress of all the targets of SDG 6. Approximately 60 percent of these countries lack sufficient data for more than four of the global SDG6 indicators and only 6 percent provided sufficient information regarding more than eight global indicators. Many Caribbean countries

contribute to these gaps. This document attempts to provide strategies to improve the SDG 6 monitoring and reporting process in Caribbean SIDS by examining current methodologies and using the "the Jamaica experience" to propose recommendations on improving the process.

Objectives

- To increase understanding of the major concepts attached to SDG 6
- To explore current monitoring methodologies for SDG 6 and adapt/enhance to suit Caribbean SIDS
- Develop a monitoring guide for SDG 6 specifically suited to the Caribbean

To achieve these objectives the strategic process shown in Figure 1 was employed as an initial guide. The process involved discussion with the consultant, members of the Statistical Institute of Jamaica (STATIN) and Global Water Partnership Caribbean (GWP-C). These discussions led to the identification of a strategic process to achieve the aforementioned objectives and the determination of the personnel required to inform the process, ensuring an integrated approach.

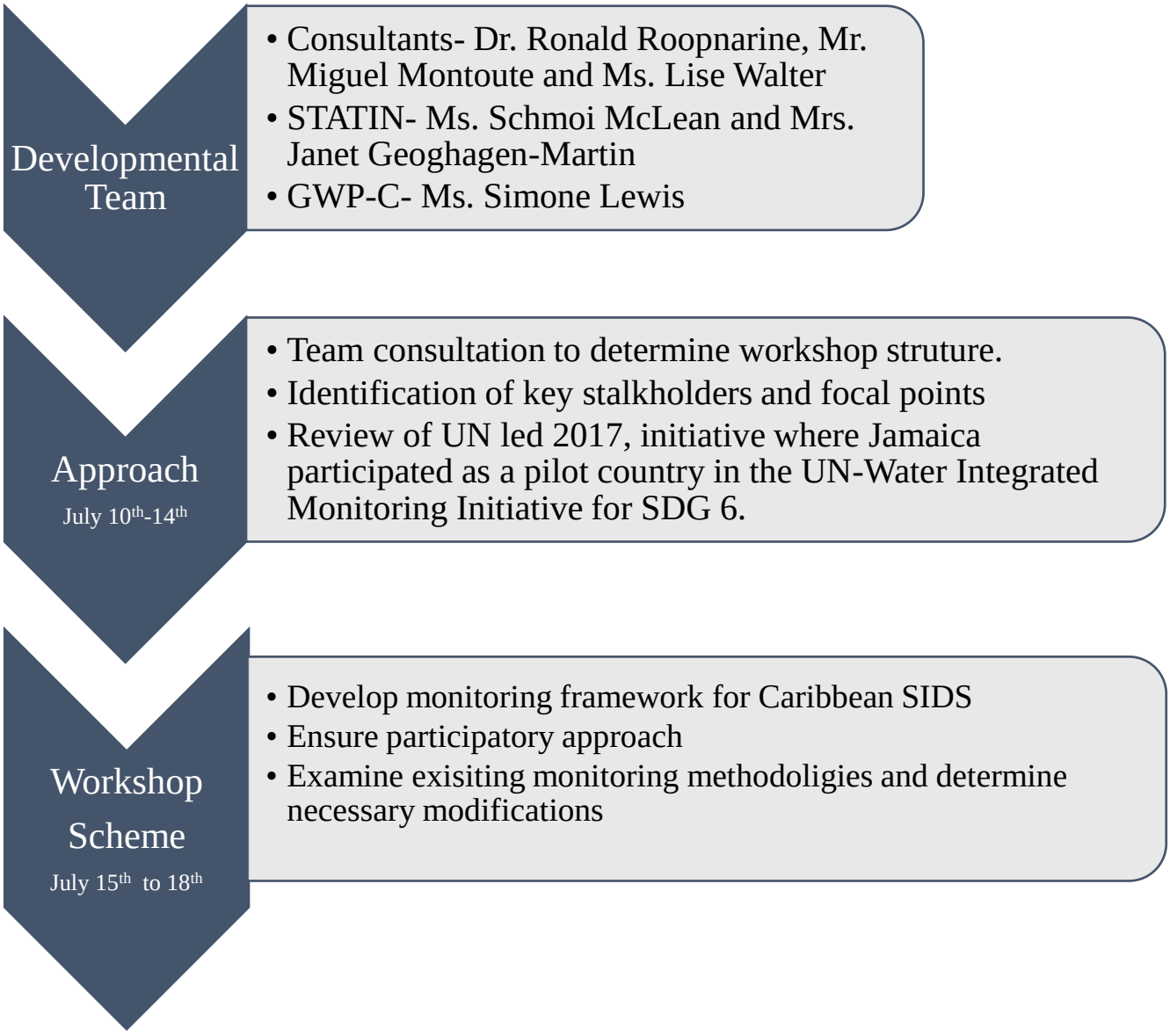

Figure 1: Strategic process used in Training (Kingston, Jamaica, 2019).

Outcomes and Recommendations

General (All SDG 6 Indicators)

The 2030 agenda for Sustainable Development can be considered a "pie in the sky", idea as realistically speaking, many of the targets outlined are extremely difficult to achieve, especially for SIDS. It is a difficult concept to peddle in nations whose people struggle for basic necessities. Perhaps they are generally not preoccupied with concerns about generations to come, or events fifty years in future; their concerns reside in the now. This was the main overarching challenge identified and applies to all SDGs. There is a need to translate the benefits of achieving these targets on a temporal scale in a manner relatable to these vulnerable populations. Table 2 below shows a few examples. It is recommended that as part of the capacity building process attached to the SDGs, each goal's targets should be translated into temporally relatable benefits.

Table 2: Indicators and Relatable Benefits

Indicators	Relatable Benefits
6.1.1-Proportion of population using safely managed drinking water services	Information can lead to targeted efforts to improve access and quality of water available to vulnerable groups in a country. e.g. Jacob Ladder Community in Jamaica
6.2.1-Proportion of population using safely managed sanitation services, including a handwashing facility with soap and water	Information can be used to identify correlation with occurrence of diseases. If improved, can significantly reduce occurrence and health related expenditure. These are direct and relatively immediate impacts. An examples is the Jamaica Social Investment Fund's Project Manager for the Petro Caribe Development Fund project whose primary objective was the replacement of pit latrines with flush toilets (6 or 8 seater sanitation blocks) in rural primary and all age school states that between 2009 and 2016, the sanitation infrastructure in sixty four (64) schools were upgraded. These interventions benefitted approximately 8,000 students and was undertaken in conjunction with the Ministry of Education, Youth and Information. Water, Sanitation & Hygiene (WASH) training was also administered in all schools to ensure the recipients were aware of how to use and maintain the new units.
6.3.1-Proportion of wastewater safely treated	Information can be used to prioritize interventions useful in countries with limited financial and human resources.
6.3.2- Proportion of bodies of water with good ambient water quality	Interventions can improve ecosystem functions and can ultimately improve livelihoods of those who directly depends on freshwater resources

Disaggregation of Data

Collected data based on the SDG 6 targets and indicators should be appropriately disaggregated. This will allow hidden incongruities to be identified within national datasets, so that varying circumstances (e.g. socioeconomic class, vulnerabilities, and marginalization) are better represented and assessed. Aggregated data tends to mask discrepancies which may exist, hence misrepresenting local circumstances on a national, regional and global levels.

Disaggregation of data is therefore extremely important to identify marginalized and vulnerable groups. It also allows the data to reflect the conditions per sector by means of their institutional categories. Table 3 shows suggested categories for disaggregation (general and institutional)

Table 3: Data Disaggregation Categories

General Categories	Institutional Categories
✓ parish ✓ sex of household head ✓ urban/rural population ✓ disability ✓ household size ✓ income ✓ sex ✓ geographical location ✓ level of education ✓ age ✓ settlement type ✓ family structure ✓ ethnicity/race ✓ religion	✓ healthcare facilities ✓ schools ✓ correctional facilities ✓ assisted-living facilities (non-residential) ✓ recreational ✓ religious

Custodian Agencies

SDG 6 indicators are assigned to UN designated Custodian Agencies, that provide the necessary guidance to countries (Figure 2). It is necessary for National Coordinating Agencies (NCAs) and Focal points to establish contact with the respective agencies. These agencies will provide relevant templates, monitoring guides as well as technical support.

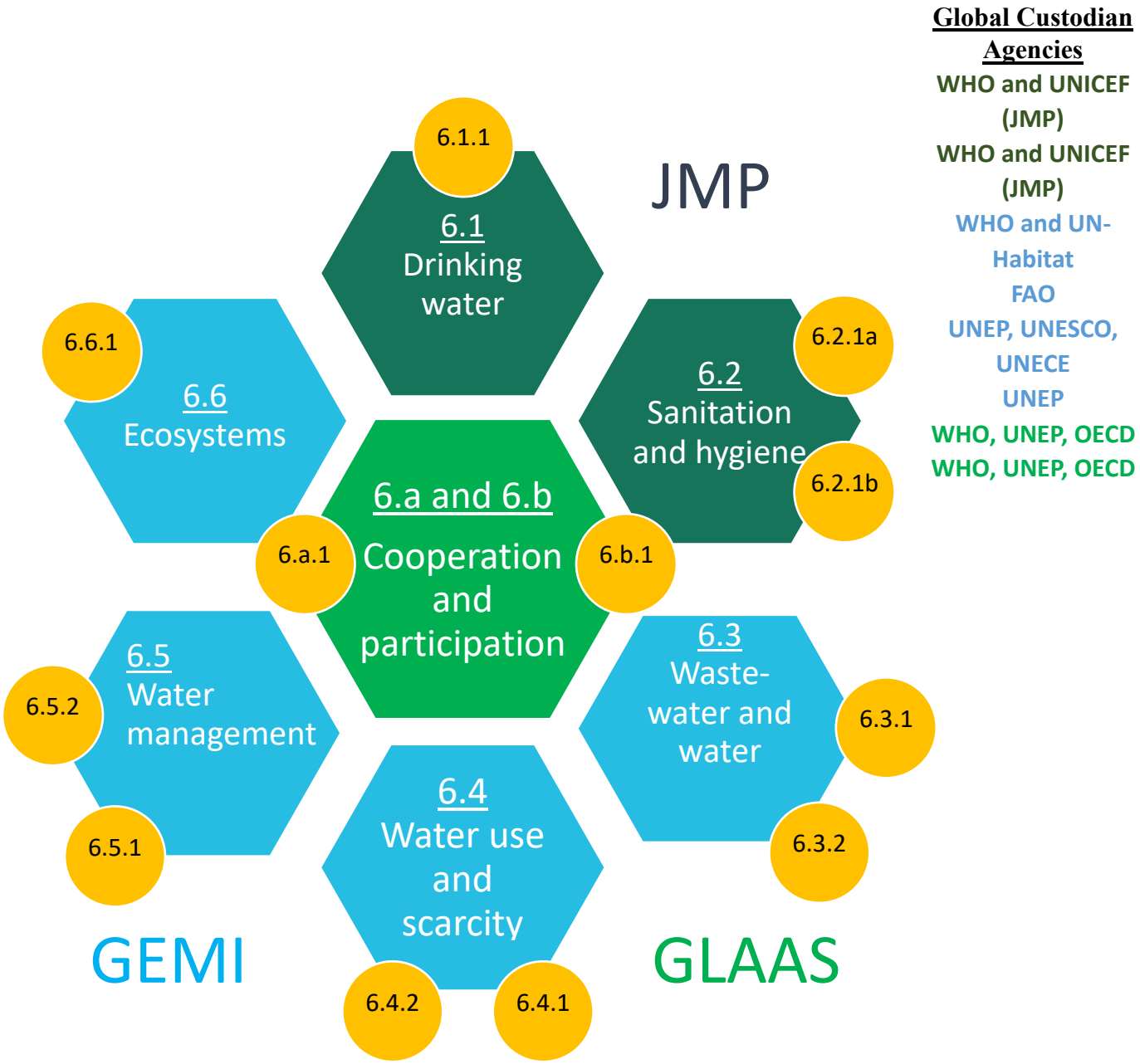

Figure 2: Custodian Agencies

Source: CapNet UNDP (2017)

Roles and Responsibilities

It is critical for countries to understand their roles and responsibilities regarding the targets of SDG 6. A key distinction between the MDGs and the SDGs is the country-driven nature of the SDGs. Table 4 itemizes these roles and responsibilities and provides some recommendations for Caribbean SIDS.

Table 4: Roles/Responsibilities and Recommendations for Caribbean SIDS

Roles and Responsibilities	Recommendation for Caribbean SIDS
Countries are responsible for collecting and making available data for the purpose of global reporting. That means the countries are responsible for providing the data. This responsibility is voluntary and bears no consequences if not done.	Should be implemented into work plans of Ministries Department and Agencies (MDAs) work plans- Most Caribbean Countries are either in the process of or have completed national developmental strategies. Ideally monitoring of SDGs should be incorporated.
The regional mechanism facilitates data and metadata transmission from national to global reporting.	Ensure that data is consistent and in the required format for global extrapolation. A central agency in each island should be responsible for disseminating information (e.g. National Statistical Office)
Custodian agencies (Figure 2) are those that the UN designates to act on its behalf, such as Food and Agriculture Organization (FAO)	Focal point must work closely with custodian agencies to ensure accuracy and efficiency of the monitoring process.

Identification of key challenges and sectors

Four main challenge clusters were identified that hamper monitoring efforts attached to SDG 6. These are:

1. Social
2. Economic
3. Political/Policy
4. Environment

A critical sector and challenge (CSC) matrix was developed to assist in identifying the specific challenges which exist across these main clusters. The specific challenges were identified during stakeholder consultation sessions of a designated SDG 6 working group during the workshop (as part of the strategic process (Figure 1)). They were then placed into the respective clusters by inserting the number “1” in applicable clusters and the number “0” in clusters not applicable, as seen in Table 5 (specific challenges can be placed into more than one clusters or categories). The horizontal sum identifies the spread of the challenge (across the categories). The vertical sum identifies the most influential cluster or category overall.

Table 5: Critical Sector/Challenge Matrix (SDG 6 Working Group, Jamaica)

Challenge	Policy/ Political	Environment	Social	Economy	Total	Solutions
Availability of data (6.1, 6.2 Acquire baseline data)	1	0	1	1	**3**	**Incorporation, collection and reporting of data sets into MDA job functions where similar data is collected.**
Inadequate use of data for decision making	1	0	1		**2**	**Improved training for leaders**
Lack of awareness/Lack of institutionalization	1	0	1	1	**3**	**Target the leaders of the MDAs to get buy in so that the SDG functions become part of core Job functions. Explain the value of input**
Human and Financial resources	1	0		1		**Same as above**
Accessibility re data collection in field (6.3-6.6 Acquire baseline data)	0	1	0	1	**2**	**Use technology (remote sensing, infrared, etc.) to supplement field measurements**
Sensitivity of data; confidentiality	1	0	1	0	**2**	**Improve training of collection personnel and use technology and social media to inform population of how the data will be used.**
Disaggregation limited; sectoral	0	1	0	1	**2**	**Incorporate new categories in existing sampling mechanisms (census, or Standard of living conditions)**
Specialized (upkeep) equipment (parts)	1	0	0	1	**2**	**Build programs/ maintenance costs into annual budget. Justify with time and cost savings obtained from equipment**
Total	**6**	**2**	**4**	**6**		

General Framework

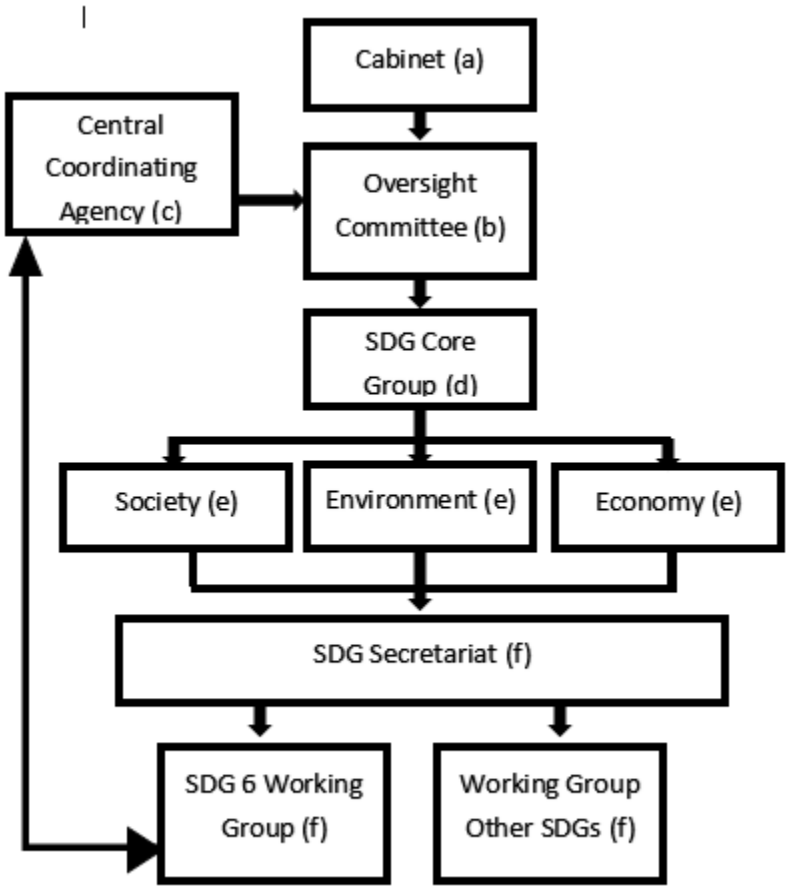

Figure 3: Data Acquisition, Monitoring and Reporting Framework for SIDS of the Caribbean

A general framework for data acquisition, monitoring and reporting was developed based stakeholder feedback and the "Jamaica experience". Figure 3 outlines the framework. Specifics attached to items "a-f" are as follows:

a. **Cabinet**: Composed of government ministers (ideally ministers involved in national development strategies)
b. **Oversight Committee (OC)**: Comprised of permanent secretaries of Ministries, Heads of agencies, NGOs, private sector representative, academia. Will identify a core group and a Central Coordinating Agency (CCA). Directive is prerogative of the planning agency. Based on committee that arose from national development plan; Reports to Cabinet. Selects agencies that will report data to Central Coordinating Agency.
c. **Central Coordinating Agency (CCA)**: Data management agency, responsible for data quality control; Reports to custodian agencies and provided feedback to oversight

committee and SDG working groups. Highly recommended that this agency be the National Statistical Office.

d. **Core Group (CG):** Includes Ministry of Foreign Affairs, Planning agency, National Statistical Office. Identifies personnel to populate thematic groups
e. **Three thematic working groups:** Social, Environment, Economic- SDGs goals can be assigned to each of these groups based on relevance and national circumstance.
f. **SDG Secretariat**: Contains representatives for each thematic group; identifies positions necessary to achieve tasks and appoint indicator focal points.
g. **SDG (6) Working Group**: Includes technical persons, academia, NGOs, private sector, focal points for indicators. The working group, designs data collection strategies, acquires data and coordinates monitoring of indicators. The CCA receives data from respective working groups, assesses quality and reports to UN and Oversight Committee.

General Guiding Process

Based on the discussions with relevant stakeholders in the Jamaica Training, the following guiding process was developed to aid in data collection, monitoring and reporting efforts of Caribbean SIDS.

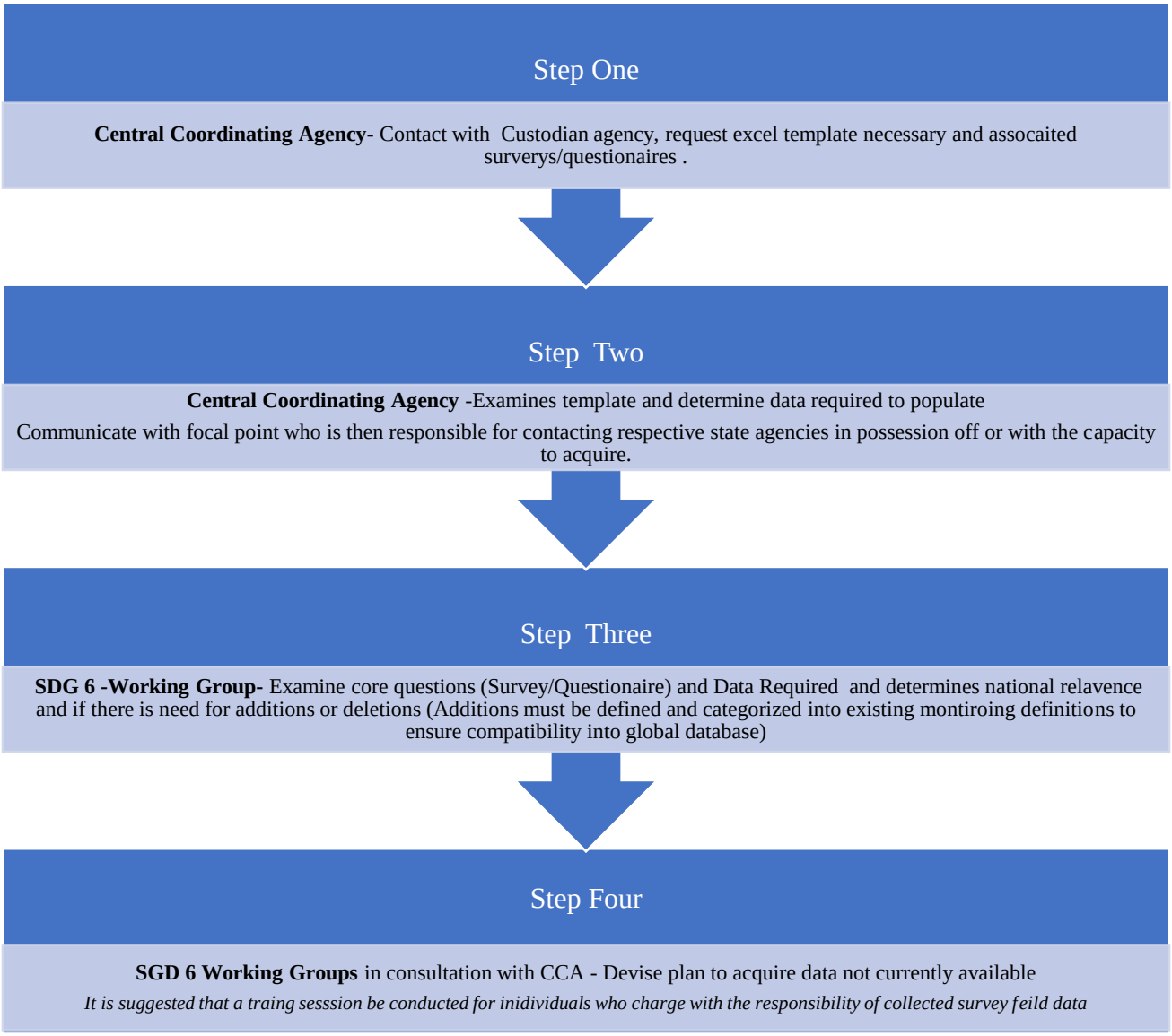

Figure 4: Guiding process towards data collection and reporting.

SDG 6 Indicators- Overview and Recommendations

6.1.1- Proportion of population using safely managed drinking water services (U.N. Water, 2016 and U.N. Water, 2018)

This indicator builds on the MDG indicator "proportion of population using an improved drinking water source" (where "improved" was used as a proxy for "safe" due to the lack of data on drinking water quality), but also incorporates aspects of quality ("safe" or free from contamination), accessibility ("located on premises") and availability ("available when needed") to further address the normative criteria of the human right to water. Table 6 shows suggested modifications that can be applied in Caribbean SIDS.

Table 6: Suggested Amendments for Drinking Water Surveys

Drinking Water	Definition	Monitoring Classification
W1 and W2 (Primary and Secondary Sources of water)		
Additions	Definition	Monitoring Classification
Water shop	Rainwater catchments with tanks and chlorination system on Rural Government land. Small fee is paid to the caretaker/operator (by A fee is charged to customers. The Ministry of Health monitors quality.	Improved
New innovations (trapped air)	A unit exists at UWI Mona that uses solar energy to convert atmospheric air to drinking water	Improved
Rainwater - Public - Private	Public – Distributed, by government agencies Private- Individual and companies	Public -Improved Private- Unimproved *Can be altered accordingly at the local level as some individuals may expose water to treatment prior to use.

Drinking Water	Definition	Monitoring Classification
Trucked Water - Public - Private	Public – Distributed, by government agencies Private- Individual and companies	Public -Improved Private- Unimproved *Can be altered accordingly at the local level as some individuals may expose water to treatment prior to distribution.
W3-Location of drinking water source		
No Changes Necessary	N/A	N/A
W4-Time to collect drinking water		
Include option for "mode of transport"	N/A	N/A
W5- Availability of drinking water		
No Changes Necessary	N/A	N/A
W6 -Drinking water quality at the source		
General Comment – Mechanism for testing country specific recommended method may not be available in all countries, as such provisions should be made for use of available methods		

6.2.1-Proportion of population using safely managed sanitation services, including a handwashing facility with soap and water (U.N. Water, 2016 and U.N. Water, 2018)

To ensure public health beyond the household level, this indicator incorporates the safe management of faecal waste along the entire sanitation chain, from containment to final treatment and disposal, and thus serves as a multi-purpose indicator contributing to indicator 6.3.1 on wastewater treatment.

Handwashing with soap as such, the presence of handwashing facilities with soap and water available is used as a proxy for handwashing behaviour. This indicator is included as a standard element in many household surveys and is recorded by field team observation rather than self-reporting by survey respondents. Table 7 and 8 shows suggested modifications that can be applied in Caribbean SIDS.

Table 7: Suggested Modifications for Sanitation Facilities Survey

<table>
<tr><td colspan="3">6.2 Sanitation and hygiene</td></tr>
<tr><td colspan="3">S1 – Sanitation Facility</td></tr>
<tr><td rowspan="2">Add options
• Flush to Absorption Pit
• Ventilated improved pit latrine (VIP)
• Ventilated improved double pit latrine (VIDP)</td><td>Definition</td><td>Monitoring Classification</td></tr>
<tr><td>Flush to Absorption pit- Primary Treatment

VIP- limited treatment

VIDP-limited treatment</td><td>Flush to Absorption pit- Improved

VIP- Improved

VIDP- Improved</td></tr>
<tr><td colspan="3">S2- Shared sanitation
S3- Location of sanitation facility
S4- Emptying of on-site sanitation facilities
S5- Disposal of excreta from onsite sanitation facilities</td></tr>
<tr><td>No changes necessary</td><td>N/A</td><td>N/A</td></tr>
<tr><td colspan="3">General Comment – Questions can be altered to suit local circumstance. Use of local jargon is recommended. Restructure to maximize response</td></tr>
</table>

Table 8:Suggested Changes for Hygiene and Menstrual Hygiene Survey

<table>
<tr><td>6.2 Hygiene and Menstrual Hygiene</td></tr>
<tr><td>H1- Hand Washing Facility Observation
H2-Water Observation
H3-Soap Observation
M1-Private Place to Wash/Change
M2- Use of Hygiene Materials</td></tr>
<tr><td>No Changes Necessary</td></tr>
<tr><td>M3- Exclusion from duties due to menstruation</td></tr>
<tr><td>General Comment – Question does not capture the issue of marginalization.
Question should be rephrased to
“Have you been forced to stop attending/partaking in any of the following activities during your period?</td></tr>
</table>

6.3.1- Proportion of wastewater safely treated (U.N. Water, 2016 and U.N. Water, 2018)

This indicator sets out to improve ambient water quality, by eliminating, minimizing and significantly reducing different streams of pollution into water bodies. The main sources of pollution include wastewater from households and economic activities (point sources), as well as runoff from urban and agricultural land (diffuse sources).

The indicator addresses the proportion of all wastewater generated that is safely treated at source or through centralized wastewater treatment plants before it is discharged into the environment.

Recommendations for monitoring of 6.3.1

- Follow steps in Figure 4 above
- Working Group- Define excreta flow chain (e.g., of excreta chain Figure 5)
- Identify methods of estimating percentage at each stage
  Example: Integrate questions to acquire necessary information into household surveys and national censuses (Can be included in surveys for 6.1.1 and 6.1.2)
    - The immediate downstream fate of household generated wastewater (e.g. outlet is connected to a piped sewer or to an open drain or to a water body etc.);
    - Emptying and transport from an onsite container, if any is used
    - Disposal in situ
- Service provider information is also necessary. As such survey must be developed to capture information for service providers at all levels of the excreta chain.
- Ensure that information gathered is enough to populate Table 9.

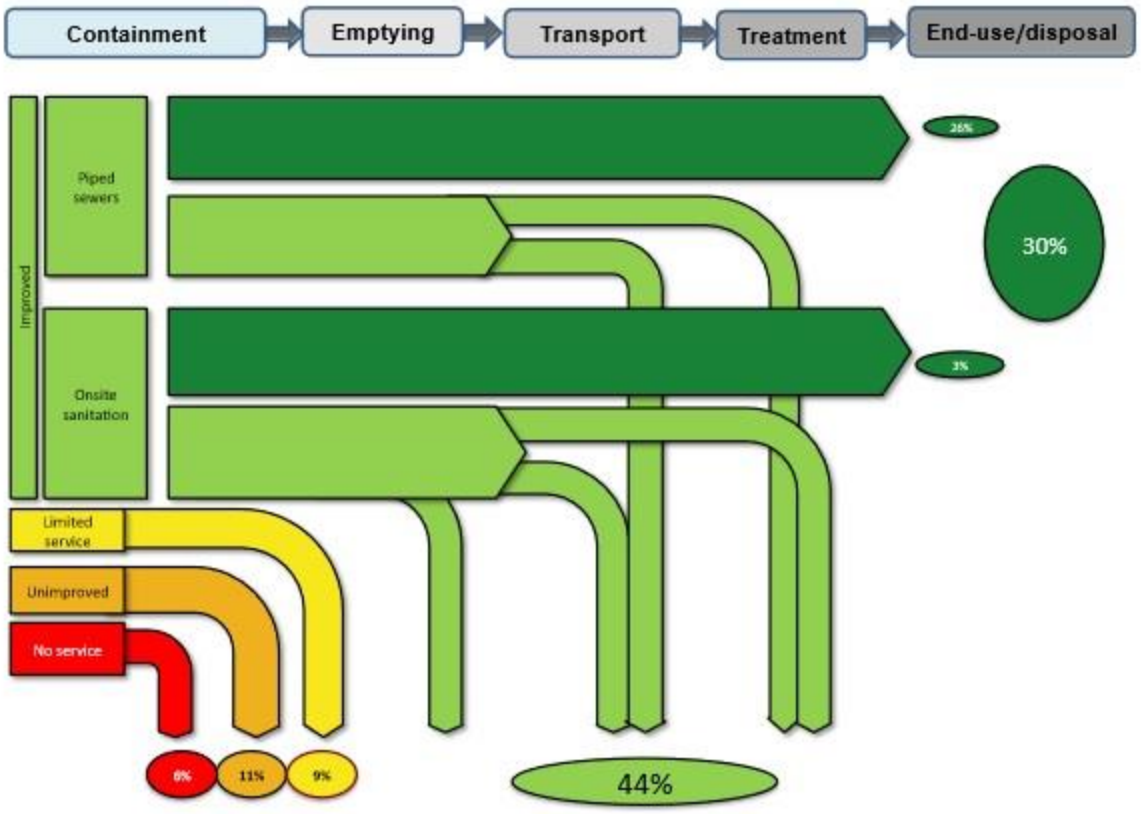

Figure 5: Example of output from monitoring of SDG indicator 6.3.1 in a middle-income country in the Latin American and Caribbean region (U.N. Water, 2018)

Table 9: Key questions that must be addressed in the initial assessment phase (U.N. Water, 2016 and U.N. Water, 2018)

System type	Of which contained	Of which safely disposed insitu	Of which emptied for transport	Of which transported and delivered to treatment	Of which treated at treatment plants
Piped sewers	Do some sewer pipe connections leak or does the pipe discharge directly to an open drain, water bodies or open ground? Estimate % contained _____%	-	-	Do sewer pipes regularly leak (e.g. exfiltration and overflow) before reaching treatment? Estimate % transported and delivered to treatment? _____%	What is level of installed treatment capacity? Are treatment plants overloaded? What is level of treatment plant performance? Estimate % treated _____%
Septic tanks	Are some septic tanks damaged or flooded so that they leak and/or are they connected to open drains, water bodies or open ground rather than to soak pits or sewers? Estimate % contained _____%	Are some septic tanks emptied very rarely? Are some emptied and the excreta buried? If so, is the excreta safely emptied and safely buried? Estimate % safely disposed insitu _____%	Are some septic tanks emptied and the excreta transported away? If so, is the emptying done safely? Estimate % emptied for transport _____%	Does all of the proportion 'emptied for transport' reach treatment or is some discharged to open drains, water bodies or to open ground? Estimate % transported and delivered to treatment? _____%	What is level of installed treatment capacity? Are treatment plants overloaded? What do monitoring records indicate about treatment performance? Estimate % treated _____%
Other improved onsite facilities (e.g. simple pit latrines with slabs)	Are some improved pit latrines damaged or flooded so that they leak and/or are they connected to open drains, water bodies or open ground? Estimate % contained _____%	Are some improved pit latrines never emptied or emptied very rarely? Are some emptied and the excreta buried? If so, is the excreta safely emptied and safely buried? Are some emptied only once the excreta is safe to handle? Estimate % safely disposed insitu _____%	Are some improved pit latrines emptied and the excreta transported away? If so, is the emptying done safely? Estimate % emptied for transport _____%	Does all the proportion 'emptied for transport' reach treatment or is some discharged to open drains, water bodies or to open ground? Estimate % transported and delivered to treatment? _____%	What is level of installed treatment capacity? Are treatment plants overloaded? What do records indicate about treatment performance? Estimate % treated _____%

6.3.2- Proportion of all water bodies in the country that have good ambient water quality (U.N. Water, 2016 and U.N. Water, 2018)

This indicator provides a mechanism for determining whether water quality management measures are contributing to the improvement of water quality in inland water bodies.

This methodology suggests a process for introducing regular monitoring of water bodies in order to determine their quality status. Over time, or with increased availability of resources, the monitoring programme can be expanded to give a more detailed description of water quality that will provide better information for management and the development of water-related policy.

The indicator assesses the proportion of all waterbodies in the country that have good ambient water quality. Ambient water quality refers to natural, untreated water in rivers, lakes and

groundwater and represents a combination of natural influences together with the impacts of all anthropogenic activities.

Recommendations for monitoring of 6.3.2

- Follow steps in Figure 4 above
- SDG working group- identify the parameters that can be measured biased on existing national capacity (Table 10– complete list of parameters, focus should be placed on core parameters). In many Caribbean countries the data to inform this indicator is available, but my not necessarily reside in the institution affiliated with the focal points.
- SDG working group must distinguish between water bodies.
- Develop monitoring plan
- Refer to Box 1 below- Jamaica Case study for 6.3.2 and 6.6.1

Table 10: Core Parameters for indicator 6.3.2 (U.N. Water, 2016)

	Parameter	River	Lake	Groundwater
Core Parameter	Dissolved Oxygen	x	x	
	Electrical Conductivity	x	x	x
	Total Oxidised Nitrogen	x	x	
	Nitrate*			x
	Orthophosphate	x	x	
	pH	x	x	x
Progressive Monitoring Parameter	Temperature	x	x	x
	Turbidity	x	x	
	Transparency		x	
	Hardness	x		x
	Suspended Solids	x		
	Alkalinity	x	x	
	Major anions (HCO_3^-,SO_4^{2-},Cl^-,NO_3^-)			x
	Major cations (Na^+,K^+,Mg^{2+},Ca^{2+})			x
	Total Phosphorus	x	x	
	Orthophosphate			x
	Total Nitrogen	x	x	
	Nitrite	x	x	x
	Ammoniacal Nitrogen	x	x	x
	BOD/COD	x		
	Non-heavy metals (e.g. arsenic or fluoride)	x	x	x
	Heavy metals	x	x	x
	Hydrocarbons	x	x	x
	Pesticides	x	x	x
	Volatile Organic Carbons	x	x	x
	Emerging Pollutants	x	x	x
	E. coli	x	x	x
	Faecal coliforms	x	x	x
	Faecal Streptococci	x	x	x
	Chlorophyll a		x	

6.4.1- Change in water-use efficiency over time (U.N. Water, 2018)

Indicator is designed to address the economic component of Target 6.4. Thus, an entirely new methodology needed to be developed to monitor the indicator. This also meant that no previous data existed for the indicator, resulting in new data computations and related interpretation of the results

Water Use Efficiency (WUE) is defined as: "the value added per water used, expressed in USD/m3 of a given section, division or group of divisions of the economy (showing over time the trend in water-use efficiency)"

This indicator assesses the value added per water used, expressed in USD/m3 over time of a given major sector (showing the trend in water-use efficiency). Following International Standard Industrial Classification of All Economic Activities (ISIC), rev. 4 coding, sectors are defined as:

1. Agriculture; forestry; fishing (ISIC A), hereinafter "agriculture";
2. Mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply constructions (ISIC B, C, D and F)
3. All the service sectors (ISIC E and ISIC G-T)

Recommendations for monitoring of 6.4.1

- Follow steps in Figure 4 above
- Indicator can be populated with estimations based on national information. If needed, data can be retrieved from internationally accessible databases for both, water-use and economic data in different sectors. In Jamaica, STATIN produces the National Income and Product Report that provides data on the gross value added (GVA) by industry and industrial groups at current prices. The figure reported is total GVA for all industries and not broken down by specific industry but should be available in the near future. https://statinja.gov.jm/PublicationReleases.aspx
- SDG working group- identify data gaps and develop a monitoring plan to fill identified gaps
- Useful Websites:
  - http://www.fao.org/nr/water/aquastat/main/index.stm
  - http://www.fao.org/nr/water/aquastat/data/glossary/search.html?lang=en
  - http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en
  - http://www.fao.org/nr/water/aquastat/water_use/index.stm
  - http://www.fao.org/nr/water/aquastat/catalogues/index.stm

6.4.2- Level of water stress: freshwater withdrawal as a percentage of available freshwater resources (United Nations, 2019)

This indicator is defined as the ratio between total freshwater withdrawn by all major sectors and total renewable freshwater resources, after having taken into account environmental water requirements.

Computation is based on three components:

1. Total renewable freshwater resources (TRWR) are expressed as the sum of:
   a. internal renewable water resources (IRWR) and
   b. external renewable water resources (ERWR). The term "water resources" is understood here as freshwater resources.

Internal renewable water resources are defined as the long-term average annual flow of rivers and recharge of groundwater for a given country generated from endogenous precipitation.

External renewable water resources refer to the flows of water entering the country, taking into consideration the quantity of flows reserved to upstream and downstream countries through agreements or treaties (and, where available, the reduction of flow due to upstream withdrawal).

2. Total freshwater withdrawal (TWW) is the volume of freshwater extracted from its source (rivers, lakes, aquifers) for agriculture, industries and municipalities. It is estimated at the country level for the following three main sectors: agriculture, municipalities (including domestic water withdrawal) and industries (including cooling of thermoelectric plants). TWW is in general calculated as being: [the sum of total water withdrawal by sector] minus [direct use of wastewater, direct use of agricultural drainage water and use of desalinated water].

   In formula: $TWW = \sum ww_s - \sum du_u$
   where:
   TWW = Total freshwater withdrawal
   ww_s = Water withdrawal for sector "s". s = agriculture, industry, energy, etc.
   du_u = Direct water use from source "u". u = direct use of wastewater, direct use of agricultural drainage water and use of desalinated water

3. Environmental flow requirements (EFR.) are the quantities of water required to sustain freshwater and estuarine ecosystems. Methods of computation of EFR are extremely variable and range from global estimates to comprehensive assessments for river reaches. For the purpose of the SDG indicator, water volumes can be expressed in the same units as the TWW, and then as percentages of the available water resources
   *estimation techniques: http://gef.iwmi.org/

Recommendations for monitoring 6.4.2

- Follow steps in Figure 4 above
- Indicator can be populated with estimations based on national information as a first step.
- SDG working group- identify data gaps and develop a monitoring plan to fill identified gaps

6.5.1 Degree of integrated water resources management implementation (0- 100) (U.N. Water, 2016 and U.N. Water, 2018)

This Monitoring Methodology provides a guide for national governments to monitor the status of Integrated Water Resources Management (IWRM), target 6.5 under Sustainable Development

Goal 6 on water and sanitation (SDG 6). It is based on a self-assessment questionnaire to be completed every three years.

The methodology seeks to use and build on existing monitoring efforts at the country level, allowing countries to begin monitoring efforts at a level in line with their national capacity and available resources, and from there advance progressively

The indicator is determined from the results of a questionnaire on integrated water resources management (IWRM) comprising of four sections:

1. Enabling Environment: Creating the conditions that help to support the implementation of IWRM, which includes the most typical policy, legal and strategic planning tools for IWRM.
2. Institutions and participation: The range and roles of political, social, economic and administrative institutions and other stakeholder groups that help to support the implementation of IWRM.
3. Management Instruments: The tools and activities that enable decision-makers and users to make rational and informed choices between alternative actions.
4. Financing: Budgeting and financing made available and used for water resources development and management from various sources

Recommendations for monitoring 6.5.1

- Follow steps in Figure 4 above
- SDG working group examine questionnaire and determine information necessary to complete: http://iwrmdataportal.unepdhi.org/iwrmmonitoring.html
- Develop a monitoring plan to acquire necessary data
    - Questionnaire can be filled out by relevant stakeholders
    - Can be distributed/populated in a variety of ways (site visits, phone calls, email, survey monkey, manually)
    - Focal point/ working group- Compile information gathered
    - National workshop with relevant stakeholder to reach consensus and determine final response.

Indicator 6.6.1 Change in the extent of water-related ecosystems over time (U.N. Water, 2016 and U.N. Water, 2018)

This indicator tracks changes over time in the extent of water-related ecosystems. It uses the imminent date of 2020 in order to align with the Aichi Biodiversity Targets of the Convention on Biological Diversity but will continue beyond that date to align with the rest of the SDG Targets set at 2030.

Global monitoring, of this indicator focuses on the following ecosystem categories:

- Vegetated wetlands (swamps, swamp forests, marshes, paddies, peatlands and mangroves)

- Open water (rivers and estuaries, lakes and reservoirs)
- Groundwater aquifers.

For the purpose of this indicator, ecosystem change, in relation to its natural condition in terms of both quantity and quality, can be categorized as follows:

- Unmodified natural (class A), where the change is no more than 10 %
- Largely natural (class B), where the change is between 11 and 20 %
- Moderately modified (class C), where the change is between 21 and 40 %
- Largely modified (class D), where the change is between 41 and 60 %
- Seriously modified (class E), where the change is more than 60 %

Sub-indicator 6.6.1.a: Spatial extent of water-related ecosystems

- Measures the geographic or spatial extent of vegetated wetlands (such as swamps, marshes and peat, and including mangroves, swamp forests and even rice paddies) as well as inland open water (rivers, floodplains and estuaries, lakes and reservoirs).
- Both Earth Observation (EO) and ground-based surveys provide data that are used to determine the change in the spatial extent of water-related ecosystems over time.

Sub-indicator 6.6.1.b: Quantity of water in ecosystems

Measures the amount of water contained in rivers, measured as streamflow, together with the water stored in lakes and reservoirs and also beneath the ground.

Sub-indicator 6.6.1.c: Quality of water in ecosystems

The data here are produced under Indicator 6.3.2 Percentage of water bodies with good ambient water quality and is carried over for inclusion in the 6.6.1 aggregated score. This data in the 6.3.2 indicator are used to measure the percentage of compliance with a good water quality. This data are used to determine the change in the quality of water over time based on the assumption that 100% compliance would mean natural water quality.

National Sub-indicator 6.6.1.d: State or health of ecosystems

Note that this sub-indicator does not form part of the aggregated 6.6.1 index. It is kept separate for National level reporting and to assist with restoration activities. This sub-indicator method does not prescribe any one particular method for measurement of the health of water related ecosystems because most of the existing methods are based on local ecological conditions that are not applicable at a global level. Also, the methods appropriate, for example, to palustrine wetlands, rivers and mangroves, etc. are all different and cannot be used interchangeably between different ecosystems.

Recommendations for monitoring 6.6.1

- Follow Steps in Figure 4 above
- Table 11 shows key areas of focus for global and national reporting. It is recommended that Caribbean SIDS focus resources on acquiring information related to global reporting initially and extend to areas required for national reporting if resources permit.
- SDG working groups analyse all sub indicators
    - Determine what can be assessed and identify a baseline
    - Develop monitoring plan for each (identify agencies that need to be involved)
    - Determine method to assess ecosystems health (species diversity indices are an option).
- Refer to Box 1 below- Jamaica Case study for 6.3.2 and 6.6.1

Table 11: Indicators for 6.6.1 Global and National levels (U.N. Water, 2016)

Steps	Monitoring activity	Detail	Units of measurement
Step 1 represents the basic Indicator 6.6.1 used for Global Reporting			
1	Change in the spatial extent of surface water-related ecosystems	Each ecosystem type is assessed using a different method. Earth Observation methods are used where possible and require ground-based verification.	% change in area (km^2) from SDG baseline reference condition
1	Change in quantity of water stored in rivers and open water bodies	Change in the flow of rivers/estuaries, the volume of storage in lakes and artificial reservoirs.	% change in the volume of flow (Mm^3) from the natural reference condition. % change in volume (Mm^3) of water storage in lakes from the natural reference condition.
1	Change in quality of water in rivers and open water bodies	The quality of water in all ecosystems is a key driver of ecosystem change. This indicator is monitored as part of Target 6.3.2 and is linked here.	% change in water quality from the natural reference condition
The steps below are additional to the 6.6.1 basic indicator and are for reporting at a National level, not for Global Reporting.			
2	Ground based interpretation of ecosystem extent changes identified by Earth Observation	This activity adds value to the assessment of extent done at Step 1. Those water-related ecosystem that are identified by Earth Observation to have significantly changed are assessed at ground-level in order to determine the nature and cause of the change.	% change in area (km^2) from reference condition
3	Change in quality and quantity of	Quality and quantity characterise different aquifers and should be mapped. The quantity of water is represented by the depth to the groundwater table	% change in water quality and quantity from natural

The Jamaica Experience- Case Study (6.3.2 and 6.6.1)

Jamaica became engaged in the monitoring initiative in January 2017 when contact was made by UN-Water to the Statistical Institute of Jamaica (STATIN), the National Statistics Office. Officers off the NSO engaged in webinars on specific indicators to include 6.3.2, 6.4.2, 6.5.1 and 6.6.1. A technical workshop funded by UN-Water and hosted by Dr Chris Dickens of the International Water Management Institute (IWMI) was held in Kingston, Jamaica in July 2018 on indicators 6.3.2 and 6.6.1. Participants included representatives of various water and sanitation industries who were key data providers to the monitoring process.

Following the training the national focal point invited the participants to form an Inter-sectoral Working Group to monitor and report on indicators 6.3.2 and 6.6.1. The group consisted a core of 10 persons, representing 4 MDAs, worked assiduously to agree on a methodology, identify, collate and analyze data for the monitoring process. Where before we largely worked in silos, we became innovative, cooperative and extremely committed to the process in order to accomplish the task. It encouraged a spin off where data is more easily shared, and members have taken a keen interest in not only SDG 6 but how their institutions can contribute to other goals.

A key initiative taken by the group was to identify the parameters that were monitored within the industry and agreeing to utilize the standards of the National Environment and Planning Agency (NEPA). The standards monitored were pH, EC, NO3 and PO4. With this done the group reviewed the methodologies outlined by the UN and made them country specific. For example, it was decided that the years to be monitored for 6.3.2 were 2014-2016, however, for 6.6.1 data was used from a longer time series based on availability. As a result of the short time frame for reporting, it was agreed to monitor surface water from various watersheds within the 10 hydrological basins in order to report on the quality of the water. Groundwater would be monitored in the next reporting period. A template was designed to monitor data from different water bodies that would be used in the final computation (Figure 6)

Challenges encountered during the monitoring period

- SDGs were not given priority as persons viewed it as additional work. In some instances, data are provided very late, not at all or in a format that is not easily understood.
- Lack of human and financial capital for proper monitoring.
- Data in some instances are outdated e.g. some watersheds have not been monitored since the 1980s
- The short time frame given to complete task

Lessons learned during monitoring period

- SDG 6 was not widely known and accepted by all the relevant data providers - data providers were not aware of their particular role within the monitoring process and how monitoring should proceed
- Support is needed at the head - where the head of agencies were aware of the SDG and their entities contribution to the process, more support was given by assigned staff members. People felt included when you explained their value of their input. However, not everyone will come onboard, but you must press on.
- You do not need a large group but a committed few to get things done - Ideally, we wanted a large representative group to participate in the process. However only a few responded to correspondence sent. We went ahead with the core agencies that came on board and they were instrumental in completing the process.

Box 1: Jamaica Case Study (6.3.2 and 6.6.1)

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Name of Source	Latitude	Longitude	Date YYYY/MM/DD	PO4	NO3	pH	EC		PO4	NO3	pH	EC
2					(mg PO_4/l)	(mg NO_3/l)		(m mhos.cm^{-1})		(mg PO_4/l)	(mg NO_3/l)		(m mhos.cm^{-1})
3	NEPA TARGET VALUES				0.8	7.5	7.00 - 8.40	150 - 600		0.8	7.5	7.00 - 8.40	150 - 600
4													
5	MONTEGO RIVER WATERBODY												
6													
7									TOTAL				
8									PERCENT COMPLIANCE				
9									% COMPLIANCE PER STATION				
10													
11									TOTAL				
12									PERCENT COMPLIANCE				
13									% COMPLIANCE PER STATION				
14									WATERBODY COMPLIANCE (%)				
15									WATERBODY CLASSIFICATION	GOOD			
16													

Figure 6: Template to calculate quality of water bodies (Jamaica, STATIN)

Indicator 6.a.1: Amount of water- and sanitation-related official development assistance that is part of a government coordinated spending plan (U.N. Water, 2016 and U.N. Water, 2018)

This indicator assesses the amount and percentage of ODA that is included in a government coordinated spending plan, whether: (1) on treasury or (2) on budget. By convention, ODA flows comprise contributions from donor government agencies, at all levels, to developing countries, either bilaterally or through multilateral institutions. A government coordinated spending plan is defined as a financing plan/budget for water and sanitation projects, clearly assessing the available sources of finance and strategies for financing future needs. A low value of this indicator (near 0%) would suggest that international donors are investing in water- and sanitation-related activities and programs in the country outside the purview of the national government. A high value (near 100%) would indicate that donors are aligned with national government and national policies and plans for water and sanitation.

The indicator can be disaggregated for type of water and sanitation activity/programs (according to the OECD Creditor Reporter System purpose codes).

Recommendations for monitoring 6.a.1

- Follow steps in Figure 4
- SDG working group-
  - Examine national budgets and determine allocations directly related to water and sanitation (this may cover multiple ministry allocations)
  - Identify all sectors (State and NGOs) that conduct activities related to water and sanitation
  - Develop methodology to acquire financial contribution from government agencies and international donor

- Useful websites:
  - https://data.oecd.org/
  - https://www.who.int/water_sanitation_health/monitoring/investments/glaas/en/
  - https://www.who.int/water_sanitation_health/monitoring/investments/trackfin/en/

Indicator 6.b.1- Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management (U.N. Water, 2016 and U.N. Water, 2018)

This indicator assesses the percentage of local administrative units within a country with established and operational policies and procedures for participation of local communities in water and sanitation management. Policies and procedures for participation of local communities in water and sanitation management define a mechanism by which individuals and communities can meaningfully contribute to decisions and directions on water and sanitation management.

Recommendations for monitoring 6.b.1

- Follow steps in Figure 4
- National policy in Caribbean SIDS apply to all administrative units. As such this indicator may not be applicable
- In multi-island Caribbean countries there may be some relevance where policies on the mainland may be different from sub-islands. In such cases the SDG working group can identify variations in polices and compute proportion accordingly.

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The authors wish to acknowledge the contributions of all those present at the training workshop (July 8th -12th, Kingston, Jamaica). Their input, healthy discussions and practical experience in various aspects of SDG monitoring and reporting informed significant components of this document. Table 12 below lists these participants and their respective institutions. The coordinating efforts of STATIN's Schmoi McLean and Janet Geoghagen-Martin and GWP-C's Simone Lewis requires special mention. Gratitude must also be expressed to Richard Johnston (WHO/Joint Monitoring Programme for Water, Sanitation and Hygiene) who graciously agreed to provide vital advice and a remote presentation.

Table 12: Participants at the SDG 6, Technical Training, July 8-12th 2019 Kingston, Jamaica

Name	Institution/Affiliations
Lise Walter	Global Water Partnership (GWP-C)
Simone Lewis	
Gillian Guthrie	Ministry of Economic Growth and Job Creation (MEGJC) - Environment Risk Management Branch
Andrea Jones-Bennett	
Andrea Spencer	
Nicole O'Reggio	
Michael Williams	Ministry of Health and Wellness (MOHW)
Cordene Segree	National Environment and Planning Agency (NEPA)
Safiya Rhoden	
Renata Rookwood	
Maxine Brown	National Irrigation Commission (NIC)
Bryan Hastings	
Stephney Duhaney	National Solid Waste Management Authority (NSWMA)
Nadine Patterson	National Water Commission (NWC)
Wendy Harrison-Smith	
Kaysha McFarlane	
Larytha Fletcher	Planning Institute of Jamaica (PIOJ)
Natalia Reid	Rural Water Supply Limited (RWSL)
Janet Geoghagen-Martin	Statistical Institute of Jamaica (STATIN)
Hope Perkins	
Maureen Falloon	
Schmoi McLean	
Orlando Thomas	Water Resources Authority (WRA)
Desmond Wellington	
Miguel Montoute	Water Resources Management Agency -Saint Lucia

Conclusion

Caribbean SIDS, despite their circumstances and associated challenges are all capable of effectively monitoring and reporting on SDG 6. The monitoring process can also be progressively incremental by first collecting the most fundamental baseline data and then acquiring information about other relevant parameters as institutional capacity and resources increase. According to the 2018 Sustainable Development Goal 6 Synthesis Report on Water and Sanitation (United Nations, 2018), the SDG 6 monitoring is a learning process which entails review and improvement. In order to meet SDG 6 six targets regionally, there is a need for strong political will and commitment. Synergies must be established between state agencies to maximize efficiency and increase productivity. A cohesive, standardized approach will alleviate many of the current challenges and increase the quality, reliability, availability, frequency and coverage of country specific data. This document hopes to aid in that regard, through the processes, frameworks and recommendations provided.

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