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EXTENDED ABSTRACT

Small Island Developing States (SIDS) are a unique group of countries, many of which are working to achieve sustainability as they develop. Their unique characteristics include small size, exposure to major natural hazards, fragile ecosystems, high vulnerability to sea level rise, labour market instability, external dependence and small economies of scale, with finite space and resources. Sustainability is vital for SIDS. The first step for SIDS in achieving sustainability is to define it for their national context. Once it is defined, clear policy directives for achieving sustainability then need to be developed. The directives should outline the goals the country wants to achieve to develop sustainably.

There is no globally agreed definition of sustainability. One popular definition that is put forward by the Brundtland Commission is the development that meets the needs of current generations without compromising the ability of future generations to meet their needs and aspirations (Brundtland, 1987). This paper proposes that this definition of sustainability is too narrow and proposes an alternate definition as described by Sen (1999), "Sustainability requires limits to growth but allows substitutability of capitals only with the support of appropriate green design or technologies. It also seeks to preserve the environment, achieve social justice, equity and freedoms while allowing for the development of a viable economy".

This definition is adapted from Davidson's work to compare political economy typologies' interpretation of sustainability and fits more with her social democratic typology along the continuum of weak versus strong sustainability (Davidson, 2011). An indicator system aligned to this definition of sustainability would track changes in policies, processes and behaviours towards limiting use of finite resources as well as ecosystem and human well-being. When this research started, there was no globally agreed mechanism or methodology for measuring sustainability. In September 2015, the United Nations member countries adopted the Sustainable Development Goals (SDGs). Along with these agreed goals are recommendations on indicators to measure their achievement.

This research provides a comparative policy analysis of the use of sustainability indicator systems and their suitability for SIDS. The analysis looked at several indicator systems, including Indices of Environmental Sustainability and Environmental Performance, Ecological Footprint, ILAC Environmental Indicators, Swiss National Sustainable Development System, Environmental Vulnerability Index,

Sustainable Human Development Indicator (SHDI) and Sustainable Development Goals (SDGs).

The study design can be described as cross-sectional and retrospective-prospective. The methodology used is applied research and more specifically, a comparative policy analysis of the use of indicators for measuring sustainability in the context of SIDS. The information gathered through this research can be utilized for policy formulation, planning, community involvement in decision-making, and enhancing understanding of phenomena (e.g. climate change) – all aspects of sustainability.

Factors in the analysis included ease of implementation, visual representation and ease of georeferencing. Thirty-seven SDG indicators served as a sample of potential indicators and were scored based on the aforementioned factors. Of the 37 indicators assessed, 7 were deemed best suited for SIDS and some of these have the potential to serve as sustainability standards (see Table 1).

Table 1: SDG Indicators suitable for SIDS

SDG Target	Indicators
2.4	Percentage of agricultural area under sustainable agricultural practices
5.5	Proportion of seats held by women in national parliaments and local governments
6.3	Percentage of bodies of water with good ambient water quality
11.c	Percentage of financial support that is allocated to the construction and retrofitting of sustainable resilient and resource-efficient buildings
14.3	Average marine acidity (pH) measures at agreed suite of representative sampling stations
15.5	Red List Index
16.1	Number of victims of intentional homicide per 100,000 population by age group and sex

An additional 13 indicators were also recommended as some issues critical for SIDS were not adequately covered by indicators proposed through the SDG process. These additional 'new' indicators are:

1. Education – Development of primary and secondary level curriculum including civics or CAS (creativity, activity, service) courses/activities that are mandatory.
2. Viable economy – Proportion of SMEs with access to loan, credit or overdraft facilities
3. Viable economy – Percentage of tourism market share that is locally owned.
4. Employment – Percentage and number of persons engaged in forced labour, per sex, and age group (disaggregated by the worst forms of child labour).
5. Resilient infrastructure – Percentage of critical infrastructure able to withstand 50-year storm or IPCC sea level rise projections through 2100.
6. Adaptation – Total official international support adaptation programs/projects focused on creating sustainable and resilient infrastructure.
7. Inequality – Total resource flows for development disaggregated by recipient and donor countries, type of flow and target national plans and programs.
8. Production patterns – Third party audits of companies to include evaluation of sustainable practices and publication of results.
9. Conservation of marine resources – Percentage of coastline and marine territory with formulated or implemented integrated coastal management or maritime spatial plans based on an ecosystem approach, that builds resilient human communities and ecosystems, and provides for equitable benefit sharing and decent work.

10. Preventing biodiversity loss – Benefits (in US dollars) derived from national legislative and administrative frameworks, including permits, for utilization of genetic resources according to guidelines of the Nagoya Protocol.
11. Preventing biodiversity loss – Programs for Invasive Alien Species control based on national legislation, including prevention, detection, control and monitoring, established and regularly assessed.
12. Global partnership for sustainability – Number of policy changes in investment regimes incorporating sustainability objectives.
13. Global partnership for sustainability – Developing countries' and least developed countries' share of global exports derived from sustainable management of natural resources.

The research found that there is limited applicability of existing sustainability assessment tools to SIDS. It is a recommendation of this paper that a SIDS-specific tool be developed with the following features inclusive of:

- The twenty indicators recommended in this paper, at a minimum;
- System dynamics models, resilience indicators, designation of tipping points, and the capacity to analyze alternative scenarios with indicators at both the planetary and individual levels (Dahl, 2012, p.17); and
- The 5M principles proposed by Evrendilek (2014) – measuring, monitoring, mapping, modelling and managing.

The tool could be developed in a phased approach focusing initially on measuring and monitoring as inputs to managing and then progressing to mapping and modelling as capacity improves within each country. SIDS could be supported in the development of this tool by multilateral agencies and targeted ODA could fast-track tool development.

The research highlights the challenges SIDS face in implementing existing tools, including the lack of capacity of their national statistical offices. The recommended tool has the potential to assist SIDS in data collection and reporting through its streamlining of the process, but not to the extent that the complexity of sustainability is lost. The recommendation to involve more stakeholders in the process, particularly students, is a means by which national capacity can be built.

Keywords: *sustainability, indicators, Small Island Developing States, sustainable development goals (SDGs)*

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Stacey Wells- Moultrie was born and raised in New Providence in The Bahamas, but spent many summers with her grandmother in Savannah Sound, Eleuthera, where she learned to appreciate the beauty of the Bahamian natural environment. Her interest in science was fostered by her father who would watch National Geographic episodes on television with her. He passed his love of the sea to her and she decided to study marine sciences.

After receiving a Bachelor of Science degree in Zoology (specializing in Marine Sciences and Fisheries) from the University of the West Indies, Stacey completed further studies at Dalhousie University where she obtained a Masters in Marine Management. She returned to The Bahamas and worked for several years as an environmental officer in the public service and a senior policy advisor for a non-governmental organization. She is now employed as an environmental consultant, specializing in environmental policy and planning. She also lectures in the Small Island Sustainability (SIS) Programme and serves as Grant Writer in the Office of Sponsored Research and Grants of the University of The Bahamas

In 2016, she was awarded a Masters in Urban Planning at the University of Florida with a sustainability specialization. She plans to continue her research on indicators and development of an assessment tool specific to Small Island Developing States to aid in their achievement of sustainability.

Her publications include *Bahamas Invasive Species Field Guide: Identification of Plant and Animal Invasives* (2013), *National Invasive Species Policy and Strategic Plan* (2013), and *Master Plan for The Bahamas National Protected Area System* (2012). She is currently working on two journal publications - one on planning for climate change on the island of New Providence and the other on combining qualitative and quantitative scenario approaches for sustainable development planning in The Bahamas with a team of Bahamian and American researchers.