

# Sustainability Assessment Methodologies

Subjects: Development Studies

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Sustainability assessment tools were the most commonly applied methodologies towards measuring sustainability performance. There are a number of assessment tools and techniques for sustainable development.

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## 1. Introduction

In recent years, the earth system has experienced drastic changes. The consequences of the ecosystem change have influenced human wellbeing including health, social relationship, security, and other components. Human activities are exerting pressure on the ecosystem and this has affected the life-support system for humans [1]. This has had adverse effects such as environmental degradation, economic crisis, and social instability. Despite several global actions were undertaken in order to minimize the risks—the problems are still prevailing. The idea of preserving the natural resources has become a matter of great concern. To respond to this challenge, sustainable development has emerged during the past decades. It has integrated the global political world in the 1970s in the United Nations Conference on Human Development. It has predominantly become one of the most emerging fields with high-level priority for many countries [2].

Sustainable development has been defined in many ways but the one quoted in the Brundtland Commission report has posed a real challenge in business practices and has also helped practitioners to understand the ecosystem, economic situations, and social effects of projects [3]. Sustainable development is defined as the “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” [4]. It has evolved to shape global development policies and agendas. Since the term was coined, it was extensively used and has undergone different interpretations but the most cited definition was the one from the Brundtland commission report. However, progress towards sustainable development is vital in order to preserve a balance between human activities and the ecosystem. Despite efforts made by scientists in certain areas, there are still some key challenging issues in sustaining a country. The reason behind is that sustainable development is not easy to define as no one can tell exactly what is sustainable or not [5]. Sustainable development has helped scientists by gradually changing the way in which development is being applied in various areas while preserving the ecosystem and the natural resources. The development was influenced by the assumption made by researchers through various definition of sustainable development making it appear differently in various sustainability fields but finally led to transforming sustainable development to its real sense. However, sustainable projects have become a priority objective internationally. The main goal is to transform unsustainable present into a sustainable future. Sustainability aims at maintaining the natural resources from unfair and inadequate use in the short and long term [6]. However, the big challenge remains maintaining sustainability at any levels. The complexity increases when sustainable development is being considered in developing countries more specifically in small island states. This is due to ongoing global changes such as overexploitation of natural resources, sea-level rise, carbon emissions, and waste generation. For example, population growth can cause irreversible changes in production and consumption in the long run. Furthermore, food security can be affected by water supply and hence increases carbon emissions. It is quite difficult to see this inter-connectedness.

Sustainable development has emerged as a concept in Small Island Developing States (SIDS) while considering the economic growth, environmental aspect, and social development in order to satisfy human beings basic needs without compromising the life of the future generations. The main concern is how to remain sustainable with constant changes in technology, economic instability, and environmental degradation. Despite its complexity and vagueness, many tools have been proposed for measuring sustainability performance but very few studies have shown the application of comprehensive techniques for SIDS [7]. These small island states face common challenges due to their size, rapid population growth, small domestic markets, exposure to natural disasters, and geographical localization. Studies have been focused on various sustainability spheres individually and when they are treated separately, they are more

enlightening [8]. The tools and techniques which focus mainly on specific sustainability dimensions have caused a real confusion in the sustainability field itself [9]. Many of the proposed sustainability assessment frameworks were often criticized [10]. Most of these tools have not yet been fully established [11]. They do not match the complexity of the problem as very few techniques fully considered the integrated sustainability spheres [12]. Sustainability is an integrated concept and a more convenient approach is required. There are very few techniques fully focused on sustainability as a whole [13]. The triple bottom line approach can address this issue from a broader perspective. Its concept has been widely accepted in the sustainability fields [14].

Changes occurring in the world today are affecting the SIDS environmental conditions, the economic situations, and societal issues [15]. They are vulnerable to climate change which is a major social issue impacting on humans [16]. They are also affected due to their small scale, exposure to natural disasters, remoteness, sea level rise, limited resources, and multiple drivers and pressures [17]. In most SIDS, many people live in a coastal region. Due to their ecosystem fragility and economical vulnerability, they are prone to face many challenges while implementing sustainable development [18]. Compared to developed countries, they are most exposed to storms, floods, and other threats such as emissions which they found difficult to reduce and move to renewable energy. Energy is a high priority for most SIDS as it encompasses the social, economic, and environmental challenges [19]. These small island states are highly dependent on imported fuels for transport and electricity production and also on cleaner energy production particularly wind and solar resources which is a financially sustainable option [20].

Sustainability assessment was always a subject matter for various countries and SIDS. Various traditional mathematical based modelling techniques such as system dynamics and Multi Criteria Decision Analysis were used for sustainability assessment. Since these techniques cannot deal with uncertainties and complexities, they are found ineffective in assessing sustainability performance. Sustainability performance assessment is limited in small island states as they are more vulnerable compared to developed countries in the sense that the ecosystem is being affected by human activities [15].

## **2. Sustainability Dimensions**

Many countries have developed sustainable development strategies which reflect the integrated sustainability spheres specificities of the countries but there are countries which are paying more attention on individual dimensions rather than the three spheres. For example, Denmark focuses more on integrating environment considerations in various sectors while Australia concentrates mostly on environmental strategies for its coastal zones. Japan is focusing mostly on the environment and in its strategy it considers global warming, recycling of materials, and biodiversity. The social dimension is the most neglected in national strategies as less attention is being paid on human development [90]. Social goals and objectives are always treated individually but are rarely combined with the environmental and economic dimensions. Some of the tools focus on the living conditions of the citizens while others concentrate more on poverty, education and criminality rate.

The overall sustainability of a country is highly dependent on time period objectives should be achieved. Countries plan their strategies for a short period of five years, others for 10 years, and some long-term timeframes can last up to 25 years. A longer timeframe allows to review the policies to reduce public expenditure, optimize the resources while preserving the environmental conditions. In practice, it is very difficult to balance the three sustainability spheres while formulating national strategies. The complexities further increases for SIDS since they face numerous challenges. Despite their low contributions to climate change they are highly vulnerable to the impacts of climate change.

## **3. Sustainability Assessment Strategies at Country Level**

Having considered all the important aspects of sustainable development, it is quite imperative to understand every single process as it does have many challenges compared to our way of living. Sustainable development is a valid concept for both developing and developed countries. Some developed countries have undergone many changes over time but it does not imply that they are sustainable because the main objectives of these countries were to get rid of societal issues such as waste and environmental management and social imbalances. However, these sustainability issues that occur in various systems such as social inequality or environmental change demonstrate some challenges which are unsystematic [91]. In order to address these problem areas, it is important to involve stakeholders who can work in ambiguous and complex contexts so as to implement sustainable actions and maintain them in the long-run. Sustainability issues are quite complex and difficult to tackle and these types of problems need comprehensive and various solutions which come from different people. In addition, leadership should be understood as a process that impacts on all the subordinates where the expected results are achieved [92].

Despite the efforts made by international researchers to measure sustainability, it still remains an important challenge to provide efficient tools [93]. Sustainability assessment has had significant impact on the short term decisions which show better results rather than long term decisions [94]. This is because long term decisions have very limited interest since it needs constant management and planning.

The most desired point of most governments is to identify and assess changes in the economic, environmental, and social conditions of their respective countries. If not properly measured, it will be difficult to improve the sustainability performance of a country. To achieve sustainability, policy-makers must obtain information in a timely manner as this will indicate whether the system is becoming more sustainable or not and specific information about the characteristics of the system will help to identify the need for improvement. The ongoing changes between human activities and the natural environment have evolved with technological advancement and economic growth. The pressure human activities is exerting on the earth is significant and can be disastrous for human welfare. It is important to track and assess progress so as to anticipate new requirements to address complex issues. This can help to increase awareness of sustainability and manage the major challenges countries are facing.

## **4. Assessment Methods**

Sustainability assessment is just a way of showing how decisions are made towards sustainability performance [95]. Its aim is to deliver net benefits that will contribute positively to sustainability. Sustainability assessment techniques are mainly designed to address sustainability issues with main objectives to demonstrate how far they can achieve sustainable results if practitioners have different structures of what the results are going to be.

Sustainability assessment at country level is based on the level of sustainability of the country in terms of problems facing in the three dimensions [64]. These sustainability issues concern the activities people are doing which are impacting on the ecosystem [96]. With the absence of a truly integrative approach, sustainability assessment does not really help the decision-makers and the stakeholders. Efforts and programs towards measuring sustainability are becoming significant research topics since they impact on various fields such as economic, environmental, and social. The severity and interlinkages of the global crises pose an unprecedented challenge. It is observed that very few techniques address the overall sustainability. Since it is complex in nature and difficult to measure, the use of appropriate techniques to bring together an established assessment technique is fundamental. The way progress is being assessed represents a key level for undertaking the root causes of sustainability [97].

There are some major challenges that some countries are facing while considering sustainable development in their agendas. Most of the developed countries express regrets for not having used consultants at a much earlier stage in order to protect the world ecosystem. However, some developing countries are still contributing greatly to a rise in sustainable development although the difficult situations they are actually facing [98]. Others countries, more specifically SIDS are totally dependent on what others are doing. In some cases, experts become an option for these small island states in terms of sharing of knowledge.

Developed and developing countries are now considering sustainable development as a major priority. However, less attention is paid on small island states. In this paper, the existing tools show significant results but do not fulfil the criteria to conduct assessment for SIDS. There are many differences among existing tools concerning the ease of use, their assessment procedure and the availability of data. The indicators are too general and large for implementing in SIDS. A small number of indicators can reduce the assessment time. Simply speaking, the data set for SIDS are different due to their unique characteristics that contribute to their vulnerabilities. Therefore, they are highly disadvantaged compared to larger developing countries in terms of economic and development performance. With their small domestic markets, they depend heavily on external markets and natural resources.