



Sustainable Development Goals on Energy and Environment: Key Issues in Sri Lanka

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Authors' contributions

This work was carried out in collaboration between both authors. Author HMN designed the study, performed the review, wrote the protocol and wrote the first draft of the manuscript. Author MCAN gave comments and collaborated in literature searches. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJEE/2017/36556

Editor(s):

(1) V. Sivakumar, Center for Development of Advanced Computing (CDAC), Pune, India.

Reviewers:

(1) Gabriel Badescu, University of Craiova, Romania.

(2) Kabi Pokhrel, Nepal.

Complete Peer review History: <http://www.sciencedomain.org/review-history/22491>

Review Article

Received 31st August 2017
Accepted 14th December 2017
Published 28th December 2017

ABSTRACT

Aims: The purpose of this study is to investigate the key energy and environmental issues that Sri Lanka is to address under sustainable development agenda of the United Nations.

Study Design: This study reviewed relevant recent studies and reports published by government and non-governmental sources on the issues in relation to selected sustainable development goals on energy and environment namely Goal 07- access to affordable, reliable, sustainable and modern energy for all, Goal 13- combating climate change and its impacts, and Goal 15- protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Place and Duration of Study: The research was conducted in Sri Lanka during May to July 2017.

Methodology: This paper is qualitative in nature and was conducted as a desk review using available resources online.

Results: Issues relating to environment and energy are among the foremost important areas to be addressed for the realization of Sustainable Development Goals in Sri Lanka. The UN's Sustainable Development Goals relating to energy and environment on the other hand tend to have captured the key energy and environmental issues that Sri Lanka is to concentrate.

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Conclusion: Issues that Sri Lanka faces in environment and energy sectors can significantly be remedied when the country makes tangible progress on relevant SDGs. It is also noteworthy however that the strategies for achieving the sustainable development goals require integrated and holistic approach backed by bold policy, legal and institutional framework.

Keywords: Sustainable development; climate change; Sri Lanka; environment; energy.

1. INTRODUCTION

Humanity, according to Brundtland Report is able to achieve sustainability in developments thereby meeting the needs of the present without compromising the ability of future generations to meet their own needs [1]. This concept of sustainability has tremendously drawn the attention of global community than ever before. The recognition of sustainability concepts in international political agenda is a recent phenomenon even though the concept of sustainability goes back many centuries [2]. Such political recognition let the new development agenda of world community interlocked with sustainability principles and commands honest deliberations of humanity to make its developments sustainable across generations. Building upon the outcome of the Millennium Development Goals (MDG), the member countries of the United Nations have manifested a new set of Sustainable Development Goals (SDG) that are envisaged to be attained by 2030¹. Purpose, concept, and politics behind SDGs are drastically different from that of the MDGs [3]. The approach adopted for these new goal setting too is significantly different from MDGs.

The broader agenda of the SDGs reflects not only a shift in priorities but a reversal of the MDG approach to goal setting. Departing from the principle that global goals should be short and memorable, the SDGs include 17 goals and 169 targets that, unlike MDGs, are not tangible and measurable outcomes – such as all children in school – that are easy to understand and difficult to disagree with but rather comprise some goals and targets focused on complex concepts and the quality of development processes such as ‘sustainability’ and ‘inclusion’ [3].

SDGs evolve across five broader areas; 5 Ps; namely, People, Planate, Prosperity, Peace and Partnership. SDGs were adopted at a historic UN General Assembly Meeting in September 2015

¹ SDGs were an outcome of the United Nations Conference on Sustainable Development - or Rio+20 - took place in Rio de Janeiro, Brazil on 20-22 June 2012.

by 193 member states of United Nations including Sri Lanka and they came into effect on 1st January 2016. These sustainability goals will serve as a comprehensive conceptual framework setting core principles guiding the global and national economic and social development [4]. They also provide clear targets for member countries for meeting the environmental challenges of the world at large.

It is commonly agreed that concerns over sustainable development originate from environmental problems [4]. The protection of environment also connects, among various other things, to energy and hence led the energy policy and environmental planning to evolve as prominent areas in sustainable development agenda [5]. On the other hand, energy consumption is linked to environment and economic growth as increased energy consumption may lead to environmental pollution while it is also important for higher economic growth. Therefore, the subjects of energy consumption, environmental planning and economic growth, as [5] state, have been focused in academic research over the past few decades.

This paper is hence an attempt to survey the key issues that Sri Lanka is encountering in selected SDGs relating to energy and environment. SDGs that are directly connected to energy and environment are namely Goal 07- access to affordable, reliable, sustainable and modern energy for all, Goal 13- combating climate change and its impacts, and Goal 15- protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss. Effective initiatives for the attainment of these goals in every country will require at least awareness and recognition of key issues underlying those goals and to mobilize stakeholders to become partner of the implementation process. This study reviewed relevant recent studies and reports published by government and non-governmental sources on the issues in relation to selected SDGs on energy and environment. This paper is

qualitative in nature and was conducted as a desk review using available resources online.

2. REVIEW OF KEY ISSUES IN SRI LANKA ON SELECTED SDGs

2.1 Access to Affordable, Reliable, Sustainable and Modern Energy for All

Ensuring access to affordable electricity, reliable and sustainable electricity by 2030 requires intensifying investment in clean energy sources and adoption of cost-effective technologies and effective regulations of electricity consumption and energy waste. Ensuring access to affordable, reliable, sustainable and modern energy is fundamental for growth and sustainability of environment and economy. Sri Lanka encounters certain issues in relation to the achievement of this goal. They may mainly include *inter alia* persistently growing demand for energy, larger dependency on thermal power sources than renewable and modern energy sources, larger cost of imported fossil fuel and foreign currency outflow, increased/ unaffordable electricity tariff which consequently lead to increased cost of production and living, unreliable energy and some issues on access to electricity.

Overdependence on fossil fuels for generating energy in Sri Lanka has much bearing on climate change. Global energy production predominantly relies on fossil fuels and this scenario imposes serious challenges in realization of this SDG [6]. It is still the thermal oil which is the highest contributor for the Sri Lanka's electricity generation which source higher emission rate of Greenhouse Gases (GHGs) [7]. Thermal power sources which comprise of oil and coal account for 54% of the total installed capacity of Sri Lanka and this increased dependency on thermal power sources causes huge cost of imported fossil fuel and foreign currency outflow. The average annual total bill of imported fossil fuel is 25% of import expenditure of Sri Lanka, and it is nearly 50% of total export income [8]. Therefore, the power and energy sector taxes significantly the country's balance of trade and exchange rates.

Affordability surfaces as another issue under this caption. Affordable energy implies that energy is to be provided at an affordable and reasonable cost to the users. Larger dependency of Sri Lanka on thermal power sources than renewable and modern energy sources is the primary issue

in provision of energy at an affordable cost. As of 2010, Sri Lanka has the most expensive electricity tariff for residential and agricultural consumer categories in South Asia, followed by Pakistan and Sri Lanka is handling the shortage by generating and selling very expensive electricity to its consumers [9]. This expensive electricity tariff may be mainly attributed to the over reliance of fossil fuels for energy generation in Sri Lanka and thus this issue warrants attention under this Goal.

The total annual electricity demand in Sri Lanka is about 10,500 GWh where domestic sector and industries consume respectively 38% and 39% of the total electricity demanded and commercial sector demands nearly 20% of the total electricity usage [8]. It is also reported that the overall annual demand for electricity is anticipated to increase by around 4-6% [8]. This persistently growing demand for energy with unparalleled interventions/ investments in supply side is going to be an issues in ensuring access to affordable, reliable and sustainable energy for all categories of energy users in Sri Lankan. Though energy used per unit of GDP (energy intensity ratio) had recorded a reduction in three quarters of the world's 20 largest energy-consuming countries during 2012 to 2014 [10], it has been estimated that the need for electricity in Sri Lanka will be doubled by 2020 compared with 2010 figure, more precisely 5,430 MW by 2020 [11]. The growing energy demand may be mainly attributed to the increasing amount of vehicles and their energy usage and industrial growth. Reduction in energy demand and consumption can however be achieved by increasing energy efficiencies in the industry and transport sectors as in the case of other major economies in the globe.

Further, in Sri Lanka, the primary energy supply sources and their share in the total supply are biomass (43%), petroleum (37%), coal (4%), hydro (13%) and renewables (3%). However in 2030, Sri Lanka expects to generate at least 34% of its total energy requirement from renewable sources thereby reducing reliance over petroleum and coal sources to not more than 1% of the total supply [8]. United Nations informs that the share of renewable energy most of which is from water, solar and wind power has grown globally from 17.9 per cent in 2012 to 18.3 per cent in 2014 [10]. Sri Lank thus requires bold policy initiates, research and development to sustainably increase share of renewable energy especially in sectors of transportation and

industry. Meanwhile, power cuts occur frequently in Sri Lanka and it hinders the reliability and quality of services. The reliability issue primarily arises because of technological constrains. Issues in reliability of electricity will damage the economic sector in particular and foreign direct investments. United Nations also indicates that globally 85.3 per cent of the population had access to electricity in 2014 [10]. However, it is reported that Sri Lanka has already achieved a grid connectivity of 98%, which is commendable by South Asian standards [8]. Yet, another 2% of population needs electrification. Sri Lanka has identified key issues and challenges to be overcome in the energy sector which include *inter alia* energy wastage and losses; unsustainable consumption patterns; large investment need for infra-structure development in the power & energy sector; traditional institutional setup not geared to meet emerging energy sector challenges; lack of local capacity development, research and technology; 100% dependency on imported oil for the transport sector; high cost of electricity and increasing demand trends across all sub-sectors [8]. All these challenges are also seen relevant in meeting the targets of the SDG -07. The current progress on the achievement of this goal as reported by the UN indicates that efforts falls short of what is needed and invite higher levels of financing and bolder policy commitments coupled with wider adoption of new technologies [10]. Sri Lankan case is not anyway an exception to this call of the United Nations.

2.2 Combating Climate Change and Its Impacts

Sri Lanka is a tropical island and is regraded to be highly sensitive to climate change impacts. Climate change is a multidimensional phenomenon the impact of which, in Sri Lanka, ranges from the natural environment to agriculture, tourism, society, and health [12]. A recent study documented by the UNDP observed that inundation caused by raising level of sea is a progressive phenomenon in Sri Lanka. Its impact is relatively significantly observed in the districts of Puttalam, Jaffna and Hambbantota [13].

Another significant issue caused by climate change is the turnout of such extreme weather events as high intensity and erratic rainfall and consequential flash floods and landslides. Extreme weather on its other extreme causes extended dry periods and resultant water scarcity. It is commonly observed that extreme weather events are primarily caused by changing

climate and have become common phenomenon these days in Sri Lanka. Severe rainfall extreme events are one of the frequent weather hazards in Sri Lanka causing massive damages to many sectors and its effect is concentrated in the Southern and Eastern quarter of the country while severe rainfall extreme also significantly affects Western province including Colombo and Ratmalana [14]. It is also noteworthy that dry extremes occur in other dry zonal regions through its impact is becoming lesser [14]. According to Ministry of Environment “the wet zone is expected to become wetter and the dry zone drier with climate change” as it expects that Southwest Monsoon will increase by 48% by 2050 affecting the southern part of the country, while the Northeast Monsoon of Northern region is estimated to decrease by 27–29% [15].

Though agriculture is inherently dependent on weather and thus remain highly sensitive to climate change, it is unavoidably one of the prominent economic sector in Sri Lanka and records its significant contribution to gross domestic product (GDP) and employment of large rural population every year. Thus, it is also argued that in addition to the long-term shifts in rainfall and temperature regimes, extreme climatic events such as droughts and episodes of high temperature can cause substantial damage to both rice and tea crops thereby seriously impacting on the national food security, foreign exchange earnings and causing substantial socio-economic damage to the large number of families that are dependent on these two crops [16].

Climate change leads to various health hazards in Sri Lanka importantly vector-borne diseases specifically dengue fever (as it is sensitive to humidity and temperature), leptospirosis and other rodent-borne diseases (mostly connected to the two yearly monsoons in Sri Lanka), such food and water-borne diseases as dysentery, viral hepatitis and typhoid (influenced by the floods, landslides and droughts associated with climate change), number of such disorders as heart related illnesses, respiratory and cardiovascular disorders, and mental health issues (aggravated due to the changing environment) and finally negative effects on nutrition through changes in food production and food security [17]. Any adverse changes in already volatile weather patterns are likely impact adversely on the socio-economic activities in the country. Other issues include acidic oceans, bleaching and dying off of coral reefs and losses to fisheries.

Strengthening resilience and adaptive capacity to climate-related hazards and natural disasters is one of the target to combat climate change and its impacts. Some of the major challenges that stand between the achievements of this target is insufficient climate adaptation research, lacking modern technological availability and application thereof and inadequate financial appropriations for the effective implementation of adaptive agenda sustainably. It is even reported that the causal relationship between climate change and sectoral impacts (even in health sector) in Sri Lanka is not clearly understood [18]. This indicates that Sri Lanka needs to give prominence for climate related research as a cardinal strategy for mitigating climate consequences. Though there are projects and initiatives to the effect of integrating climate considerations into national policies, strategies and planning, one of the key challenge in this regard is that the process gets weaker, distorted or discontinued when political regime changes. Though there are some state institutions. e.g. Ministry of Environment and Renewable Energy, Climate Change Secretariat Sri Lanka housed in the Ministry of Environment and Renewable Energy, Centre for Climate Change Studies (CCCS), The Centre for Climate Change Studies (CCCS) housed in the Department of Meteorology, Epidemiology Unit housed in the Ministry of Health and some other relevant ministries, there is no effective overarching institutional agency that is enabled through an enabling legislation so that it can work across different sectors on a holistic and comprehensive fashion and incorporate environment and other sustainable development perspectives into national policy and development. It is however noted that present government is working towards the establishment of a sustainable development council through the enactment of Sustainable Development Act (which is currently as a bill).

2.3 Protect, Restore and Promote Sustainable Use of Terrestrial Ecosystems, Sustainably Manage Forests, Combat Desertification, and Halt and Reverse Land Degradation and Halt Biodiversity Loss

According to the official webpage designated for sustainable development goal², 'Goal 15' focuses specifically on managing forests sustainably,

halting and reversing land and natural habitat degradation and combating against desertification and biodiversity loss. Sri Lanka encounters certain issues below discussed that should be addressed in the realization of this Sustainable Development Goal-15.

Though the rate of deforestation has declined as compared to past assessments, the issue still remains significant. The area covered by forest in Sri Lanka is speedily diminishing and it is even less than 20% as compared to the forest cover during the pre-colonial period [19]. Though historically 90% of the land area of the country was under natural forest cover in 1840s, the assessment by the Forest Department in 2010 showed that the forest cover of the country represents only 29.7% of the land area [20]. Encroachment of forests, high demand for forests for development activities and spread of invasive plant species and frequent fires are the prevalent threats/ issues challenging conservation of the forest cover of the country [20].

Though no part of Sri Lanka, in the contexts of the range of ratios for desertification as specified in United Nations Convention to Combat Desertification, is currently falling under desertification zone, it is however likely that desertification may emerge as a problem in the Dry Zone in the near future in Sri Lanka considering the monthly variations in evapotranspiration, frequent droughts experienced, anticipated climatic changes and the accelerated land degradation that is taking place due to human activities [21].

Land degradation is generally understood as the decline of productive capacity of land temporarily or permanently through natural phenomena or through human interference. It is widely accepted that land degradation is one of the most life-threatening problems affecting the future environment and economic development in Sri Lanka. Heavy soil losses, high sediment yields, soil fertility decline and reduction in crop yields, marginalization of agricultural land, salinization, landslides and deforestation and forest degradation are the important manifestations of land degradation issues in Sri Lanka [21]. Further, Sri Lanka is one of the countries commonly recognized as a destination for biodiversity and rich species. Land degradation however severely threatens the biodiversity of the country and has resulted in loss of biodiversity. Loss of bio diversity in Sri Lanka is

² <http://unstats.un.org/sdgs/report/2016/goal-15/>

primarily attributed to such factors as deforestation, pollution, indiscriminate use of agrochemicals, soil erosion, frequent floods & droughts [20].

Though Sri Lanka is inherited with abundant water resources, climate changes and land and water degradation activities have created frequent and regular water shortages severely impacting lives on the earth and lives under water. It also seriously impacts on development activities in the country. Ministry of Environment reports that these situations are exacerbated by quality deterioration and degradation of watersheds due to mismanagement of lands [20]. It also claims that both surface and ground water has been subjected to this fate. This issue of water degradation is an urgent issue to be remedied under this SDG in order to prevent acute water shortages and to meet the future water demands by all sectors.

In consideration of many targets set to achieve this sustainable development goal, Sri Lanka would have to overcome many challenges. One of the very important challenges is persisting growth of population and population density and their causal effect on land demand and consequential land degradation activities. National Action Plan for Combating Land Degradation recognizes the fact that in Sri Lanka the wet zone districts show very high densities while dry zone districts show lower densities where Colombo and Gampaha districts experience the highest densities followed by Kalutara, Galle, Matara, Kandy and Matale districts [20]. Haphazard garbage disposal and impediment to drainage are said to be another grievous act of degradation of land and other properties of environment.

Though the incidence of poverty is gradually declining in Sri Lanka, its impact on land and water degradation is not to be ignored in certain districts that are having relatively high incidence of poverty [22]. Land and water degradation especially of rural area are primarily attributable to land and water based livelihoods of people living in poverty. It is vital to be emphasized that many sustainable development issues have their intrinsic relationship with spatial development pattern. Sustainable development agenda must therefore guide overall spatial distribution of land, water and other natural resources within every member state thereby achieving optimal integration between human settlements and land, water and other natural reserves thereby

maximizing resource efficacy and minimal degradation of environment. Wildlife crimes are another significant challenge to overcome for the successful attainment of many targets under this Goal. Reduction of degradation of natural habitats, halting the loss of biodiversity and protection and extinction of threatened species would not be possible if the wildlife crimes persist and are not effectively arrested. Further, climate change is a crosscutting issue that underlie many target under this goal. High intensity rains and subsequent floods cause severe soil erosion, siltation of water bodies, wetlands & agricultural lands, water logging in low-lying areas and loss of biodiversity. Frequent droughts may deplete water resources in drought prone areas leading to loss of vegetation. Therefore, it is a challenging fact that targets set under this SDG cannot effectively be met in isolation and require a broader integration with climate issues as well. Lacking public awareness is another challenge to overcome.

3. RESULTS AND DISCUSSION

The target to provide access to affordable, reliable, sustainable and modern energy for all has numerous economic and social implications in Sri Lanka. The achievement of this goal would ensure that entire Sri Lanka population will have access to affordable, reliable and modern energy services. A shift from conventional energy sources to modern and renewable sources of energy will significantly arrest environmental degradation caused when generating power and energy. Achieving a substantial share of renewable energy in the Sri Lanka energy mix would considerably decline the emission rate of GHGs and will significantly control and prevent the depletion of Ozone layer. These developments will impact on reduction/elimination of dangerous climate change related hazards. As this goal aims to double the global rate of improvement in energy efficiency by 2030, it will reduce energy waste and thus the energy demand will decline. This will also reduce emission rate of GHGs to the environment and will curtail the impact of climate change.

The attainment of SDG on combating climate change would on the other hand positively impact on the reduction of various dangerous consequences of climate change in Sri Lanka. The Carbon emission can be minimized and controlled. Public investment and expenditures would be made in harmonization of climate

considerations. The attainment of this goal would ensure that the government would plan and implement its long term public investment and the recurrent expenditures in a way that support to the agenda of combatting the climate change. The adaptive capacity of the country would be enhanced. The country would be able to manage the risk associated in the climate change at a minimum level. The attainment of this goal on combatting climate change will increase the awareness level of public about the hazards relating to climate change thereby enabling the public to act spontaneously in a way that is friendly to their environment. Unless people individually and collectively act spontaneously, the achievement of many targets under this goal is not possible or will fall defaulted at least in sustainability perspective. Achievement of this goal will minimize environmental degradation activities and the related damages thereby fostering restoration and maintenance of sustainable use of terrestrial ecosystems, sustainable management of forests, controlling desertification, halting and reversing land degradation, halting biodiversity loss, reversing climate change and economic and social sustainability.

Thus, it is apparent that issues relating to environment and energy are among the foremost important areas to be addressed for the realization of SDGs in Sri Lanka. The SDGs relating to energy and environment on the other hand tend to have captured the key issues that Sri Lanka is to concentrate in the fields of energy and environmental development. This implies that issues that Sri Lanka faces in environment and energy sectors can significantly be remedied when the country makes tangible progress on relevant SDGs.

4. RECOMMENDATIONS AND CONCLUSION

For the effective implementation of SDGs, the government should adopt integrated and holistic approach backed by bold policy, legal and institutional framework. The targets set under each SDG must as much as possible be imbedded in the strategic plans of relevant departments and ministries and be transmitted into their Key Performance Indicators.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:

*The peer review history for this paper can be accessed here:
<http://sciencedomain.org/review-history/22491>*