

# Environment Protection Strategies and Climate Change Adaption for Sustainable Development: An Overview of Bangladesh

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## Abstract:

Sustainable development can be achieved by developing the surrounding environment and by adapting climate change. This paper aims to explain the environmental protection and climate change adaption strategies taken by the Government of Bangladesh and the Bangladeshi nationalities in a different context to attain sustainable development. This paper based on empirical and theoretical data sources. Bangladesh significantly keeps on the good sign to achieve sustainable development by banning three-wheeler from controlling air pollution and by banning non-degradable polythene bags. If Bangladesh can overcome the challenges by implementing environment protection strategies the day is not so far when Bangladesh will be a developed country by becoming a role model for other developing countries.



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## 1. Introduction

Bangladesh is a fast-growing developing country of South Asia having an area of 1, 44,000 square kilometres. The country has a population more than 150million. Bangladesh is a riverine country with vast biodiversity. The rapid climate change can have an adverse impact on ecology and environment although the weather of Bangladesh is moderate. Bangladesh is a flood-prone country where flood is the main obstacle of Bangladesh economic development(Neto, 2010). Flood is affecting Bangladesh's agro-based economy resulting in losses of food stock, livestock and fish stock(Rashid & Yasmeen, 2018). Also, due to rapid urbanization Bangladesh is having several environmental problems. For instance, air pollution, water pollution, high energy consumption, water scarcity etc(Islam, 2015). All these problems are obstacles to gaining sustainable development. Sustainable development is the key factor of a country's development. Sustainable development is known as Economic development without diminution of natural resources(Daly, 1990). This article focuses on how Bangladesh is gaining sustainable development by implementing environmental protection strategies and adapting climate change. Bangladesh has made outstanding achievements in the Millennium Development Goals (MDGs) and achieved 5 out of 8 goals(Biswas, Shakil, & Islam, 2014). According to the "Millennium Development Goals: Bangladesh Progress Report 2012", by the end of 2015, Bangladesh has reached achieving many important goals that are different from the Millennium Development Goals. Bangladesh has formulated a long-term plan based on the Millennium Development Goals and its development policies. The plan addresses some major areas such as agriculture, environment, and technology. Over the past 47 years, Bangladesh cut about half of the poverty, increases the per capita income 130%, become an inspiration for the world in the agricultural sector and 2018 Bangladesh become eligible for "Developing Country Status" by UN. Some of the significant development of Bangladesh towards the sustainable development journey set remarks for the whole World. Among them, CNG Fuel, Jute Polythene, Solar Home Systems need to be included.

## 2. CNG-Fuel for Vehicle

In Dhaka, the streets are full of thousands of noisy speakers, pedestrians, beggars, food vendors and stray animals. As so many people migrated from the rural area to Dhaka year by year, the city becomes crowded, and the number of vehicles also increased. Many people use auto-rickshaws that can move around on the narrow road of Dhaka city. Before 2003 these type of auto rickshaw was powered by two-stroke gasoline engines. This type of gasoline engine also can found in many motorcycles and larger tricycles in Dhaka. According to the Asian Development Bank, this alone was responsible for 60% of all vehicle-related pollution because two-stroke engines do not use gasoline efficiently(Zia Wadud, 2014). Up to 40% of the fuel emerges from the tailpipe unburned, as smoke and soot. Carbon dioxide, carbon monoxide, sulfur dioxide, hydrocarbons, nitrogen oxides, and soot are produced by burning gasoline and diesel. In 1997 the soot level was found ten times higher than the World Health Organization (WHO). According to World Bank estimates, this resulted in another 16,000 deaths and millions of diseases. After finding this report, Bangladesh Government started to take action to reduce air pollution by banning gasoline in 1999, and the CNG program was launched. An import ban also placed on a two-stroke three-wheeler. Compressed natural gas is 95 per cent methane and releases significantly fewer tailpipe emissions than does gasoline or diesel fuel. CNG began to succeed in Bangladesh at this time because of the push for a cleaner environment in 2000. The price of CNG also fell drastically. CNG now sells for BDT16 per litre, which is equivalent to about 87 cents per gallon. Gasoline, on the

other hand, is currently trading at \$4.33 per gallon, while diesel is at \$2.38. CNG represents a considerable saving. In 2003 two strokes three-wheeler was finally banned and in all over Bangladesh CNG (name of the auto rickshaw which uses Natural Compressed Gas) become so popular (Chowdhury, 2012). The name CNG has become synonymous with motorized rickshaws. It is painted green and referred to as CNG for short. After using CNG, the level of particular pollution dropped 30% to 40% (Z Wadud & Khan, 2013). Bangladesh becomes one step ahead of implementing green environment.

### 3. Floating Agriculture to Fight Climate Change

Bangladesh is one of the countries with the most severe sea level rise caused by climate change (Ali, 1999). Bangladesh is also a riverine country. In monsoon season the half of the area southern part of Bangladesh is covered with water. As a result, it is impossible for the people of those who are to grow the crop. One of these types of area is Nazirpur upazilla of Pirojpur. However, people of this area are practising a method to produce vegetable known as 'DHAP' or floating garden. This floating agriculture becomes an important invention to fight against climate change (Pavel, Chowdhury, & Mamun, 2014). The floating garden made with the help of a raft. The raft is covered with the soil and cow dung where the farmers grow vegetable instead of the land. Each year, a new raft needs to be built, but in the dry season, the old raft can be used as fertilizer. The raft is known as "Dhap". Under the model, residents have brought the unused water bodies under cultivation "Dhap" submerged in about eight months of this year on those water bodies. Water hyacinth and other organic materials like cow dung are usually piled up to create a "Dhap" which takes shape over a few days, floating on the water like a boat. The raft can be around 180-foot-long with around a 2-foot thickness and a 4-foot width. Farmers grow vegetables like beans, tomatoes, okra, eggplants, pumpkins, and peppers. Local farmer earning money by selling these vegetables and on the other hand the owner of the marshland is making money by giving the lease to seasonal farmers. Even the cost of implementing floating garden is meagre (Centre, 2011).

**Table 1: Total cost of implementing floating garden**

Activity	Total Cost (BDT)	Total Cost (USD)
Production of Floating Bed	3000	35.24
Collection of organic/raw Material	1000	11.75
Purchasing Seed	600	7.05
Harvesting and Maintenance	1000	11.75
Total	5600	65.79

The floating garden becomes a popular trend in the southern part of Bangladesh. It is providing food at a stressful situation and also become a source of income. This trend gives an economic boost up to Bangladesh and one of the inspirational steps for sustainable development (Anik, 2012).

### 4. Banning Polythene Bag- Developing Environment

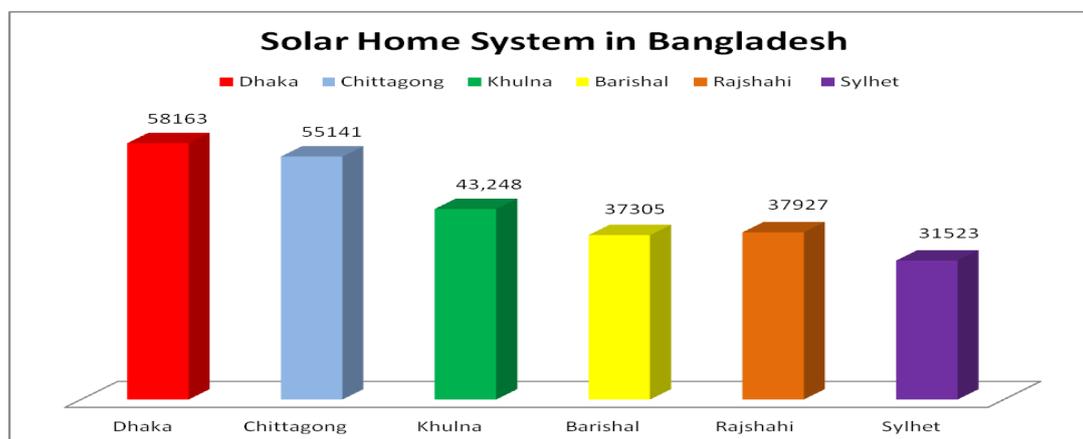
Bangladesh was the first country to ban the use of plastic bags. More than a decade later, many developed countries are still trying to emulate this success. Although plastic bags only account for a small portion of all trash, the impact of these bags is significant. One of the main effects of Bangladeshi plastic bags is their impact on rainwater drainage systems (S. U. Ahmed & Gotoh, 2005). Annual precipitation in Bangladesh is as high as 5 meters, setting a world record for the highest daily rainfall in a single day (Habibur & Matin, 2015). Plastic bags clog sewers and waterways during the monsoon season. At the flood of 1998, it was estimated that 80% of the urban waterlogging was caused by plastic bags clogging the drainage system after

that plastic bag becomes the vital element for Dhaka city water logging problem. Plastic bags filled with becoming mosquito breeding grounds. At, 1990 about 9.3 million plastic bags were dumped in the city every day among only 10-15% put in dustbins. The rest 90%-85% goes into drainage and sewage lines, causing blockages. Clogged sewage systems with the improper disposition of plastic bags also pose a public health threat in Bangladesh. Improperly disposed of plastic bags end up in the sewer creating blockages and waterlogging, the important wetlands contain raw sewage and a variety of other materials disposed of via the conduit, sunlight, and decomposition cause these ponds to emit toxic gases in an alarming rate. The waterlogging leads to the destruction of low land homes, mudslides and interrupts the traffic system. As the plastic bag takes 10 to 1000years to decompose it is also a vital threat to the environment. At 1990, Environment and Social Development Organization-ESDO by writing articles in newspapers and carrying out community awareness campaigns, the public was first asked to pay attention to plastic bags. This campaign attracted the attention of the media as well as the government. As a result, the production and use of plastic bag were banned from January 1, 2002. According to Rule 6ka, for use, production, import, and sales penalties will be - up to 10 years of imprisonment, or 1 million taka fines, or both. By banning polythene for protecting the environment of Bangladesh, the Government of Bangladesh set a perfect example in front of the whole world.

## 5. Solar Energy

Providing full access to affordable energy and adopting clean carbon-free energy source is the seventh goal of sustainable development goal. 14% of electricity consumption can be reduced by adopting cost-effective wider range of technologies. Bangladesh Solar experience may provide a model to help achieve the goal of the National Sustainable Energy Initiative, which means universal access to electricity, doubling the share of renewable energy in the global portfolio, and doubling the efficiency improvement rate(Nandi, Hoque, Ghosh, & Chowdhury, 2013). In 2002, only 7,000 Bangladeshi families were using solar panels. At present, Bangladesh has more than 1.4 million low-income rural households supplying electricity through solar photovoltaic panels, most of which are imported from China. Grameen Shakti is one of the private pioneer organizations in the field of renewable energy in Bangladesh. It was established in 1996, and its main motto is to promote renewable or solar energy in the rural areas of Bangladesh. To promote renewable energy in rural areas, Grameen Shakti has established unit offices in different parts of Bangladesh and currently has 189 unit offices<sup>50</sup>. As of May 2006, it has installed 65,000 SHS with approximately 40,000 beneficiaries and covers presently 20,000 villages and 11 remote places in Bangladesh. After the solar home system was introduced in the rural area, the daily work activities changed. Better light quality provides opportunities for learning and refreshment. The sources of income in rural areas are positively related to the population's exposure to power. Revenue creation activities were created after the villagers acquired the solar home system. People who used traditional fuels to do business now using a solar-powered lamp, which leads to more business than ever before. With the installation of a solar home system, medical pharmacies and mobile phone service centres have been established(Mondal, 2010). The tailoring machine was purchased to earn some money. Women participate in income-generating activities. Due to Solar Home System, grocery store owners who are using kerosene lamps after evening have extended their working hours. With more and more income-generating facilities and opportunities formed by the introduction of solar energy in rural areas, solar energy may reduce poverty in rural areas. It can also play a role in a balanced distribution of income in a given village. After installing a solar energy system,

Bangladesh not only gains the opportunity to fulfil the goal seven also will be able to accomplish the other goals of sustainable development by boosting up the economy (M. Ahmed et al., 2015).



**Figure1: Solar Home System in Bangladesh**

## 6. Biodegradable Jute Polythene

When the world is concerned about the ecological impact of polyethylene and polypropylene bags, people will get solutions from Bangladesh. Although there is no commercial name, it can be called 'Jute Poly Bag'. Many biodegradable and eco-friendly bags have been opened around the world, but they cannot be sustained due to rising prices. This time, Bangladeshi scientist Dr Mubarak Ahmed Khan, who is currently a scientific advisor to the Bangladesh Jute Mill Company (BJMC) and a former chief science officer of the Bangladesh Atomic Energy Commission, invented a biodegradable from jute cellulose (Mohanty, Khan, & Hinrichsen, 2000). The eco-bags are considered a great achievement of Bangladesh. So far, this package did not provide an official name, but it will soon to be submitted to all ministries as "Sonali Bag." Cellulose is the main component of this biodegradable environmentally friendly polybags. By processing and using other environment-friendly liquids this bag is produced. This bag contains more than 50% of cellulose. It does not provide any other non-degradable products. So within 2 to 3 months, it transfused in the soil. This new inventive bag is very useful for the use of packaging food and ready-made garment as it is as transparent as polythene. This package is a value-added product, which is why this use should be classified. According to Dr Mubarak Ahmed Khan, it can be used for garment packaging. Bags can also be used for food packaging. AK Nazmuzzman, Consultant of the JJ Production Department of BJMC, told a TV channel that the polybag is very environmentally friendly. From this perspective, Bangladesh will produce Jute Poly Bag that meets local demand and may go to the international market.

## 7. Discussion and Conclusion

J.Gjessing stated that sustainable development could be achieved when pollution frequency falls or stabilized (Gjessing, 2008). In another research S. Oyedepo noted that by reducing environment pollution and by developing environment (Oyedepo, 2012). Also, sustainable development strategies include using clean energy production by replacing fossil fuel as discussed by H.lund. He also explained that if one nation converts its energy production system into renewable energy, that nation will gain sustainable energy development (Lund & Mathiesen, 2009). Wadud denoted that by implementing CNG conversation policy in 2010

Bangladesh succeed to reduce air pollution and significantly keep on a good sign to achieve sustainable development(Zia Wadud, 2013). According to M. Abdullah Bangladesh achieved economic development by a floating garden which is also regarded as a good precedent of adapting climate change(Pavel et al., 2014). Bangladesh has made outstanding achievements in the Millennium Development Goals (MDGs) and achieved 5 out of 8 goals. With these achievements, Bangladesh has been hailed as a successful example of the Millennium Development Goals globally and has won the prestigious "United Nations Millennium Development Goals 2010" and "South-Asia Awards" aimed at alleviating poverty. The Sustainable Development Goals (SDGs) are the legacy of the Millennium Development Goals. However, as a developing country, Bangladesh faces so many challenges to achieve a sustainable development goal. Some are the challenges are: Bangladesh is facing challenges in how to put goals and targets in context and allocate them among relevant agencies for planning and implementation and as a developing country financing \$45 billion a year. Infrastructure development, renewable energy, affordable energy and security, skills development, technological adaptation, policy frameworks, and long-term strategies are crucial to achieving sustainable development goals. The Seventh Five-Year Plan endorses the goals of the Sustainable Development Goals but does not indicate procurement funds, allocations and clear roadmaps, and plans of action for implementing targets.

Through many metrics, Bangladesh's development trajectory is a unique success story, especially since the 1990s, the democratic rule of law has been restored and extensive economic reforms have been carried out. The incidence of poverty has dropped from 60% to about 30%. Enrolment in primary and secondary schools has achieved gender equality. Bangladesh also implements the plan of "Boat School(J. U. Ahmed, Ashikuzzaman, & Mahmud, 2017)." Altogether it can be said if Bangladesh can overcome the challenges the day is not so far when Bangladesh will be a developed country by becoming a role model for other developing countries.

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