Impact of Environmental Issues in Construction Sector: Bangladesh Perspective

Salman Rahman Rasel, PhD[1*], Dr. Md. Sadrul Amin[2]

[1]*Local Government Engineering Department (LGED), Sherpur Sadar, Sherpur, Bangladesh*
[2]*Department of Environmental Science, American Independent University, California, USA & Ex-Dean, Faculty of Post Graduate Studies, Hajee Mohammad Danesh Science & Technology University, Bangladesh*

Abstract: **The common features of most of the Asian cities are high density of population, scarcity of land, unplanned growth and expansion of cities and overall environmental and ecological degradation. Some of the developing countries of Asian have already been alarmed by the present situation and to avoid the future disaster the impact of environmental issues needed to be prioritized. Bangladesh faces the constant challenges of rampant poverty, high population density, and increasing population rate. Poor people are arsenic contaminated and urban people are mostly exposed to the polluted air, recurring natural disasters and a dwindling natural resource base. It is one of the poorest countries of the developing world, with a low resource base, a very low land-man ratio, and is threatened by both natural hazards and overexploitation. However this resource base is under see threat and environmental planning is necessary to signal any hope for survival with dignity and sustainability. Therefore, Bangladeshi peoples need awareness, protection and national environmental policy. With this objective, the Government of Bangladesh had established several Commissions and Committees since the independence of the country. So it is necessary to consider that a well-arranged framework for a global analysis is important in respect of environmental impact in construction sector to current situation. Environmental impact and construction engineering is the most discussed subject in the present time. It becomes the central issue not only for Bangladesh context as well as in the international debate in the early part of twenty first century. The land, water, air, sea, ocean, hill, mountain, roads, transport, industry and its sound, human, animals, insects, trees etc. consisting of whole environment. The development & survival of human fully depend on the peaceful and balanced coexistence of the environment. But most regretfully, the human society is destroying the equilibrium of nature by changing and mishandling the mineral resources. As a result the human society is facing the natural disasters with certain intervals. Therefore it is essential to rethinking that a good-arranged structure for a historical study is significant in respect of environmental impact in construction.**

Key words: **Environmental Impact, Construction, Material, Bangladesh**

I. INTRODUCTION

Development and Construction are linked together. Construction is one of the major indicators of development. There are numerous challenges facing today's construction sector. Some are new to the industry, and some are centuries old. A surprising number of challenges are not construction issues but must be addressed and managed ensure project success. Some of the construction issues include workforce considerations, safety, time constraints, and the changing nature of the work. Non-construction challenges that are part of the business landscape include legal issues, government regulations, environmental concerns, and socio-political pressures. But today it's critical that the construction project must understand and fulfill the demanding realities of environmental issues in the planning and also in control of construction operations.

To care environment issues means that measures must be taken today to safeguard natural resources for any impact tomorrow. Construction projects represent a unique set of activities that takes place to produce a unique product. The success of a project is judged by meeting the criteria of cost, quality, time, safety and environmental issues as required. The construction project must control, and mitigate the effects of any occurrence or situation that could affect the environment later.

II. OBJECTIVE OF THE STUDY

The prime objective of this paper is to address the problems, progress and prospects of the environmental issues in the construction sector and in Bangladesh perspective. The specific objectives of this study have been stated below that followed in this context.

1. Overview of construction sector and environmental issues.
2. Identify how and how much the built environment is affected by climate change.
3. Identify reasons why the construction industry needs to act relative to the environment.
4. Present environmental related legislation, policy and its effectiveness.

III. METHODOLOGY

Basically it is a collective research. The study is based on Secondary Data. Moreover scientifically aspects of natural environment with distinguished features of its structure has been analysed and reviewed. In respect of source materials of research in this paper mainly considerd the references in the official and demo-official records, published reports, newspapers and journals and various private organizations reports to related in environmental issues in construction

engineering. Secondly, some of the useful literatures related to environmental impact in construction in Bangladesh written by prominent researchers have been taken too compared across and justified against the objectives. The above mentioned source-materials have been collected in governmental and non-governmental and different university libraries in Bangladesh and Malaysia etc. I have also utilized modern technologies like internet, website, email etc. To collect facts and figures about this research field which was helped to reach a further-more accurate decisions and opinions.

IV. RESULTS AND DISCUSSION

Around half of all non-renewable resources mankind consumes are used in construction, making it one of the least sustainable industries in the world. However, mankind has spent the majority of its existence trying to manipulate the natural environment to better suit its needs so today our daily lives are carried out in and on constructions of one sort or another: we live in houses, we travel on roads, we work and socialise in buildings of all kinds. Contemporary human civilisation depends on buildings and what they contain for its continued existence, and yet our planet cannot support the current level of resource consumption associated with them.

Table 1: Estimate of global resources used in buildings

Sl	**Resource**	**(%)**
1	Energy	45–50
2	Water	50
3	Materials for buildings and roads (by bulk)	60
4	Agricultural land loss to buildings	80
5	Timber products for construction	60 (90% of hardwoods)
6	Coral reef destruction	50 (indirect)
7	Rainforest destruction	25 (indirect)

Estimate of global pollution that can be attributed to buildings

Buildings are long-lived, and cities have even longer lives: their impacts will stretch into the lives of many generations of our ancestors; into a future of unknown resources, pollution and unstable climatic conditions. Clearly, for the good of the environment and the survival of the planet, its myriad of interwoven and interdependent ecosystems and mankind, something has to be changed, and construction companies have a leading role to play in that change.

Table 2: Main impacts of the construction and use of our built environment

Sl	Pollution	(%)
1	Air quality (cities)	23
2	Climate change gases	50
3	Drinking water pollution	40
4	Landfill waste	50
5	Ozone depletion	50

Energy Use, Global Warming and Climate Change

- In the last hundred years the Earth has warmed by about 0.5^{O}C. There is strong evidence that this is due to an increase in the concentrations of certain trace greenhouse gases. Principal amongst these is CO_2 which is produced whenever fossil fuels are burnt to obtain energy. Globally, energy use, and the associated CO_2 emissions, has been rising rapidly over the past few decades.
- The main consumers are the developed countries who enjoy standards of living to which the developing countries aspire. The consequences of the continuing growth of energy use which this implies are potentially catastrophic. The developed countries must improve their energy efficiency as a part of ensuring that the problem is brought under control. Construction industry related energy use accounts for approximately half of national energy use.
- The use of fossil-fuel-derived energy in the production of materials, during the construction process, and by the occupants or users of the building or structure throughout its lifetime is a source of significant quantities of CO_2. Though not the most potent of the so-called greenhouse gases, it is the one produced in the greatest quantities. These climatic changes themselves may necessitate changes in construction practice.

Resource depletion, waste and recycling

- The construction industry is a conspicuous user of resources. Materials are derived from numerous sources and suppliers, and minimization of waste presents particular problem. Although many of the materials in use are common to most sites, the fragmented nature of development constrains the practical extent of recycling. Furthermore, despite the long life of its products, their eventual demolition or redevelopment can produce significant waste for land disposal unless re-used.
- The mass of resources used in the construction industry is dominated by stone and primary aggregates: sand and gravel extraction of these primary resources implies major environmental impact from loss of habitat and ecosystem, damage to the landscape, potential subsidence problems and release of methane. Noise and dust and heavy transport through populated areas confer local nuisance and contribute to restricted award of extraction licenses by local authorities. The same issues arise in the disposal or processing/recycling of waste.
- Construction also has a major impact on the environment in its consumption of energy, both directly and embodied in the materials that it uses. The large bulk of materials used consumes a great deal of energy for transport. Taking into account both

direct use and embodied energy, the construction industry consumes about 4.5% of the national total as a consequence of this energy consumption, construction generates over 40 million tons of carbon dioxide which contributes to global warming from the greenhouse effect. Acid gases and oxides of nitrogen (NO_2) are also produced, contributing to acid rain and photochemical smog production.

- The links between water and energy are gradually becoming more evident. Generating energy uses a lot of water for cooling and a lack of water has already led to power cuts where nuclear power stations have been shut down during droughts. Likewise, treating and pumping drinking water and waste water uses a lot of energy with the UK water industry accounting for around 1% of UK CO_2 emissions. In homes domestic water heating is responsible for 5% of UK CO_2 emissions, and 25% of household energy bill. The construction of a small house, using a combination of methods, requires about 6 million liters of water.
- Throughout the construction cycle, and especially at the end of a structure's life, large quantities of waste are produced. Significant quantities of waste are also generated by the construction process itself. Much of this wastage is avoidable on site, but inattention to design detailing, inappropriate material, dimensions, late variations, over-ordering, etc. also contribute to waste.

Pollution and hazardous substances in the natural and built environment

- Pollution can be defined in many ways: that arising from the built environment (sewage, waste etc.); pollution caused during the manufacture of materials and products; pollution and hazards from the handling and use of materials or from the site itself; and other construction and operationally related activities. The design and construction phases involve the specification of materials, and the use of plant, processes and techniques. Most also involve extensive disturbances to the existing environment, whether on green field or previously developed sites.
- Each of these activities poses a risk of introducing pollutants into the environment which can affect the workers on site, the neighborhood, or the local ground, water and air quality.
- Similar impacts can occur during the operational phase of the development. Such disturbances can also upset the equilibrium between the ground, water and air and introduce the risk of pollution.
- Limited research work has been carried out, so uncertainty of causes prevails with little quantitative data available.

Environmental Concerns

1. The Building industry is the 3rd largest consumer of energy after industry and agriculture.
2. Its rising urbanization and change in lifestyle and food habits, the amount of municipal solid waste has been increasing rapidly and its composition changing.

Environmental Impacts of Construction

1. Change of Land use: Agricultural/ Rural/ Waste land to/ Commercial land Redevelopment of existing urban land from single story structure to high-rise/high density structure.
2. Direct Impact – On the plot of land
3. Indirect Impact – On neighboring plots
4. Cumulative Impact – On the surrounding area which will gradually change.
5. Clearing of Surface Vegetation – Each plot of land supports a certain habitat, and is part of the biodiversity of the region.
6. Removal of topsoil due to excavation will lead to high water requirement for future landscape purposes and will prevent the growth of native plant species.
7. Change in topography of the area will change in drainage patterns of the area.
8. Reduced ground water recharge due to increase of hard surfaces.
9. Construction activities create dust/air pollution.
10. Heavy machinery used generates noise pollution.
11. Urbanized areas lead to a temperature rise of 1-2^o C due to higher absorptive surfaces.

V. CONCLUSION

For the sustenance and dynamism of livelihood, every growing society is characterized by the erection of either permanent or temporary structures for the purpose of living and work which is the second necessity of life. The quest for industrialization, housing has tremendously increased urbanization and the built environment resulting in various environmental impacts and environmental degradation which is recently being traced to human activities with construction projects/ works taking a lion's share. Environmental Impact according to Rubin and Davidson; Babawale; CIOB and Majumdar, are used to describe some implications of human activities on the environment. At the highest level, this includes the study of interactions among all forms and activities of the environment. More commonly, Environmental Impact refers to effects of human activities on his environment. According to Federal Environmental Protection Agency, the various environmental impacts may be connected to the mass flooding in different cities of Bangladesh as a result of blockage of water ways and channels. Also the mass pollution of water and air in Island of our country is traced to human activities like waste disposal and construction activities.

The menace is also affecting many other cities in the world like the alarming rate of pollution in Abu Dhabi city of the United Arab Emirate and Pittsburgh- a densely industrialized city of the United State of America which has the highest record of air pollution because of manufacturing of Construction equipment. The coast into which the river extents its banks at the high tide periods has been built up, thereby causing the river to overflow its banks resulting in flooding. A review made by Koleosho and Adeyinka, Horsley and Hardy, also shows the need for cross examination of the activities of the built environment that causes Environmental changes so as to identify their impacts for the purpose of construction engineering.

The fast growing threat of environmental impacts of building construction projects on the ecosystem needs revolutionary mitigating measures in all ramifications. Though, the environmental impacts of building construction activities may vary from country to country. The research revealed that the major environmental impacts are pollution, resource use and habitat destruction which is caused by destruction of vegetation, desertification, waste disposal, soil erosion and material wastage. All the impacts listed are above the mid index that there are all significant environmental impact and causes of environmental degradation by building construction projects.

Waste management, pollution control and ecology conservation were ranked as the most important environmental protection measures used to control building construction environmental impacts. The study therefore subjects the use of Bangladesh environmental protection board, ministry of the environment, environmental impact assessment (EIA) documents and Bangladesh conservation foundation to reduce environmental degradation and enhance sustainable environment. These findings should serve as a guide in developing a framework for mitigating measures associated with Construction Projects in Bangladesh. Implementation of environmental planning and management methodologies based on stakeholder's involvement should be adopted in the construction industry and government should initiate sustainable construction measurement and management practice in Bangladesh. A range of environmental related legislation is required applicable to construction and requires certain actions from clients, designers, contractors, and suppliers.

Our built environment and its interactions with the natural environment are complex and have a massive impact on the world around us. Hence sustainability is a complex concept which encompasses not just energy but all the resources needed to support human activity. A large part of building sustainably is concerned with addressing the global warming that is driving climate change; using energy conservation and techniques. It is also about enhancing biodiversity, creating spaces that are healthy, economically viable and sensitive to social needs. Rather than constantly battling against the natural environment, we need to start respecting natural systems and learning from ecological processes: creating a better balance between human need and the wider environment.

VI. RECOMMENDATIONS

1. In designing a project Acceptable levels of environmental performance characteristics should be determined.
2. No permanent environmental contamination should occur during and after construction
3. The material production and application should be energy efficient
4. Efficiently communicate through varied disciplines within the environmental issues.
5. Classify applicable solutions to local environmental harms and issues and identify legal and economic policies and statutes that best address specific environmental problems.
6. Realize the cause and effect correlation between human attitudes and manners and the environment.
7. More research to understand the multiple effects of the environmental issues.

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