

Greenhouse Effect in Bangladesh - Environmental Rules and Regulations Perspective

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Abstract—The greenhouse effect is an increase in the average temperature of the earth. It happens because certain gases called greenhouse gases absorb infrared heat that would normally be radiated into space. The problems begin when human activities distort and accelerate the natural process by creating more greenhouse gases in the atmosphere than are necessary to warm the planet to an ideal temperature. Climate change driven by global warming in Bangladesh is threatening to substantially modify important ecosystems because the rate of climate change exceeds rates at which ecosystems and biodiversity they can adapt or migrate. The government of Bangladesh has set up the Ministry of Environment and Forest (MOEF) in 1989 with two major departments under it namely the Department of Environment (DOE) and Forest Department (FD) to address the emerging environment related issues. The government has also developed and adopted an Environment policy in 1992 and an Environment protection act in 1995 as well as a National Environment Management Action Plan (NEMAP) in 1996. Under the Environment Protection Act, 1995 government also prepared and adopted the Environment Protection Regulation, 1997. Bangladesh is a developing country in south Asia with an area of 147,570 square kilometers and a population of 150.5 million (2011 census). The physical environment of Bangladesh is diverse. There is a mix of both traditional and modern methods of land use. This complexity of environment and land use patterns has important implications for the vulnerability and depletion of the natural resource base in the country. Floods are common in Bangladesh, where flood plains constitute about four fifths of the landmass. The adverse impacts of floods become particularly extensive and severe when the effect of drainage congestion is combined with several other factors including excessive rainfall in the Ganges- Brahmaputra-Meghna basin. Being one of the world's most vulnerable countries from the point of view of climate change, the government and the people of Bangladesh are sensitive to environmental issues. This is observed from this study that environmental laws and regulations that have been adopted in Bangladesh are very insufficient

to prevent climate change. Also the implementation of environmental laws and regulations are weak and public awareness level is very low in Bangladesh.

Keywords: Greenhouse gas, Environmental policy, Environment rules and regulations, Climate change.

I. Introduction

The existence of the greenhouse effect was argued for by Joseph Fourier in 1824. The argument and the evidence was further strengthened by Claude Pouillet in 1827 and 1838, and definitely proved experimentally by John Tyndall in 1859, and more fully quantified by Svante Arrhenius in 1896. The greenhouse effect is a process by which thermal radiation from a planetary surface is absorbed by atmospheric greenhouse gases and is re radiated in all directions. Since part of this re radiation is back towards the surface, energy is transferred to the surface and the lower atmosphere. As a result, the average surface temperature is higher than it would be if direct heating by solar radiation were the only warming mechanism. Solar radiation at the high frequencies of visible light passes through the atmosphere to warm the planetary surface which then emits this energy at the lower frequencies of infrared thermal radiation. Infrared radiation is absorbed by greenhouse gases which in turn re-radiate much of the energy to the surface and lower atmosphere. The mechanism is named after the effect of solar radiation passing through glass and warming a greenhouse but it retains heat is fundamentally different as a greenhouse works by reducing airflow, isolating the warm air inside the structure so that heat is not lost by convection.

If an ideal thermally conductive blackbody was at the same distance from the sun as the earth is, it would have a temperature of about 5.3^oC. However, since the earth reflects about 28-30% of the incoming sunlight, the planets effective temperature would be about -19 ^oC, about 33^o C below the actual surface temperature of about 14 ^oC. The mechanism that produces this difference between the actual surface temperature and the effective temperature is due to the atmosphere and is known as the greenhouse effect. Almost 100% of the observed temperature increase over the last 50 years has been due to the

increase in the atmosphere of greenhouse gas concentrations like carbon dioxide, methane and ozone.

II. Causes of greenhouse effect

Some of the causes are mentioned below:

i) Burning natural gas, coal and oil including gasoline for automobile engines raises the level of carbon dioxide in the atmosphere.

ii) Farming practices and land use changes increase the levels of methane and nitrous oxide.

iii) Factories producing long lasting industrial gases that do not occur naturally contribute significantly to enhance greenhouse effect.

iv) Deforestation contributes to global warming. Trees use carbon dioxide and give off oxygen in its place which helps to create the optimal balance of gases in the atmosphere. As more forests are logged for timber or cut down to make way for farming, there are fewer trees to perform this critical function.

v) Population growth is another factor in global warming because as more people use fossil fuels for heat, transportation and manufacturing the level of greenhouse gases continues to increase.

III. Role of greenhouse gases on climate change

Carbon dioxide is produced by fossil fuel burning and other activities such as cement production and tropical deforestation. Measurement of carbon dioxide from Mauna Loa observatory show that concentrations have increased from about 313 ppm in 1960 to about 389 ppm in 2010. The current observed amount of carbon dioxide exceeds the geological record maxima from ice core data. The effect of combustion produced carbon dioxide on the global climate, a special case of the greenhouse effect first described in 1896 by Svante Arrhenius has also been called the callendar effect. Because it is a greenhouse gas, elevated carbon dioxide levels contribute to additional absorption and emission of thermal infrared in the atmosphere which produce net warming. According to the latest assessment report from the intergovernmental panel on climate change most of the observed increase in globally averaged temperatures since the mid 20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations. Over the past 800,000 years, ice core data shows unambiguously that carbon dioxide has varied from values as low as 180 ppm to the pre industrial level of 270 ppm. Paleo climatologists consider variations in carbon dioxide to be a fundamental factor in controlling climate variations over this time scale.

IV. Climate change in Bangladesh

The world's climate has always been changing between hotter and cooler periods due to various factors. However for the first time in the earth's history it has now been firmly established that its human inhabitants are altering the climate through global

warming as a result of greenhouse gas emissions. Bangladesh being a third world country poses significant risks due to climate changes. Between 30-70% of the country is normally flooded each year. The huge sediment loads brought by three Himalayan rivers coupled with a negligible flow gradient add to drainage congestion problems and exacerbate the extent of flooding. The societal exposure to such risks is further enhanced by Bangladesh's very high population and population density. Many projected climate change impacts including sea level rise, higher temperatures, evapo-transportation losses, enhanced monsoon precipitation and run off, potentially reduced dry season precipitation and increase in cyclone intensity would in fact reinforce many of these baseline stresses that already pose a serious impediment to the economic development of Bangladesh. Linked to the problem of coastal flooding is the potential impact of climate change on the Sundarbans which straddle south western Bangladesh and the adjoining coast in the India state of West Bengal. With a total area over 10,000 square kilometers, the Sundarbans constitute the world's largest contiguous mangrove ecosystem. The potential impacts of climate change on the Sundarbans will only be superimposed on the baseline stresses that are already posing a critical threat to the ecosystem.

One of the critical variables that determine the vulnerability of Bangladesh to climate change impacts is the magnitude of sea level rise. The Bangladesh country study put the range at 30-100 cm by 2010 while the IPCC third assessment gives a global average range with slightly lower values of 88-90 cm. Higher mean sea levels are likely to compound the enhanced storm surges expected to result from cyclones with higher intensity.

V. Climate change and Environmental laws in Bangladesh.

The environment policy of 1992 of Bangladesh has recognized the need for a better and comprehensive approach to address climate change and climate issues. Very few of the elements of the environment policy, however, are yet to be translated into laws. The only legislation which specially deals with environment issues is the Bangladesh environment conservation act 1995. The act was passed for conservation and improvement of environmental standards and for controlling and mitigating environmental pollution. The major limitations of the act are its silence on the standards, parameters, emission levels and management elements.

VI. Constraints for implementations of environment laws.

The formulated environment law although fairly rich in content is not supported by necessary actions of implementation. Some of the constraints are:

- i) Inconsistency with other policies.
- ii) Lack of inter sectional co ordination.

- iii) Lack of regulatory and institutional capacity.
- iv) Limitations of environment laws.
- v) Ignorance about laws.
- vi) Non punitive approach of laws.
- vii) Politician polluter nexus.
- viii) Less funding and investment for implementation.

VII. Protection of greenhouse effect

There is no independent law in Bangladesh to address the problems of greenhouse effect in Bangladesh. The national policies, laws, rules and committees that Bangladesh have are all related to environmental issues. The important of them are: National Environmental Policy, 1995, The Environmental Conservation Act, 1995, Bangladesh Environmental Conservation Rules, 1997, Ministry of Forest and Environment, Directorate of Environment, The Industrial Act, 1937 and 1992, and National Committee for Formulation of Integrated Environmental Guidelines.

VIII. Findings

i) Greenhouse effect is the common and dangerous phenomena all over the world. The impact of the industrialized countries of greenhouse gases is the main cause of greenhouse effect in the developing countries like Bangladesh.

ii) Environmental laws and regulations that have been adopted in Bangladesh are very insufficient to prevent climate change. The implementation of environmental laws and regulations are weak and public awareness level is very low in Bangladesh.

iii) The environmental laws are not defined what factors are connected with the ecology and environment and what management elements a company should establish to discharge its obligations under environmental law.

iv) The major limitation of the environmental laws is its silence on the standards, parameters, emission levels and management elements based on which the environmental clearance should have been applied and obtained.

IX. Conclusions

i) The industrialized countries emissions of greenhouse gases should be reduced immediately.

ii) Government should take initiative to form a commission with scientific and legal experts to advance the climate change issues.

iii) The environmental laws should be more clear and specific in Bangladesh. The government should ensure proper implementations of environmental laws and regulations.

iv) Comprehensive ground work is needed to pursue the case of climate affected people of Bangladesh.

v) The UN environment program's recommendations encouraged all nations to enact environmental statutes and build their environmental protection agencies should be implemented.

vi) Every nation should take necessary step to mitigate the greenhouse gases that have been identified, these are: Carbon dioxide, Methane, Nitrous oxide, Hydrofluorocarbons, Perfluorocarbons and Sulphur hexafluoride.

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