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Global Warming And Climate Change

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ABSTRACT: Global warming will not only be felt many decades from now—it is already happening and its impacts are clearly visible. There have been perceptible changes in the climate all over the world, particularly in the last two decades or so. The climate change and its adverse impact on the environment, human health and the economy have recently risen to the top of economic and political agenda in various national and international forums and meetings on the environment. Some of the climate changes are attributable to human activity. A change in human behavior can be an important instrument of minimizing the extent of those changes in the climate which have harmful effects. Studies have shown that human activity may cause large disturbance in regional and global climate. The most important climatic changes that have come to the fore recently and that are harmful include acid rain, global warming and depletion of the stratospheric ozone shield or layer. Global warming is one of such disturbances. It is an important issue and all over the world people have very strong feeling about global warming. Global warming means that the world is heating up. It is the increase of earth's average surface temperature due to effect of greenhouse gases, such as carbon dioxide emissions from burning fossil fuels or from deforestation, which trap heat that would otherwise escape from earth. This is a type of greenhouse effect and it work just as a blanket. Global warming has the following effects: (i) Precipitation patterns may change, causing some regions to have more frequent droughts and some areas suffering from heavier snowfall and rainstorms. (ii) Shortage of fresh water in many arid and semi-arid areas. (iii) Global warming will also adversely affect human health, leading to increase in heat-related disease and health. Besides, it will also indirectly affect human health due to higher incidence of malaria, dengue, yellow fever and viral encephalitis caused by expansion of mosquitoes and other diseases carries to warm areas. (iv) Adverse effect on agricultural production due to droughts and increased incidence of pests, causing shortage of food. There are three ways of managing global warming, namely, prevention, mitigation and adaptation. Prevention can be accomplished by preventing the build-up of greenhouse gases in the atmosphere. For example, this could be done through development of alternatives to fossil fuels and levying taxes on greenhouse gases. Mitigation is moderation or postponement of global warming. It could be achieved through planting more trees to serve as carbon sinks. Adaptation is responding to changes brought about by global warming. This could be achieved through shifting agricultural zone or changes in crop pattern.

Keywords: Emissions, Global Warming, Green House Effect, Ozone Layer Prevention.

1. Introduction

Global warming is for real. Every scientist knows that now, and we are on our way to the destruction of every species on earth, if we don't pay attention and reverse our course. ---

Theodore C. Sorensen

The climate change and its adverse impact on the environment, human health and the economy have recently risen to the top of economic and political agenda in various national and international forums and meetings on the environment. Some of the climate changes are attributable to human activity. A change in human behavior can be an important instrument of minimizing the extent of those changes in the climate which have harmful effects. Studies have shown that human activity may cause large disturbance in regional and global climate. The most important climatic changes that have come to the fore recently and that are harmful include acid rain, global warming and depletion of the stratospheric ozone shield or layer. Global warming is one of such disturbances. It is an important issue and all over the world people have very strong feeling about it. Global warming will not only be felt many decades from now—it is already happening and its impacts are clearly visible. There have been perceptible changes in the climate all over the world, particularly in the last two decades or so. It is undisputed that the average temperature at the surface of the Earth has increased over the past century by about 1°F (0.6°C), with both the air and the oceans warming (IPCC. 2001). The fact is, many widely accepted, peer-reviewed scientific studies have found evidence that global warming has already had major impacts on ecosystems and societies across the world. Due to industrialization, overpopulation, land-use change, deforestation and change in lifestyles, the concentration of the different gases present in the atmosphere have undergone change. Some of such gases like carbon-dioxide, nitrous oxide, methane, etc., create a partial blanket over the Earth's atmosphere and do not allow the outgoing infra-red radiations to travel back into space. They, in turn, trap the infra-red radiations and reflect them into the Earth's atmosphere. This mechanism of trapping gases is mostly adopted in greenhouses to take aid of the warmth generated from such gases in the quicker growth of plants present therein. As the mechanism involved is similar to what is deliberately done in a greenhouse, such effect in the Earth's atmosphere is known as the 'Greenhouse Effect'. As a consequence of the greenhouse the global mean temperature of the Earth increases. Such increase in temperature continues effect, over a long period of time and is the main cause of extensive warming of the planet and hence termed as 'Global Warming'. Global warming means that the world is heating up. It is the increase of earth's average surface temperature due to effect of greenhouse gases, such as carbon dioxide emissions from burning fossil fuels or from deforestation, which trap heat that would otherwise escape from earth. This is a type of greenhouse effect and it work just as a blanket. The main source of CO_2 on this planet is the earth's oceans. As the earth's oceans heat up, more CO_2 gas is released. The CO_2 gases cause the world to retain more heat, thus causing the release of more CO_2 gas. Briefly, the world environment is trapped in a vicious cycle of global warming.

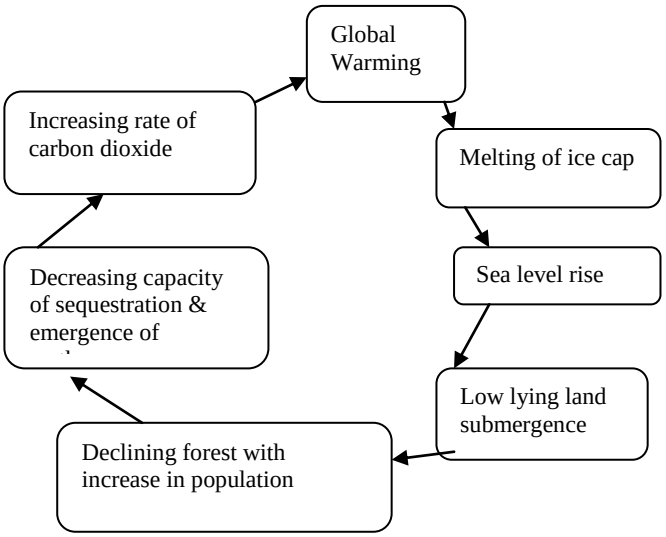
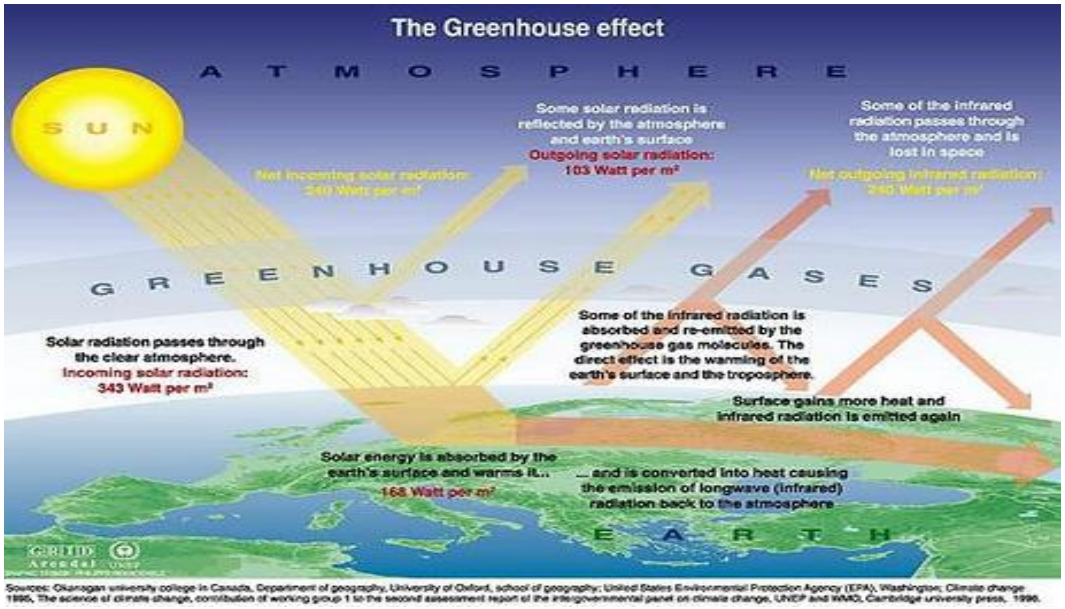


Figure 1: *Vicious Cycle of Global Warming*

Based on NASA data it is seen that during the period 1880-2009 earth's surface temperature increased by $0.7^{\circ}C$ since 1880; 2/3rd of warming since 1975 @ $0.15^{\circ}C$ to $0.20^{\circ}C$ per decade. In 1980, the mean global temperature $15.18^{\circ}C$; it increased to $15.38^{\circ}C$ in 1990, $15.39^{\circ}C$ in 1995 and $16.04^{\circ}C$ in 2005. In fact, in the northern hemisphere, 2005 is likely to go down as the warmest year ever recorded with an increase in the mean global temperature of the order of $+0.65^{\circ}C$. Increasing concentrations of greenhouse gases are likely to accelerate the rate of climate change. Scientists expect that the average global surface temperature could rise $0.6 - 2.5^{\circ}C$ in the next fifty years, and $1.4 - 5.8^{\circ}C$ in the next century with significant regional variations. Evaporation will increase average global precipitation.

2. Causes of Global Warming

Global warmth begins with sunlight. When light from the Sun reaches the Earth, roughly 30 percent of it is reflected back into space by clouds, atmospheric particles, reflective ground surfaces, and even ocean surf. The remaining 70 percent of the light is absorbed by the land, air, and oceans, heating our planet's surface and atmosphere and making life on Earth possible. Solar energy does not stay bound up in Earth's environment forever. Instead, as the rocks, the air, and the sea warm, they emit thermal radiation, or infrared heat. Much of this thermal radiation travels directly out to space, allowing Earth to cool. Some of this outgoing radiation, however, is reabsorbed by water vapor, carbon dioxide, and other gases in the atmosphere (called greenhouse gases because of their heat-trapping capacity) and is then re-radiated back toward the Earth's surface. On the whole, this re-absorption process is good. If there were no greenhouse gases or clouds in the atmosphere, the Earth's average surface temperature would be a very chilly -18°C (0°F) instead of the comfortable 15°C (59°F) that it is today. There is new and stronger evidence that most of the global warming over the last 50 years is attributable to human activities. Human activities have altered the chemical composition of the atmosphere through the build-up of green house gases--- primarily carbon dioxide, methane and nitrous oxide. Since the beginning of the Industrial Revolution, atmospheric concentrations have more than doubled, and nitrous oxide concentrations have risen by about 15 per cent. These increases have enhanced the heat-trapping capability of the earth's atmosphere. The heat trapping property of these gases is undisputed although uncertainties exist about exactly how the earth's climate responds to them. The UN Inter Governmental Panel on Climate Change (IPCC) (1995) reported 5that human-produced air pollutants have played the key role in recent climate change. The IPCC, based on studies by numerous scientists, had projected a $1^{\circ}C$ to a $3.5^{\circ}C$ increase in global temperature by the year 2100 (Raven et al. 1998). Global warming is caused by concentration in the atmosphere of carbon dioxide and certain other trace gasses including methane, nitrous oxide, chlorofluorocarbons (CFCs) and stratospheric ozone. The concentration of atmospheric carbon dioxide has increased from about 28 parts per million (ppm) over the last 200 years or so to 361 ppm in 1995 and is increasing year after year (Raven et al.1998). This is largely due to the rapidly increasing number of motor vehicle. Global warming occurs because carbon dioxide and other gases trap the sun's radiation and then dissipate the heat into space, leading to an increase in the atmospheric temperature. Some of atmospheric heat is transferred to the ocean and raises its temperature as well. Due to the atmosphere and ocean worm the overall global temperature rises. As CO_2 and other gases trap the sun's heat in much the same way that glass does in a green house, global warming produced in this manner is called the greenhouse effect. Scientists generally believe that the combustion of fossil fuels and other human activities are the primary reason for the increased concentration of CO_2 . Plant respiration and the decomposition of organic matter release more than 10 times the CO_2 released by human activities; but these releases have generally been in balance during the centuries leading up to the Industrial Revolution with CO_2 absorbed by terrestrial vegetation and the oceans. What has changed in the last few hundred years is the additional release of CO_2 by human activities. Fossil fuels burned to run cars and trucks, heat homes and business, and power factories are responsible for about 98 per cent of US CO_2 emissions, 24 per cent of methane emissions and 18 per cent of nitrous oxide emissions. Increase agriculture, deforestation, landfills, industrial production and mining also contribute to significant share of emissions. I 1997, the United States emitted about one-fifth of total global green house gases. Estimating future emissions is difficult, because it depends on demographic, economic, technological, policy and institutional developments. Several emissions scenarios have been developed base on differing projections of these underlying factors. For example, by 2100, in the absence of emissions control policies, CO_2 concentrations are projected to be 30-150 per cent higher than today's levels.



3. Effect of Global Warming

Impacts of global warming stand galore. The World Health Organization, United Nations Environment Programme and the World Meteorological Programme observe that each year more than 1, 50,000 people succumb on grounds associated or linked to global warming. Global warming has the following effects:

1. Thawing of glaciers and polar ice caps leadings to rise in sea level and consequent flooding of low lying coastal areas, for example, Banladesh. During the last century, the sea level has risen by 18 cm and according to the IPCC estimates; it will rise by additional 50 cm by 2100. This will increase the occurrence of hurricanes. Since 1970, flooding and high wave's accompanying tropical storms have caused 300,000 deaths in Bangladesh alone (Raven et al.).
2. Precipitation patterns may change, causing some regions to have more frequent droughts and some areas suffering from heavier snowfall and rainstorms.
3. Shortage of fresh water in many arid and semi-arid areas.
4. Global warming will also adversely affect human health, leading to increase in heat-related disease and health. Besides, it will also indirectly affect human health due to higher incidence of malaria, dengue, yellow fever and viral encephalitis caused by expansion of mosquitoes and other diseases carries to warm areas.
5. Adverse effect on agricultural production due to droughts and increased incidence of pests, causing shortage of food.

Like acid rain, global warming is a complex international issue having several political, economic and social dimensions. Greenhouse gases are primarily produced by developed nations but developing countries may experience the greatest impact of global warming. This has led to tensions between the developed and developing countries.

5. Managing Global Warming

There are three ways of managing global warming, namely, prevention, mitigation and adaptation. Prevention can be accomplished by preventing the build-up of greenhouse gases in the atmosphere. For example, this could be done through development of alternatives to fossil fuels and levying taxes on greenhouse gases. Mitigation is moderation or postponement of global warming. It could be achieved through planting more trees to serve as carbon sinks. Adaptation is responding to changes brought about by global warming. This could be achieved through shifting agricultural zone or changes in crop pattern.

6. Conclusion

We can make no serious effort to combat global warming, and instead try to cope with its increasingly devastating impacts on our livelihoods and the natural world we cherish. Or we can act now to stabilize the climate and mitigate future damages. Progress in combating global warming has already been made at the international, state, and local levels. But national action by the U.S.—the world's most powerful and technologically advanced nation and its biggest emitter of greenhouse gas pollution—is urgently needed as well. National legislation that sets a mandatory cap on emissions, as well as a renewed engagement by the U.S. with the international community would be transformative steps towards solving the problem of global warming. The countries in the world need to recognized that we are saving the world not just our benefit but from global climate change and this can be done only when nations, leaders, communities, societies, civil workers and people of the world join hands and start a joint venture to **save the world.**

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Author Profile

Bhajan Chandra Barman was born in 1975. He got his M.A. degree in Economics from North Bengal University in 1999. He started his career as a school teacher. Next, he joined as

an Assistant Professor in the Department of Economics, Netaji Nagar College, Kolkata. He has more than 15 years of teaching experiences. He has presented 16 papera in National Seminars/ Conference. Besides, he attended more than 20 National Seminar/ Conference. He has published six papers in journal and ten one in edited book. Most of his publications are in the area of new issue like regional rural bank, environment, microfinance, women empowerment and poverty. His Research Work on "Microfinance, Poverty and Livelihood" is going on under the University North Bengal.