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Global Warming: A Burning Issue of the Current Scenario

Dr. Shrishti Sharma, Assistant professor, Department of Geography, Dr. C.V. Raman University, Kota, Bilaspur, Chhattisgarh, India

Abstract

Many researchers, engineers, and environmentalists are expressing deep concern about the changes in the overall climate of the planet. Fossil fuels are being continuously used for electricity generation. The burning of these fuels produces gases such as carbon dioxide, methane, and nitrous oxide that cause global warming. Temperatures are also rising due to deforestation. The threat of global warming is continuously causing great harm to the earth's environment. Most people are still unaware of global warming and do not consider it a major problem in the coming years. Most people do not understand that global warming is currently taking place, and we are already experiencing some of its devastating effects. It will and will severely affect the ecosystem and disturb the ecological balance. Due to the deadly effects of global warming, some solutions must be found. This paper introduces global warming, explains its causes and dangers in detail, and presents some solutions to solve this burning issue. Above all, alternative energy sources (solar, wind, hydro, geothermal, biomass) need to be seriously adopted. Finding and using renewable sources of energy is one way to effectively tackle the ever-increasing global warming.

Keywords: climate, fossil fuels, deforestation, global warming, alternative energy sources

Introduction

The continuous rise in the temperature of the planet is indeed disturbing. Its root cause is global warming. Global warming begins when sunlight reaches the Earth. Clouds, atmospheric particles, reflective land surfaces and the surface of the oceans then reflect about 30% of the sunlight back into space, while the rest is absorbed by the oceans, air and land. This results in the warming of the surface of the planet and the atmosphere, making life possible. As the Earth warms, this solar energy is radiated by thermal radiation and infrared rays, which are radiated directly into space causing the Earth to cool down. However, some of the outgoing radiation is reabsorbed by carbon dioxide, water vapour, ozone, methane and other gases present in the atmosphere and radiated back to the Earth's surface. These gases are commonly known as greenhouse

gases due to their ability to trap heat. It should be noted that this reabsorption process is actually good because the Earth's average surface temperature would be much cooler if greenhouse gases did not exist. The dilemma began when the concentration of greenhouse gases in the atmosphere was artificially increased at an alarming rate by mankind for the last two centuries. By 2004, more than 8 billion tons of carbon dioxide had been pumped in, increasing levels of greenhouse gases further hinder thermal radiation, resulting in a phenomenon called the human-enhanced global warming effect. Recent observations about global warming have reinforced the theory that it is actually the human-enhanced greenhouse effect that is warming the planet. The planet has experienced the greatest increase in surface temperature in the last 100 years. Between 1906 and 2006, the Earth's average surface temperature increased between 0.6 and 0.9 degrees Celsius, although the rate of temperature increase has nearly doubled in the last 50 years. Landfills and agricultural decomposition of biomass and animal manure produce millions of pounds of methane gas. Nitrous oxide is released into the atmosphere by various nitrogen-based fertilizers, including urea and ammonium phosphate, and other soil management uses. Once released, these greenhouse gases remain in the atmosphere for decades or longer. According to the Intergovernmental Panel on Climate Change (IPCC), carbon dioxide and methane levels have increased by 35% and 148% respectively since the industrial revolution in 1750.

The Greenhouse Effect

While other planets in Earth's solar system are either very hot or very cold, Earth has a relatively mild, stable temperature at its surface. Earth enjoys these temperatures because of its atmosphere, which is a thin layer of gases that covers and protects the planet. However, 97% of climate scientists and researchers agree that humans have changed Earth's atmosphere in a dramatic way over the past two centuries, resulting in global warming. To understand global warming, it is first necessary to be familiar with the greenhouse effect. As Figure 1 shows, the natural greenhouse effect usually traps some portion of the heat in such a way that our planet is protected from reaching sub-zero temperatures while the human-enhanced greenhouse effect leads to global warming. This is caused by the burning of fossil fuels which increases the amount of greenhouse gases (carbon dioxide, methane, and oxides of nitrogen) present in the atmosphere.

Figure 1. Types of greenhouse effect

The trade-off between incoming and outgoing radiation that warms the Earth is often referred to as the greenhouse effect because a greenhouse works in a similar way (Figure 2). Incoming ultraviolet radiation easily passes through the glass walls of a greenhouse and is absorbed by the plants and hard surfaces inside. However, weaker infrared radiation has difficulty passing through the glass walls and is trapped inside, therefore warming the greenhouse. This effect allows tropical plants to thrive inside a greenhouse, even in cold weather. A similar phenomenon occurs in a car that is parked outside on a cool sunny day. Incoming solar radiation warms the car's interior but outgoing thermal radiation is trapped inside the car's closed windows. This trapping occurs in such a way that warm air does not rise and lose energy as would be customary.

In the words of Michael Daly, Associate Professor of Environmental Science at LaSalle College: "Gas molecules that absorb thermal infrared radiation, and are present in sufficient quantities, can force the climate system. These types of gas molecules are called greenhouse gases". Carbon dioxide and other greenhouse gases act like a blanket, absorbing infrared radiation and preventing it from escaping into outer space. The net effect is the regular warming of the Earth's atmosphere and surface. The greenhouse effect is expected to have philosophical implications with the increasing levels of greenhouse gases and the resulting global warming. If global warming continues unchecked and nothing effective is done to limit this evil, it will lead to significant climate change, sea level rise, extreme weather events, and other brutal natural, environmental, and social impacts.

Greenhouse gases: A threat

There are several greenhouse gases that are emitted mainly by human activities. The first and foremost on the list is carbon dioxide. Excessive burning of fossil fuels like coal and oil is the major factor in the production of this gas. Besides, deforestation i.e. removal of trees for land acquisition also produces large amounts of carbon dioxide in the atmosphere. Cement manufacturing also contributes carbon dioxide to the atmosphere when calcium carbonate is heated to produce lime and carbon dioxide. The second culprit gas is methane, commonly known as natural gas. It is produced as a result of agricultural activities like livestock digestion, paddy cultivation and use of manure. Methane is also produced due to improper management of waste. Nitrous oxides are mainly generated by fertilizers. Apart from this, fluorinated gases like chlorofluorocarbons (CFCs) are mainly the result of various industrial processes and refrigeration. Figure 2 shows the distribution of greenhouse gases pictorially. These gases are playing their negative role in increasing the havoc of global warming. They are continuously causing increase in the temperature of the earth.

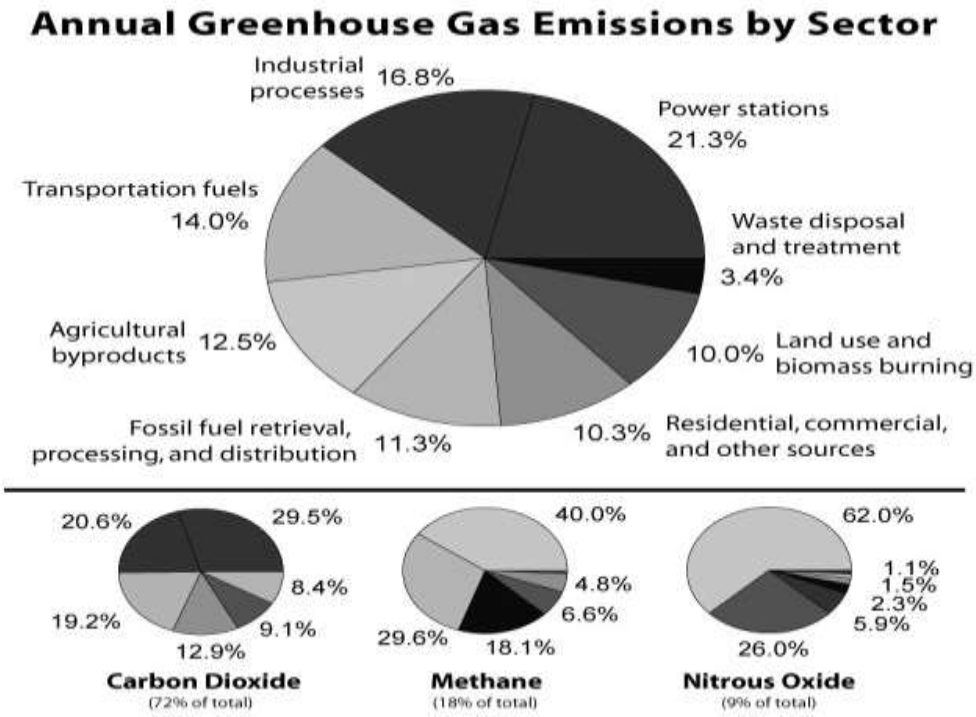

Figure 2. Distribution of greenhouse gases

Causes of Global Warming

The main cause of global warming is greenhouse gases. These include carbon dioxide, methane, nitrous oxide, and in some cases compounds containing chlorine and bromine. The accumulation of these gases in the atmosphere alters the radiation balance in the atmosphere. Their overall effect is to warm the Earth's surface and lower atmosphere because greenhouse gases absorb some of the Earth's outgoing radiation and radiate it back toward the surface. The total warming from 1850 to the end of the 20th century was equal to about 2.5 W/m2, with carbon dioxide contributing about 60% of this figure, methane about 25 percent, nitrous oxide and halocarbons contributing the remainder. In 1985, Joe Farman of the British Antarctic Survey published an article showing a decrease in ozone levels over Antarctica in the early 1980s. The response was shocking: massive international scientific programs were undertaken to prove that CFCs (used as aerosol propellants in industrial cleaning fluids and refrigeration equipment) were the cause of the problem. Even more important was the sudden international action to curb the emission of CFCs. The second major cause of global warming is the depletion of the ozone layer. This is caused primarily by the presence of chlorine-containing source gases. When ultraviolet light is present, these gases release chlorine atoms which then catalyse ozone destruction. Aerosols present in the atmosphere are also causing global warming by altering the climate in two different ways. First, they scatter and absorb solar and infrared radiation and second, they can change the microscopic physical and chemical properties of clouds and perhaps affect their lifetime and extent. The scattering of solar radiation acts to cool the planet, while the absorption of solar radiation by aerosols heats the air directly rather than allowing sunlight to be absorbed by the Earth's surface. The human contribution to the amount of aerosols in the atmosphere is in various forms. For example, dust is a by-product of agriculture. Biomass burning produces a mixture of organic droplets and soot particles. Many industrial processes produce different types of aerosols depending on the aerosols being burned or generated in the manufacturing process. In addition, emissions from various types of transportation produce

a rich mix of pollutants that are either aerosols from the start or are transformed to form aerosols by chemical reactions in the atmosphere.

Global Warming: Effects

Predicting the consequences of global warming is one of the most difficult tasks facing climate researchers. This is because the natural processes that cause rain, snowfall, hail, sea level rise depend on many diverse factors. Also, it is very difficult to predict the size of greenhouse gas emissions in future years as it is mainly determined through technological advancements and political decisions. Global warming causes many negative effects some of which are described here. First, the excess water vapour present in the atmosphere again falls as rain causing floods in various regions of the world. When the weather is hot, the process of evaporation from both land and sea increases. This leads to drought in areas where the increased evaporation process is not compensated by increased rainfall. Some of the world's.

In the regions, it will result in crop failure and famine, especially in areas where the temperature is already high. The amount of excess water vapour present in the atmosphere will again fall as excess rain causing floods. Cities and villages that depend on meltwater from snowy mountains may face drought and water supply shortages. This is because glaciers around the world are shrinking at a very fast pace and the melting of ice appears to be much faster than previously estimated. According to the Intergovernmental Panel on Climate Change (IPCC), about one-sixth of the world's total population lives in areas that will be affected by the reduction in meltwater. Warmer climate is likely to cause more heat waves, more violent rainfall and an increase in the severity of hailstorms and thunderstorms. Sea level rise is the most deadly effect of global warming, as ice and glaciers are melting faster due to the increase in temperature. This will increase the water level in oceans, rivers and lakes which can cause devastation in the form of floods. As is evident from Figure 3, temperature anomalies are projected to increase in the coming years. Before the 20th century, the situation was largely under control, but the situation started to worsen at the beginning of this century. All this happened due to the increase in global warming, mainly due to the fact that new industries and power plants started working and emitted harmful gases, which made the planet hotter. This data is based on research conducted by various climate and environmental research agencies. Similarly, Figure 6 elaborates the risks and effects of global warming in the coming years. As can be inferred from the figure, we are currently facing the severity of extreme climate events in the form of typhoons, floods, and earthquakes. This destruction will increase rapidly if nothing is done to prevent this threat. According to the National Aeronautics and Space Administration (NASA), the figure shows the global average temperature in recent years. This trend clearly poses a serious question for us.

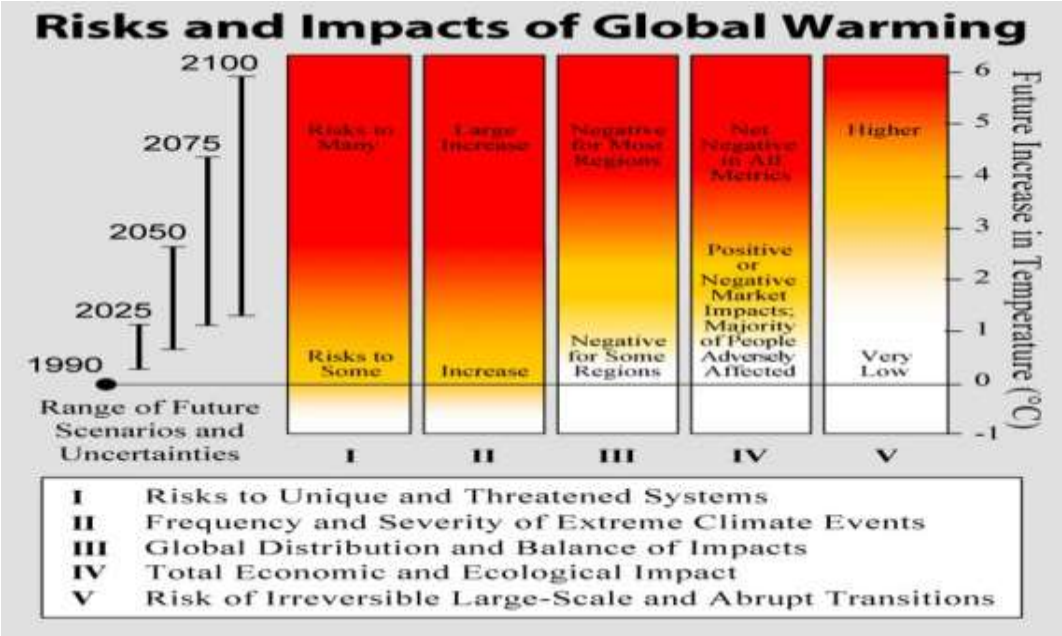

Figure 3. Assessment of the relative impact and risks associated with global warming. Five categories are evaluated. The bars are colour-coded to show the level of impact/concern for each factor based on temperature rise

Effects on living beings

Global warming can seriously affect the health of living beings. Excessive heat can cause stress that can lead to blood pressure and heart diseases. Crop failures and famines, which are a direct result of the warming of the earth, can lead to a decrease in the human body's immunity to viruses and infections. Global warming can also transfer various diseases to other regions as people will move from areas with high temperatures to areas with comparatively lower temperatures. Warmer oceans and other surface waters can cause severe cholera outbreaks and harmful infections in certain types of seafood. Also, it is an established fact that warmer temperatures lead to dehydration which is a major cause of kidney stones. A medical team from the Children's Hospital of Philadelphia examined the health proceedings of more than 60,000 Americans along with weather records. They found that people were most likely to be hospitalized with kidney stones three days after the temperature rose. Since 1994, the incidence of kidney stones has increased from about one in 20 people to one in 11. As the world continues to warm, this trend is likely to increase. According to Louis Ostrowski, M.D., director of the Division of Infectious Diseases at the University of Texas Health Science Centre at Houston Medical School and medical director of epidemiology at Memorial Hermann-Texas Medical Centre: "One infection that is definitely forming a strange pattern is valley fever". In his words, "This is a fungal infection that we previously only saw in California, Arizona, New Mexico and Texas, but last year we found it in Washington State for the first time." This potentially fatal condition caused alarm in California when the number of cases increased drastically during 2010 and 2011.

Valley fever infections have increased, probably because of climate warming and droughts leading to dust storms. Dry soil and wind can carry the spores that spread the virus. Warmer and drier climates are expected

to increase the amount of dust carrying the disease. Researchers have already observed an increase in mosquito-borne diseases such as dengue fever and malaria due to hotter and longer summers. Perhaps the most prominent mosquito-borne disease, West Nile virus, has already experienced a sharp increase in annual cases. According to the U.S. Centres for Disease Control and Prevention, the summer of 2012 was the worst West Nile season on record, with the likely cause being the scorching heat and drought of summer. Lyme disease is another dangerous disease that spreads primarily through the bite of certain tick species [12]. Figure 8 describes in the form of a block diagram how changes in the global climate can affect human health. The bitterest fact is that it can cause various diseases and deprive humans of food.

Global warming is also affecting animals. They have to move to cooler places to survive. This process has been observed in many places, for example, in the Alps, in mountainous Queensland in Australia and in the misty forests of Costa Rica. Fish in the North Sea have also been reported to move northwards. The effects on species are becoming remarkable to such an extent that their movements can be used as an indication of a warming world. They are silent witnesses to the rapid changes taking place on Earth. Scientists and researchers estimate that global warming is gradually damaging the ecosystem of various species and playing a very disproportionate role in making them extinct. For example, Asia's only ape - the orangutan - is in immeasurable trouble. Its last remaining strongholds in the rainforests of Indonesia are under threat from a variety of pressures, including climate change, putting this animal at risk of extinction in a few decades. As global warming increases the duration and frequency of droughts, these heavily degraded forests are catching fire more frequently, further reducing the orang-utan habitat. Similarly, in Africa, elephants face a variety of threats, including shrinking habitat, which leaves them more frequently isolated from people. Because of this reduction in habitat, elephants will not be able to survive any changes to their natural habitat caused by global warming, including more common and longer periods of drought, which will put further pressure on their survival.

Alternative Energy Sources

The dangers caused by global warming are enormous. Excessive use of fossil fuels such as coal, natural gas, and oil also plays a role in it. The use of fossil fuels must be stopped immediately. The most important solution to end this disaster is to use alternative energy sources. These include wind, solar, biomass, geothermal, and hydro. The most notable thing in using these sources is their clean nature. They do not generate any kind of pollution or toxic gases that can cause global warming. They are environmentally friendly and pose no threat to the ecological balance. However, their high installation and setup costs may drive energy companies away from them at first, but in the long run they are certainly beneficial for everyone. The most important thing is that fossil fuels will get exhausted one day and sooner or later, we will have to turn to renewable energy sources for energy production. Thus, the ultimate solution to end global warming is to use alternative energy sources. Figure 9 shows in a pictorial way that the Earth can be saved from the dangers of global warming if we use renewable energy sources.

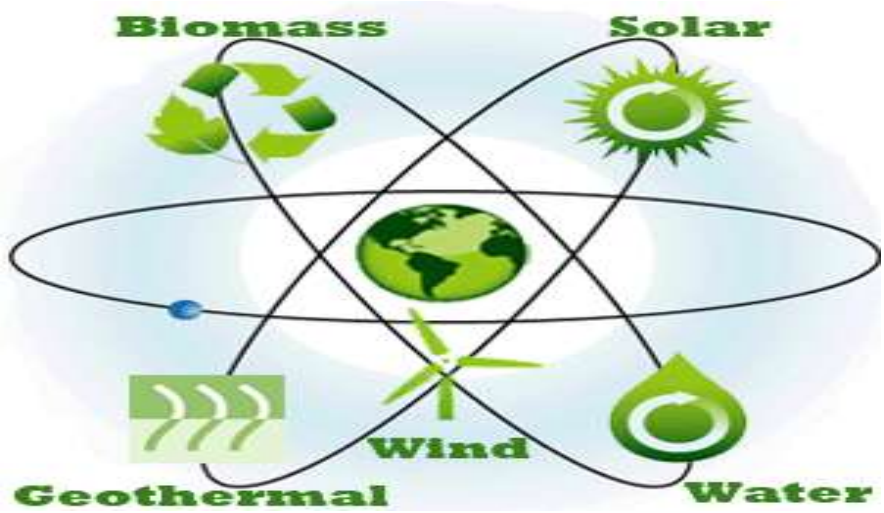

Figure 4. Save the earth from global warming by using renewable energy sources

To combat the medical dangers of global warming, it is necessary to turn to renewable energy sources. The general public should be responsible about their decisions on ways to conserve energy. This will ensure a healthy environment and stable climate for our future generations. Governments should formulate and pass policies that encourage energy companies and common people to use renewable energy instead of conventional energy. Non-governmental organizations (NGOs) should distribute pamphlets to motivate people to use alternative energy sources and discourage them from using fossil fuels. They should also explain the dangers caused by the use of fossil fuels. Many developed countries are already generating huge amounts of electricity using renewable energy. These countries should collectively help developing countries to combat the evil of global warming. The use of renewable energy is the most effective way to reduce the emission of gases that play a major role in global warming.

Other Solutions

As mentioned earlier, toxic emissions are a major cause of global warming, one possible solution to reduce harmful emissions is to cut down on the use of vehicles that generate them. This has not been very successful as many people refuse to reduce their habit of using cars. No doubt some people have started using bicycles and public transport, while some others prefer walking, but these numbers are relatively small. It should be noted that fuel savings and emission rates are the main factors regarding the choice of a car. Hybrid cars have higher efficiency and lower emission rates. Keeping the tyres inflated will help improve mileage and air filters should be changed frequently to reduce harmful emissions. People should share rides with friends or colleagues to reduce the total number of vehicles on the road. Print and social media can play an effective role in curbing this problem. It should use the philosophy of automobile advertisements to encourage drivers to conserve energy and reduce pollution. Awareness campaigns can be launched using placards, posters and logos similar to those shown in Figures 12-14. They are a very useful way to demonstrate that global warming is not good for the planet. Recycling is also a good way to reduce global warming. People should use rechargeable batteries instead of disposable batteries. Buy quality products that last longer. Shop from local

markets to reduce transportation. Even small individual efforts like lowering the thermostat in winter and using compact fluorescent lamps instead of incandescent lamps can help solve the issue of global warming. Reforestation schemes should be launched to grow trees in large numbers. Forest degradation and deforestation should be discouraged at the government level. Nuclear power is also a possible solution as this power results in less emissions but this method should be used carefully as it can lead to serious accidents, therefore, the biggest hurdles to overcome if this method is to be made practical are the safety, proliferation, waste disposal and high cost of nuclear power.

Figure 5. Symbolically shows that the Earth is melting due to global warming

Figure 6. Showing a symbolic representation to stop global warming

Conclusion

The scientific and environmental community is unanimous about the bitter truth of global warming and the involvement of human factor in it. The paper discussed here has only scratched the surface of a very complex line of scientific and engineering exploration. Global warming is a major threat and appropriate measures must be taken to deal with this grave problem. This problem is causing trouble not only to humans but also to animals and plants. Melting of polar ice caps will cause floods which can create havoc everywhere. The rise in sea level will devastate agriculture and fishing activities. To deal with these problems, certain remedial steps must be taken in time, which include but are not limited to the use of renewable energy sources and

preventing deforestation. Innovative solutions must be brought forth to eliminate this threat forever. Due to global warming, the atomic properties of elements and compounds will not behave normally like NTP. Their characteristics and applications are subjected to the ever-changing process, as the natural temperature and pressure do not remain constant in case of global warming. In case of global warming the whole life pattern of organisms will be full of complexity and will not be guided by any rules. Rapid growth of industries, refineries, excessive electromagnetic wave propagation through air, transport vehicles – road and airways, entertainment equipment like air-conditioned (AC) machines, refrigerators, television, mobile phones, computers etc. are the main reasons for the increase in environmental temperature. To solve this emerging problem, industrialization (industry should be developed with minimum work space thereby minimizing environmental pollution) and naturalization (maximum part of the earth should be covered with either arable green trees or clean water) should be provided together and also people have to minimize the use of all types of entertainment equipment, otherwise global warming may lead to the destruction of the world.

References

Causes of Global Warming". http://www.wmo.int/pages/themes/climate/causes_of_global_warming.php, Accessed 29 May 2015.

Climate change and food safety", https://epianalysis.wordpress.com/2011/12/01/climateandfood/, Accessed 29 May 2015.

"Global warming awareness posters", http://digitalmofo.com/36-global-warming- awareness-posters-pics/, Accessed 29 May 2015.

Green energy industry", http://jatrogreentech.com/overview-2/, Accessed 29 May 2015.

Greenhouse effect", http://hyperphysics.phy- astr.gsu.edu/hbase/thermo/grnhse.html, Accessed 23 May 2015.

Hall universal wide greenhouse", http://www.hallsgreenhouses.co.uk/halls_universal_12ftx8ft_wide_greenhouse.htm, Accessed 23 May 2015.

Impacts of Global Warming", http://www.climatehotmap.org/global-warming-effects/health.html, Accessed 29 May 2015.

Species threatened by climate change", http://wwf.panda.org/about_our_earth/aboutcc/problems/impacts/species/, Accessed 29 May 2015.

The big melt-globalwarming",http://www.bigmelt.com/introduction-to-global- warming/, Accessed 23 May 2015.

Cubasch, U., Meehl, G.A., Boer, G.J., Stoufer, R.J., Dix, M., Noda, A., Senior, C.A., Raper, S., and Yap, K.S. (2001). Projections of future climate change. Climate Change 2001: The Scientific Basis.

G. M. Masters, Introduction to Environmental Engineering and Science, 5th Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2001.

H. S. Peavy, D. R. Rowe, G. Tchobanoglous, Environmental Engineering, McGraw Hill International Company Edition 2000.

IPCC (2007). Climate Change 2007: The physical science basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, New York.

IPCC (2009). Climate Change 2007: Mitigation of Climate Change. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, New York.

M. L. Davis and D. A. Cornwell, Introduction to Environmental Engineering, 3rd Edition, McGraw Hill International Company, 1998.

Marc L, "Greenhouse gas emissions: causes and sources", 10 February 2015, http://www.livescience.com/37821-greenhouse- gases.html, Accessed 23 May 2015.

Marc L, "What is the greenhouse effect", 28 January 2015, http://www.livescience.com/37743-greenhouse-effect.html, Accessed 23 May 2015.

Mendelsohn, R. & Dinar, A. (2009). Climate change and agriculture: An economic analysis of global impacts, adaptation and distributional effects. Northampton, MA: Edward Elgar Publishing, Inc.

N. K. Uberoi, Environmental Management, Revised Edition, Excel Books, 2002.

P. K. Bhattacharjee, "Environmental Pollution Control and Prevention System" Indian Engineering Congress, 2008 at Warangal, A.P, India, pp 148-150, Dec, 2008.

P. K. Bhattacharjee, "Environmental Pollution Free System in All Over the World", International Journal of Environmental Science and Development, Singapore, vol. 1, no. 1, pp 57-59, April 2010

S. V. S. Rana, Essentials of Ecology and Environmental Sciences, Prentice Hall of India Pvt. Ltd, New Delhi, 2003.

UN (2007). United Nations Expert Group Meeting on Population Distribution, Urbanization, Internal Migration and Development, United Nations population division, UN/POP/BGM-URB/2007/01.

UNDP (2008). Fighting climate change solidarity in a divided world. Human Development Report.

UNFCCC (2009). Climate Change: impacts, vulnerabilities and adaptation in developing countries.