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The Risk of Global Warming: Concerns and Solutions

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Abstract

Global warming is one of the greatest environmental, social and economic threats facing the planet. The warming of the climate system is unequivocal, as is now evident from observations of increase in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level. While the world's climate has always varied naturally, the vast majority of scientists now believe that rising concentrations of "greenhouse gases" in the earth's atmosphere, resulting from economic and demographic growth over the last two centuries since the industrial revolution, are overriding this natural variability and leading to irreversible climate change in the global climate system that supports the planet's basic life support functions.[1]

Global warming, which began with the advent of industrialization in the late nineteenth and early twentieth century, has accelerated over the last few decades and bodes ill for the Earth's ecosystems and for human health. The planetary temperature has increased one degree Celsius over the last century, a number that might seem small yet has dramatic consequences.[2]

This paper highlights the grave problem of global warming, its harmful consequences, efforts of global community in addressing this challenge and role of India in the climate change regime. This paper also makes suggestions for further course of action at the individual, national as well as global level as this problem requires a multilateral and co-operative approach.

Keywords: Global Climate, fossil fuels, deforestation, global warming, alternative energy sources fuels, deforestation, alternative energy sources.

Introduction

Global warming is a gradual increase in Earth's average atmospheric temperature attributed to the greenhouse effect, which is induced by higher levels of methane, carbon dioxide, chlorofluorocarbons, and other contaminants. Global warming is one of the 21st century's most contentious scientific concerns, threatening the very structure of global society. Global warming begins when sunlight reaches the Earth. The clouds, atmospheric particles, reflective ground surfaces and surface of oceans then sends back about 30 % of sunlight back into the space, whilst the remaining is absorbed by oceans, air and land. This consequently heats up the surface of the planet and atmosphere, making life feasible. As the Earth warms

[1] Stellina Jolly and Varun Bajaj, "Clean Development Mechanism; Inter National Legal Systems Response to Global Warming", Conference Papers, thirty–Sixth Annual Conference, The Indian Society of International Law, 24-25 March 2007, pp. 223-244, p. 224

[2] "Report of the Stern commission on Climate Change", cited in, Martin Donohoe, "Global warming: A Public Health Crises Demanding Immediate Action", World Affairs, Summers 2007, Vol. 11, No. 2, pp 44-58, p. 45.

up, this solar energy is radiated by thermal radiation and infrared rays, propagating directly out to space thereby cooling the Earth.

Projected global warming is likely to trigger serious consequences for humanity and other life forms, including a rise in sea levels of between 18 and 59 cm which will endanger coastal areas and small islands, and a greater frequency and severity of extreme weather events and change in the amount and pattern of precipitation.[3] Other effects of global warming include changes in agricultural yields, glacier retreat, species extinction and increase in the range of disease vectors.

No doubt, considering the magnitude of the problem, the international community has embarked on the development of climate policy with an unprecedented speed. United Nations Framework Convention on Climate Change (UNFCCC) was signed at the UN Conference for Environment and Development in Rio de Janeiro 1992 which identified, high anthropogenic emissions as the main reason behind climate change. But it was rather a general approach and never specified emission targets or binding mechanisms and instruments of climate policy. The UNFCCC entered into force in 1994. Further negotiations were crowned with success when in 1997 Conference of Parties 3 (COP 3) in Kyoto reached on certain specific mechanisms to reduce emission of greenhouse gases, now called the "Kyoto Protocol".[4] In consequence, a carbon market is developing rapidly as a step towards reducing and stabilization of greenhouse gases in the atmosphere to avoid dangerous global warming.

Causes of Global Warming

Global warming refers to the increase in the average temperature of the Earth's near surface air and oceans in recent decades and its projected continuation. The detailed causes of the global warming remain an active field of research, but the scientific consensus identifies elevated levels of greenhouse gases due to human activity as the main influence. Therefore, causes of global warming are:

1) Greenhouse Effect

The Intergovernmental Panel on Climate Change (IPCC) concludes that "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 via the greenhouse effect".[5]The greenhouse effect refers to the tendency of carbon dioxide, methane, nitrous oxide, Sulphur compounds and chlorofluorocarbons to trap that portion of the sun's heat energy, which is reflected off the Earth. Without the greenhouse effect, the Earth's average surface temperature would be -18°C instead of 15°C and our frozen planet could not sustain human life.

The debate centers on how the strength of the greenhouse effect is changed when human activity increases the atmospheric concentration of some greenhouse gases. The increase in concentrations of greenhouse gases like CO_2, methane, nitrous oxide leads to rise in temperature. The present atmospheric concentration of CO_2 is about 383 parts per million by volume.[6]The IPCC Special Report on Emissions Scenarios gives a wide range of future CO_2 scenarios, ranging from 541 to 970 ppm by the year 2100.[7]

[3] "Climate change", available on http://ec.europa.eu/environment/ climate/home_en.htm

[4] See, Kyoto protocol to the United Nations Framework Convention on Climate Change available on http://unfccc.int/resource/docs/convkp/kpeng.html

[5] Climate change 2007: The Physical SCIENCE Basis", Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, available on http://www.ipcc.ch/spm 2 Feb 07.

[6] "Global Warming", available on en.wikipedia.org/wiki/Global-warming, visited on 25 October 2007.

[7] IPCC Special Report on Emissions Scenarios", Intergovernmental Panel on Climate Change, available on http://www.grida.no/climate/ipcc/emission/104.html

2) Industrialization and Automobiles

Since pre-industrial times, the atmospheric concentration of carbon dioxide has increased by 31 percent.[8]The major cause of increased greenhouse gas production is the burning of fossil fuels such as coal, oil and natural gas. Transportation, electricity generation and heating and cooling for industrial processes contribute almost equally.

Industrialization and the accelerating worldwide demand for fuel-inefficient automobiles have polluted our air and hastened global warming and the destruction of the protective ozone layer. Large industrialized countries are the greatest contributors to global warming. The top one-fifth of the world's nations account for over 60 per cent of global CO_2 emissions, while the lowest one-fifth, just 2 percent.[9]

While the United States contains just 5 percent of the world's population, it is responsible for 25 percent of the world's energy consumption, 33 per cent of its paper use and 72 per cent of all hazardous waste production.[10] On the other hand, the countries likely to be most
affected by global warming are those least responsible for the increases in global temperature, primarily the developing nations of the Southern Hemisphere.

To focus on automobiles -- for every gallon of gasoline manufactured, distributed and then burned in a vehicle, 25 pounds of carbon dioxide are produced. In the US, there is one car for every two people, in Mexico one for every eight and in China one for every 100. The global automobile population is expected to double in the next 25 to 50 years and the number of miles driven per person will grow as urban sprawl leads to longer commute distances.[11]

3) Deforestation

Deforestation, spurred by overpopulation, poverty, unsustainable farming practices and rapacious logging to satisfy an increasing demand for paper products, has in turn augmented global warming, degraded soil quality and contributed heavily to species loss. Deforestation destroys the plant life, which serves as the planet's carbon dioxide sink. Half of all tropical forests have been destroyed; by 2010, three quarters may be lost.[12] In addition, 20 to 50 per cent of global wetlands have been destroyed. The areas most affected by deforestation are the Amazon, Sub-Saharan Africa, the Philippines and most recently the Pacific Northwest and British Columbia. The factors that lead to deforestation are the need for new agricultural settlements, spurred by overpopulation, poverty and unsustainable farming practices; urban sprawl; logging for building materials and paper; cattle ranching and drug cultivation in countries like Peru, Bolivia and Columbia. With deforestation and global warming come shifts in the ranges and behaviors of plants and animal species. One example is the increase in the range of mosquitoes, which carry malaria to higher elevations, contributing to a rise in the prevalence of this deadly killer disease.

4) Combustion for Cooking and Heating

Another important contributor to global warming and pollution is the combustion, by almost three billion people worldwide, of coal and biomass (wood, charcoal, crop residues and animal dung) for cooking,

[8] A Gore, "An Inconvenient Truth", cited in Martin Donohue, "Global warming: A Public Health Crises Demanding Immediate Action", World Affairs, Summers 2007, Vol. 11, No. 2, pp 44-58, p. 45

[9] Staff – Union of Concerned Scientist (UCS), "Frequently Asked Questions (FAQS) about global warming", available at http://www.ucsusa.org,

[10] M T Donohoe, "Causes and Health Consequences of Environmental Degradation and Social injustice", Social Science and Medicine, Vol. 56, No.3, 2003.

[11] Martin Donohoe, "A Public Health Crises Demanding Immediate Action", World Affairs, Summer 2007, Vol.11, No.2, pp. 44-58, p. 46.

[12] M T Donohoe, "Causes and Health Consequences of Environmental Degradation and Social injustice", Social Science and Medicine, Vol. 56, No.3, 2003.

heating and food preservation.[13] Health consequences of released pollutants are magnified when such combustion is carried out in enclosed spaces, which is common.

Consequences of Global Warming

There are many actual and potential adverse effects of global warming. They are:

Melting and Flooding: One of the adverse consequences of global warming is the melting of polar icecaps and glaciers and the rise of global sea levels.[14] Over the next 100 years, sea levels are predicted to rise between 9 and 88 CMS, which is likely to result in greater coastal erosion, flooding during storms and may inundate Male (the capital of the Maldives) and South Pacific islands like Tuvalu and Vanuatu. Low-lying countries like Bangladesh will be threatened and aquifers in New Orleans and San Francisco may be destroyed. Large portions of the Antarctic ice shelf have carved into the sea and the Greenland ice sheet is rapidly receding. With less ice to reflect sunlight, the Earth absorbs more heat, which accelerates melting. If the layer of permafrost covering the Siberian tundra continues to melt, huge amounts of carbon dioxide could be released, further accelerating global warming.

Extreme Weather Events: Global warming augments the effects of extreme weather patterns, and may have contributed to the recent dramatic increase in severe hurricanes and costly flood damage in the US. Changes in temperature and precipitation may adversely affect freshwater availability and quality in many areas. By 2020 between 75 million and 250 million people are projected to be exposed to an increase in water stress due to climate change in Africa. Coupled with increased demand, this will adversely affect livelihood and exacerbate water-related problems.[15] Even Central, South, East and South-East Asia have been projected to be affected by water availability. Given the fact that population growth and increasing demand resulting from higher standards of living would require larger quantity of water, the impact of climate change could adversely affect more than a billion people in respect of water availability in Asia by the 2050.[16]

Air Pollution and Ramifications for Human Health: Numerous studies have documented the links between global warming, greenhouse gasses, air pollution, ozone depletion and acute and chronic health problems. Greenhouse gasses are major contributors to air pollution, whose levels have been strongly linked to morbidity and mortality from cardiopulmonary and cerebrovascular diseases, lung cancer and infant mortality in the US.

Rising temperatures increase smog and ground level ozone, increasing symptoms in those suffering from asthma and chronic obstructive pulmonary disease. Higher level of carbon dioxide favor the growth of ragweed and other pollen-producing plants, which exacerbates allergies. Furthermore, due to the pollution-induced destruction of the ozone in the upper atmosphere (as well as cooling of the upper atmosphere, a consequence of more heat being trapped in the lower atmosphere), the ozone layer, which protects us from the sun's harmful ultraviolet radiation, is being depleted. This has led to an increase in cataracts, a consequence of ultraviolet-light induced damage to the eye's lens and a predicted increase in the lifetime risk of malignant melanoma, the most virulent form of skin cancer. Finally, with higher temperature come more heat waves, resulting in more deaths from hyperthermia, although deaths from hypothermia should

[13] See, M Ezzati and D Kammen, "The Health impacts of Exposure to Indoor Air Pollution from Solid Fuels in Developing Countries", Environmental Health Perspectives, 2002, Vol. 110, No.11,

[14] "Report of the Intergovernmental Panel on Climate Change 2007", available at http://www.ipcc.ch,

[15] Rajendra Pachauri, "Climate Change Threatens the Fight to End Poverty", available on www.countercurrents.org

[16] Ibid.

drop.the World Health Organization have estimated that about 160,000 people die each year from the side effects of global warming and that this number could double by 2020.[17]

Oceans Ability to Soak Greenhouse Gases Decreasing: Research conducted by British scientists have shown that oceans ability to act as a "carbon sink" soaking up greenhouse gases is decreasing. Measurement of the North Atlantic taken by British scientists over the decade from the mid-1990s to 2005 show the level of carbon dioxide in its waters has fallen by about half over that time.[18]According to natural processes, the amount of CO_2 in the atmosphere is reduced when the gas dissolves into the waters of the oceans which cover much of the surface of the earth, turning them into vast "sinks" storing the carbon safety. But the new study suggests the amount of carbon dioxide entering the oceans is declining because warmer global weather has heated the water near the surface and there is less subsurface water formed and so the CO_2 is not being taken down into the deep water.

Adverse Consequences for Developing Countries: Climate change is a matter of grave concern for developing countries like India, which are highly vulnerable to its potential impacts. The IPCC points out that developing economies rely more heavily on climate-sensitive sectors like agriculture, which operate close to environmental and climatic tolerance levels. Few developing countries have the necessary financial, technical and institutional capacities for efficient adaptation to climate impact.

Recent scientific studies of the possible impacts of climate change reiterate the higher vulnerability and low adaptability of tropical developing countries. For instance, a 40-cm sea-level rise by the 2080s could lead to an annual flooding of 55 million people in South Asia, 21 million in South-East Asia, and 14 million in Africa, as opposed to only 3 million in the rest of the world.[19] Agriculture in tropical countries is particularly vulnerable to climate change. Climate change could also aggravate problems of biodiversity loss and desertification. Climate change disproportionately impacts the poorest in society, exacerbating inequities in access to adequate food, clean water, health etc. Thus, the issue of climate change is closely linked to other environmental issue, and to the challenge of sustainable development itself.

International Negotiations

Climate change emerged on the political agenda in the mid-1980s with the increasing scientific Ference in the global climate system and with growing public concern about the environment. Because climate change is such a complex and challenging issue, policy makers need an objective source of information about the causes of climate change, its potential environmental and socio-economic impacts, and possible response options.

Recognizing this, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC) in 1988. The Panel's role is to assess on a comprehensive, objective, open and transparent basis the best available scientific, technical and socio-economic information on climate change from around the world. It is their task to consider scientific research from dozens of nations and thousands of scientists around the world and channel it into one report that is agreed to by all. In 1990, it released its First Assessment Report that highlighted concerns about global warming and its environmental impact. The report was extremely influential because, for the first time, thousands of scientists from around the world had reached a consensus on the existence of climate change and the likelihood that the problem was caused by humans.

[17] "Global Warming Deaths on the Rise", available at http://www.wired.com

[18] Andrew Woodcock, "Fears that Seas Soak Up Less Greenhouse Gas", available on www.countercurrents.org

[19] For details, see http://enufor.nic.in/cc/index.htm

In other words, the conclusions of the report had been agreed to by all the scientists involved. The UN general assembly responded to this by launching negotiations to formulate an international treaty on global climate protection, which resulted in completion of the United Nations Framework Convention on Climate Change (UNFCCC) in May 1992.[20]

The convention was opened for signature at the Earth Summit in Rio de Janeiro in June 1992, when it was signed by 154 states and European Community. It entered into force on March 21, 1994. India signed UNFCCC.

On 10th June 1992 and ratified that in 1993. [21]The convention established the Conference of Parties (COP) as its supreme body. During COP3 meeting in Kyoto, Japan, the Parties agreed to a legally binding set of obligations for 38 industrialized countries and 11 countries in Central and Eastern Europe, to return their emission of GHGs to an average of approximately 5.2% below their 1990 levels over the commitment period 2008-2012. This is called the Kyoto Protocol to the convention. The Protocol entered into force on 16th February, 2005 and targets six main greenhouse gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and Sulphur hexafluoride (SF_6).

Article 12 of the Kyoto Protocol provides for the Clean Development Mechanism (CDM), which enables developing countries to participate in joint greenhouse gas (GHG) mitigation projects. Under this Protocol, Annex I countries (developed countries and economies in transition) are required to reduce GHG emissions to below their 1990 levels

The CDM enables these countries to meet their reduction commitments in a flexible and cost-effective manner. It allows public or private sector entities in Annex I countries to invest in GHG mitigation projects in developing countries. In return the investing parties receive credits or certified emission reductions (CERs) which they can use to meet their targets under the Kyoto Protocol.

While investors profit from the CDM projects by obtaining reductions at costs lower than in their own countries, the gains to the developing country host parties are in the form of finance, technology and sustainable development benefits.

The basic rules for the functioning of the CDM were agreed on at the seventh Conference of Parties (COP-7) to the UNFCCC held in Marrakesh, Morocco in October-November 2001.

Deemed as the “Kyoto Surprise”, CDM is the only link between the developed and developing countries under Kyoto Protocol.[22] Although developed countries like the United Kingdom and Australia have been given emission targets, developing countries like China and India have not. This may seem strange given that China is the second largest emitter of greenhouse gases after the United States. However, the decision is based on the principle of common but differentiated responsibility.

The first part of this principle recognizes that while all countries share a common responsibility to reduce their emissions, historically it is developed countries that were the main contributors to the greenhouse gas emissions during the industrial revolution that is causing climate change today. The second part of this

[20] The Convention on Climate Change sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. The Convention enjoys near universal membership, with 189 countries having ratified it. The Convention entered into force on 21st March 1994. CCC on 10th June 1992 and ratified it on 1st November 1993.

[21] India signed the UNFCCC on 10 June 1992 and ratified it on 1 November 1993. Under the UNFCCC, developing countries such as India do not have binding GHG mitigation commitments in recognition of their small contribution to the greenhouse problem as well as low financial and technical capacities. The Ministry of Environment and Forests is the nodal agency for climate change issues in India. http://envfor.nic.in/ India_unfccc.htm

[22] Stellina Jolly and Varun Bajaj, “Clean Development Mechanism: Inter National Legal Systems Response to Global Warming”, Conference Paper, Thirty-Sixth Annual Conference, The Indian Society of International Law, 24-25 March 2007, pp. 223-244, p. 227

principle recognizes that rich industrialized countries are better able to introduce measures to reduce emissions than developing countries. As a result, developed countries like Australia and the United Kingdom are to act first to reduce emission.

Since emissions from developing countries will eventually surpass those from the Annex I countries, developing countries full participation in such a regime is crucial. Thus, emissions target needs to be specified for developing countries also as to combat global warming united efforts are required from all the countries.

India's Initiatives

India's position on the climate change regime is being guided to a considerable extent by the principle of common but differentiated responsibility. This principle not only suits India's economic interest, but also helps it in championing the protection of climate system on behalf of the developing world.

1) India and UNFCCC

India signed the United Nations Framework Convention on Climate Change on 10 June 1992 and ratified it on 1 November 1992. India has undertaken numerous response measures that are contributing to the objectives of the United Nations Framework Convention on Climate Change. They are – increasing significantly the capacity of renewable energy installations, improving the air quality in major cities and enhancing afforestation, thus putting economic development on a climate-friendly path.

Under the framework Convention, all parties are obligated to develop and publish a national inventory of Greenhouse Gases (GHG) not controlled by the Montreal Protocol.[23]

There is a difference in fulfillment of this requirement between Annex countries and non-Annex 1 countries.[24] The former are required to report annual inventories, while the latter are required to report for the year 1994, or alternatively for 1990 for initial national communications and for the year 2000 in the second national communications.

India had already taken the initiative on a limited scale estimating anthropogenic GHG emission inventories in 1991. In 1992, India published its first definitive report for the base year 1990 on an enlarged scale. But it was only in 2004 that India submitted its initial National Communication to the UNFCCC for the base year 1994, comprising a comprehensive inventory of the Indian emissions from all energy, industrial processes, agriculture, activities, land use, land use change and waste management practices.[25]

2) India and Kyoto Protocol

By acceding to the Kyoto protocol on 26th August 2002, "India has sent a good signal by taking the lead in the region and showing that multilateral approach is better than unilateral"

Right now, India is emerging as one of the major beneficiaries of clean technology. India has necessary institutional and regulatory mechanism for implementation of CDM projects and has large potential for CDM-related project activities in the areas of energy, coal, industry, renewables, transport and municipal solid waste.

The projects under CDM should result in sustainable development in developing countries. As part of the eligibility criteria, India has set up Designated National Authority (DNA) that is hosted by the Ministry of

[23] Articles 4(1) and 12(1) of the Conventions provides for the parties to develop and publish a national inventory of GHG emissions and removal by sinks of all greenhouse gases not controlled by the Montreal Protocol

[24] Annex I Parties include the industrialized countries that were members of the OECD (Organization for Economic Co-operation and Development) in 1992, plus countries with economies in transition (the EIT parties) including the Russian federation, the Baltic States, and several Central and Eastern European States. Non-Annex I parties are mostly developing countries

[25] Anwar Sadat, "India and the Climate Regime: A Critical Approach", Indian Journal of International Law, 2007, Vol. 47, pp. 87-95, p.92

Environment and Forests, Government of India.[26] The two main functions of DNA are to: (1) provide written approval of the voluntary participation of each party involved in the project; and (2) obtain confirmation by the host party DNA that the project activity assists it in achieving sustainable development.[27] It shows India's preparedness to receive CDM projects.

India 's credential as a supporter of multilateral efforts to protect climate system received a blow when it became part of the Asia-Pacific Partnership on Clean Development (APPCDC). The pact, created by United States, supported by Australia and with China, India, Japan and South Korea as its additional partners, is aimed at establishing an alternative targetless climate framework.[28]

Suggestions to Confront Global Warming

1) International Level

Global co-operation through international treaties is critical for decreasing global warming as we have seen that Montreal Protocol has been fairly successful in phasing out chlorofluorocarbon use. No doubt, to confront global warming, countries has entered into Kyoto protocol but Kyoto only represents the beginning of global co-operation as it has not received full international support. United States (historically being the world's largest emitter of greenhouse gases), Australia and Kazakhstan have refused to ratify the Kyoto protocol and have not formulated a workable plan to achieve the goals of the protocol. Citing "serious harm" to its economy, as well as the exemption of developing nations from the treaty, the United States contends that the Kyoto protocol is an unfair and ineffective means of addressing global climate change concerns.[29] Even so, many US cities have taken the lead and passed legislation to meet Kyoto standards. China, though exempt from its provisions as developing country, is the second largest emitter of greenhouse gases after the US, which makes the issue of exemption of developing countries debatable. The Kyoto Protocol expired in 2012, and international talks had begun in May 2007 on a future treaty to succeed it. All nations were expected to join their efforts and enter into an agreement that included the cooperation of all countries, including the US, which was one of the largest emitters of greenhouse gases, as tackling global warming required a multilateral effort. Last but not least, the US should not have tried to hinder multilateral efforts by entering into pacts like the Asia-Pacific Partnership on Clean Development (APPCDC). Through such efforts, the US was trying to entice emerging emitters to support this approach instead of the Kyoto framework. To confront global warming, full cooperation from all nations was required, and such cooperative approaches should not have been hindered.

2) National Level

Governments and corporations can reduce global emissions by increasing energy efficiency standards, sharing technologies, encouraging the use of renewable energy sources, eliminating coal and oil subsidies and protecting forests. Stronger clean air and water standards and elimination of fossil fuel industry tax breaks and subsidies could save billions of dollars and thousands of lives each year. Tax breaks and subsidies for research and development of renewable energy should be increased and the tax system restructured to decrease levies on work and savings and increase levies on destructive activities, such as carbon emissions and toxic waste generation. Alternatives to electrical-coal-oil-nuclear and natural gas-based power include solar energy, wind turbines, geothermal power, tidal/wave power, hydropower and

[26] Anwar Sadat, "India and the Climate Regime: A Critical Approach", Indian Journal of International Law, 2007, Vol. 47, p.94

[27] The operational details of CDM were decided at the seventh COP held in Marrakesh in 2001. This is known as the Kyoto rule-book

[28] Peter Christoff, "Post Kyoto? Post Bush? Towards an Effective Climate Coalition of the willing", International Affairs, 2006, Vol. 5 No. 82, p. 848.

[29] "Global Warming", available on en.wikipedia.org/wiki/Global-warming

co-generation (harnessing waste heat), all of which would decrease air pollution and the risk of accidental or deliberate catastrophes.

3) Individual Level

A multi-faceted approach to the problems of environmental degradation includes shifting from a throwaway economy to a re-use/recycle economy and re-evaluating economic inputs and outputs by including the contributions of natural phenomena and processes to human health. To reduce their contribution to global warming, private citizens can properly insulate their homes, use energy-efficient lighting, take public transportation and stop receiving catalogues and junk mail and purchase locally-produced goods, including foodstuffs, to minimize the pollution associated with the transportation of such products from distant locations.

Conclusion

The rapid, human-caused warming of the Earth over the last century carries serious consequences for our environment and health. While the economic costs of global warming may constitute up to 20 percent of the world's Gross Domestic Product (GDP) each year, an investment of just one percent of the annual world GDP by 2050 could reduce emissions significantly and head-off the worst projected impacts of global warming. Therefore, all the nations of the world should unite, cooperate and act now to ameliorate and reverse climate change as it should not be forgotten. "We have not inherited the earth from our ancestors, but have borrowed it from our children."[30]

[30] Martin Donohoe, "A Public Health Crises Demanding Immediate Action", World Affairs, Summer 2007, Vol.11, No.2, pp. 44-58, p.58