AN ANALYTICAL STUDY OF IMPACT OF ENVIRONMENTAL IMBALANCE WITH REFERENCE TO GLOBAL WARMING AND CLIMATE CHANGE ON DIFFERENT ASPECTS OF NATURE

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Received December 15, 2012
Accepted March 25, 2013

ABSTRACT
The earth’s climate has entered a state unparalleled in recent history. The planet is dying and it is we humans who have endangered it. We have brought the mother earth to her deathbed through our advancing technology, industrial wastes, large scale deforestation, feeble exploitation of natural resources, polluting the environment, eroding the ozone layer which have resulted in what might be irreversible climate changes that will eventually destroy the planet. This study presents the global trends of Environmental Imbalance (Global Warming and Climate Changes) and analyses its impact with a diagrammatic presentation on the different aspects of the nature viz. temperature, climate patterns, water bodies, flora and fauna, agriculture and human beings. Additionally, the study also provides strategies to mitigate the effects of global warming and climate changes.

Key Words: Environmental imbalance, Population displacement, Economic decline, Mitigation, Climate changes

INTRODUCTION
Human beings have the capacity to subvert the world, far more than any other living species. We can turn the world into something that becomes hotter, greedier and more destructive or we can turn it into something that is calm and that reflects the divine purpose. Since industrial revolution, human activities have pumped steadily more CO₂ into the atmosphere. Most was quietly absorbed by the oceans, whose immense sink capacity meant that 170 years were needed for levels to increase from the pre-industrial 280 parts per million (ppm) to 300 ppm. But the vast increase in fuel burning since 1950, has overwhelmed even the oceanic sink. Atmospheric concentrations are now rising almost as steadily as CO₂ emissions themselves. An excess of these gases such as CO₂ ozone, methane, nitrous oxide, CFC11, CFC12, known as Green House Gases helps trap more heat and leads to Global Warming.

AIMS AND OBJECTIVES
To study the global trends of the environmental imbalance. To analyze the impact of environmental imbalance with reference to global warming and climate changes on different aspects of the nature. To study the strategies to mitigate the effects of global warming and climate changes.

METHODOLOGY
The study is based on quantitative analysis and also draws on qualitative information for better understanding of the concept of environmental imbalance with focus on global warming and climate changes. Secondary data has been referred for the study from published materials-books, magazines and journals. Newspapers, especially The Times of India have provided immense useful information regarding environment and its different aspects. Internet has also been referred for deep insight into the topic.

Environmental imbalance
Advancing human technology and the rapidly expanding population it supports, industrial wastes, acid rainfall, expanding deserts, large scale deforestation, man-made chemicals eroding
the ozone layer all combine to create environmental changes leading to its imbalance, at a rate far faster than the earth can accommodate. As a result, the Earth’s average temperature has risen approximately 0.5°C since the beginning of this century. Further rises seems inevitable, with 1990 marked as the hottest year worldwide since records began. The earth is currently in a warm phase between ice-ages. A warmer earth probably means a wetter Earth, with melting ice-caps and raising sea-levels. Warmer temperatures results in higher sea-levels as more of the polar ice caps melts. (The polar ice-caps play an important role in modifying the Earth’s climate). Most of the world’s population lives near the coast, so any changes which might cause sea-level to rise, could have a potentially disastrous impact.

**Now consider the global trends**

In the past 100 years, the world economy expanded sevenfold. Meanwhile the global population increased from 1.6 to 6.5 billion, the world lost half of the tropical forests and CO₂ levels rose to 380 ppm. The 0.74°C rise in temperature in the past century is causing sea levels to rise, melting glaciers, destroying species and producing extreme weather. And once the CO₂ levels exceed 450 ppm, the changes in global temperature could exceed the pre-industrial by 20°C, enough to produce massive climate instability.¹

**Consider also the local realities much closer to home**

The health and productivity losses from just particulate air population amounts to 2-3% of GNP in China, India, Turkey and elsewhere. All across Asia and Latin America, the destruction of forests is damaging the local ecology, bad for crops and bad for people. Deforestation and soil erosion are compounding the local damages of natural disasters, especially for the poorest in Asia and elsewhere (Fig. 1).

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*Fig. 1: Environmental imbalance*
RESULTS AND DISCUSSION

With facts, findings and future projections the impact of environmental imbalance on different aspects of the nature can be analyzed as under:

**Impact on global temperatures**
Over the past 50 years, the average global temperature is said to have increased at the fastest rate recorded in the history. It has increased to 0.74°C in 1906-2005 in 20th century. According to the to Fourth Assessment Report of the IPCC projection of average global temperatures by the end of this century range from a best estimate of the lower end of 1.8 and at the upper end of 4°C. A rise in global temperatures is responsible for:
- Rise in sea-levels,
- Inundation of low lying coastal areas, even leading to many smaller islands totally submerged. All of Maldives and large part of Bangladesh are among the regions estimated to go under water and
- More frequent incidence of extreme weather events like floods, heat waves, drought and hurricanes and so on.

Temperature increase by 3-4°C would cause-
- Displacement of 330 million people due to floods,
- Malaria infection for 220-400 million people due to floods and
- Extinction of 20-30% of all the land species.

**Impact on climate pattern/weather conditions**
The world’s climates have changed naturally throughout the history. In recent times, scientists have become concerned that human activities, such as burning of fossil fuels, are producing green house gases, such as CO₂ and there are causing global warming. The effects include
- Ocean currents altering,
- Ice sheets melting,
- Sea levels rising by 3mm a year and
- More severe winters – cyclones, floods becoming more common.

According of IPCC, the worst effect of climate changes on human beings will be caused by water or lack of it in form of floods, droughts, melting glaciers, rising sea levels, ocean. Acidification threatening to destroy coral reefs, plankton and many commercial fish species.

Climate changes is causing a spike in natural disasters as well as gobbling uparable land and reducing water availability in critical areas. Climate changes is increasing with of tropics. With zone expanding 500 km in 25 years, drought and epidemics threaten heavily populated areas like region of Southern Australia, South Africa, the Southern Europe – Mediterranean, Middle East region, the Southern Western United States, Northern Mexico and Southern South America, Predicted to experience severe during
- The area of the Arctic perennial polar ice cap is declining at the rate of 9% per decade
- In the year 2009, Assam which normally only faces floods, was almost the first to declare drought.
- 262 million people affected by natural calamities between 2000 and 2004

**Impact on water bodies**
According to American Meteorological Society’s Journal of Climate, 15th may edition, 2009:
- The flow of water in the world’s largest rivers including India’s river Ganges has declined over the past half century, with significant changes found in about a third of the big rivers.
- An analysis of 925 major rivers from 1948 to 2004 showed an overall decline in total discharge. The reduction in inflow to the Pacific Ocean alone was about equal to shutting off the Mississippi river. Among the rivers showing decline in flow, several serve large population. These include the Yellow River in Northern China, The Ganges in India and The Niger in West Africa and the Colorado in Western United States.
- The annual flow into the Indian Ocean dropped by about 3% or 140 cubic kilometers.
- 60% of world’s major rivers have been dammed or diverted. One in ten of the world’s largest rivers is running dry every year before reaching its natural end the sea.
- Surface ocean temperature are rising 50% faster. The ocean will soon reach a tipping
According to a study published in journal Nature Geosciences – 2/3rd of the world’s major deltas, home to nearly half a billion people are caught in the scissors of sinking land and rising seas. 85% of the 33 largest delta regions experienced severe flooding over the past decades affecting 2,60,000 sq. kms. 

Two NASA scientists used satellite data to look at 104 large inland lakes around the world and found that on an average they have warmed 1.1°C since 1985. That’s about 2.5 times the increase in global temperatures in the same period. Lakes appear to be warming more than the air temperature making it clear that the world is warming up. 

The Chinese Academy of Sciences estimates, the glaciers have shrunk by 5% since 1950’s. At the current rate of retreat, glaciers could shrink by as much as 75% by the year 2050, poring a major risk to the region’s water security. The pollution clouds also have helped to reduce the monsoon season in India.

**Impact on flora and fauna (Biodiversity)**

The biodiversity register of the planet is becoming thinner day by day. More than a million species are today threatened and could be extinct by 2050. 

The International Union for Conservation of Nature reported that more than 800 animals and plant species have gone extinct and the past five centuries with nearly 17,000 new threatened with extinction.

- Highest number of threatened animals globally are amphibians, the first animal to walk on earth, with 66% of Indian amphibian under the threat of extinction, a major ecological imbalance is imminent.
- Some 30% amphibian, 23% of mammals and 12% of birds are under threat of extinction due do human activities.
- Fresh fish populations have declined by 50% in the last 20 years.
- Birds have been moving north in Europe over the past 25 years, because of climate changes in the vanguard of likely huge shifts in the ranges of plants and animals.
- Bees colonies are disappearing, even butterflies.

- In last 50 years, in India there has been a serious decline in the number of birds like crow, eagle, vultures, parrot, cuckoo, etc. 63 of the 350 known species of frogs in India are believed to be extinct.

**Coral reefs**

Coral bleaching due to rising temperatures has struck many reefs around the world, hitting the Indian Ocean, parts of the Caribbean and Australia. Most recently, coral bleaching is occurring because the seas in the tropical parts of the world are becoming too warm. Australia is suffering an accelerated climate changes, making the Great Barrier Reef’s World Heritage corals at particular risk. The Reef has a third of the world’s soft corals, more than 1500 species of fish and six of the world’s seven marine turtle species. Indian Ocean corals were harder hit than Australia’s in 1998, with 50% dying along its western rim in months. So far 27% of world’s coral reefs have been either destroyed or damaged by human activity and rest are endangered.

**Natural resources**

As humankind persist with thoughtless and extravagant consumption of natural resources, the earth is hurtling towards an unprecedented resource crunch. The resources needed to sustain present level of consumption have reached such alarming levels that on a per capita basis we are consuming more than 1/3rd in excess of what the world can afford to lose. According to UN Report, Humanity’s Ecological Footprint – or the land and marine area required to regenerate what’s consumed- stands at 21.9 hectares per person at present, while the earth’s capacity is only 15.7 hectares per individual. This is clearly an unsustainable situation.

**Impact on agriculture**

- Almost 30% of the variation in the global agricultural yields can be explained by temperature rise. Wheat, maize, barley is hit the maximum due to temperature rise. And India, the second largest producer of wheat and fifth largest producer of maize in the world, is obviously suffering silent kill on its agrarian economy. $ 5 billion worth crops are destroyed annually because of temperature rise.
Decline in productivity of certain crops as wheat is being observed as the effect of global warming. Wheat yields would fall 5-10% with every increase of 1°C.

Staple crops like wheat when grown in high concentrations of CO₂ have less protein and iron but contain higher leads (8% drop in iron and 14% increase in lead). Both these changes are worrisome and bad for human health. Particularly drop in iron as half of the world’s population are already iron deficient, is going to be worse.

Global warming and carbon levels is turning Cassava, the staple of 750 million impoverished people in Africa, Asia and Latin America, more toxic with much smaller yields.

Less rainfall in Darfur has turned millions of hectares of marginal land into deserts, producing one of the largest social conflicts ever.

Food insecurity and loss of livelihood would be further exacerbated by loss of cultivated land and nursery areas for fisheries by inundation and coastal erosion in low-lying areas of tropical Asia.

Impact on human beings

Talking about the two most vulnerable sections of society – the women and the children are the worst affected due to global warming. According to FAO, women produce more than 50% of food cultivated on the planet. In Africa women produce 80%, in Asia 60% and in South America 40%. 70% farmers in India are women.

Women bear the brunt of climate changes in different ways,

Limited access to resources, livelihood, takes toll on health,

Walking much longer distances for drinking water, firewood,

Giving up their portion to feed family,

Stress leading to premature deliveries,

Dalits, adivasi women are the worst affected

In dry fields and flooded villages women are the worst off.

Moving on to the children, who are not responsible for climate changes, are the ones who are hardest hit. The Report-Feeling the Heat: Child Survival in a Changing Climate- Links access to basic facilities with climate changes. It is said that 2 million children under 5 years of age die every year from diarrhoea, malaria, pneumonia. Climate Changes will make these conditions worse, placing children at greater risk, i.e. 900 million children will be affected by water storage in the next generation, 160 million more at risk of malaria. It is estimated that malnutrition affects 178 million kids worldwide, 1/3rd of whom lives in India. Food scarcity, diminishing resources to grow nutritious food will affect more- 25 million more by 2050. 175 million children will be affected every year. Droughts and floods will trigger mass migration leading to increased child trafficking, child labour. And any progress India makes in reducing child mortality will be transfer slowed down by the effects of climate changes.

Global warming is among the world’s most dangerous security risk. It could lead to large scale migration of populations to safer areas. Climate refugees could face hostilities from local residents and this could lead to conflict. Large scale migration and competition for resources could become a serious security challenge.

The world isn’t just getting hotter from man-made global warming, it is getting sticker. The amount of moisture in the air near the surface- the stuff that makes hot weather unbearable increased 2.2% in just under three decades. This humidity changes is an important contribution to heat stress in humans as a result of global warming.

RECOMMENDATIONS

Responding to environment imbalance mitigation strategies

Striking a balance between economic development and environmental protection is essential. It has been suggested that countries ought to adopt strategies to mitigate global warming, such as energy conservation, shifting to renewable sources of energy rather than carbon fuels and thus, reduce emission of CO₂ and green house gases.

Sacrifice

The fact is that there is no way both to clean up the environment and conserve natural resources without changing the life style of people in the
industrialized nations. The challenge is that of motivating people to make the necessary changes now, before a worldwide disaster forces much more difficult adjustments upon us.

**Political action**
To preserve the natural environment for ourselves and the generations to come, two things must be done. First, a stronger educational campaign must be launched to make people aware of the environmental problems. Second, more ordinary citizen must join together and become involved in the political action necessary to strengthen antipollution laws, increase the enforcement effort and protect our natural resources.

**Conserving resources**
There is no doubt that existing resources can be used more efficiently. It is possible that a large scale, multi-stage recycling program can be introduced in imitation of natural ecosystems. The immediate task is not to develop technologies that are more efficient, the challenge is to find ways of persuading people to use the conservation measures that are already available.

**New technology**
A growing number of scientists and concerned citizens are coming to see solar power as the best answer to the world’s energy problems. Solar power units use the endless supply of energy from the sun, are nonpolluting and pose no threat of radiation or explosion. Such technology is an imitation of nature since all the energy in natural ecosystems ultimately comes from the sun.

**Limiting growth**
Any effective solution to the environmental crisis must include some form of population control, otherwise there is bound to be more and more pollution and ever increasing drain on natural resources. The world would be more peaceful and secure if the people of industrialized nations learned to accept a more leisurely life style and a lower standard of living while encouraging economic growth in the Third World.

**Green global economy**
Green is not an option but a necessity for recharging the economy of the countries and creating jobs. All Governments should expand green stimulus elements including energy efficiency, renewables, mass transit, new smart electricity grids and reforestation and to coordinate their efforts for rapid results. Investing in the green economy is not an optional expense. It is a smart investment for a more equitable prosperous future. India should continue with its own climate initiatives such as solar energy project proposal and the plan to promote energy efficiency and conservation. The latter has been approved as a part of Government’s National Action Plan on Climate and the Prime Minister has declared India’s intention to save 5% energy annually by 2015. We have far more effective solutions available locally like- climate-friendly diets energy saving infrastructure, especially in buildings; terraces need to have small gardens with useful plantation, so that plants can work their miracle of converting CO₂ into O₂.

Developing countries like India have tremendous potential to improve more efficient vehicles, reduction in transmission and distribution losses, better roads and city-planning, better designed houses, they all add up to bring the cumulative changes needed.

**International co-operation**
International cooperation is of utmost importance to reduce planetary emissions in the wake of environmental cataclysm.
- Working out a viable financial framework to cut emissions and fund climate changes mitigation strategies requires a healthy dialogue between the stake-holders.
- Innovative policies for generating renewable energy and water conservation can make climate changes mitigation efforts more affordable, minimize the burden on the state exchequer and boost employment and overall growth.

**Green construction or sustainable building**
It is the practice of creating structure and using processes that are environmentally responsible and resource-efficient throughout a building’s life-cycle. Green buildings are designed to reduce the overall impact of the built environment on human health and natural environment by efficiently using energy, water and other resources reducing waste, pollution and environmental degradation.

**Organic farming**
Promoting the production and use of organic products/food is one of the effective ways to prevent global warming. The tendency of organic
soils to capture CO$_2$ far exceeds that of the soil used in conventional farming. Estimates suggest that we can get rid of 580 billion lbs of CO$_2$, if we resort to organic farming for food production.

**CONCLUSION**

The problem is what’s been emitted has been emitted, although it is not fair, it’s a fact that we all have to co-operate to do our utmost or we are never going to make it. Developed countries who contributed to most of the problem will have to pay for other countries to get energy access, technology and so on. Developing countries should move on with clean technologies, so that they avoid the path of dirty growth.

We have everything at our disposal, but we have to put them at right place and start working on it. We cannot progress until and unless we give the same importance to climate changes and its consequences as we give to economic development or poverty alleviation and so on. Development along with environment should be our new agenda. This is the time for each and every country to revise policies that sacrifice the climate in the name of development or growth. Protection of environment and development of economy must go hand in hand.

**REFERENCES**

17. Facing the heat: By 2050, glaciers may shrink by 75%, *The Times of India*, 15 Nov. (2008).
27. 0.5°C rise in temperature will reduce wheat yield by 450 kg/hectare, *The Times of India*, 12 Apr., 3, (2007).