

GLOBAL WARMING - CLIMATE CHANGE AND ENVIRONMENTAL CHALLENGES: ISSUES AND STRATEGIES FOR SUSTAINABLE DEVELOPMENT

B. L. Teli

Professor & Head, Department of Geography
H.N.B. Garhwal University, Campus Pauri, Uttarakhand, India
Email: blteli33@gmail.com

Abstract: *The global environment is facing a number of problems due to increasing biotic pressure, deforestation, over exploitation of resources and pollution. The environmental degradation can be observed in the form of soil erosion, decreasing productivity of agricultural land, climatic changes, lack of forests and forest products, decreasing capacity of pastures etc. Not only these but the pollution is at the all time high, has not only polluted the earth but affected the upper strata as well by creating a hole in the Ozone (O₃) layer. It may have serious implications on the human health, his activities and plants. It may also reduce crop yields significantly. The developing countries face a near crisis situation, economic as well as environmental. The Himalayas are no exception of it. In this region the natural balance between environment forming and conserving forces on the one hand and degrading and depleting on the other, has been disturbed. It is the function of soil-water-forest conservation, population and pollution control measures to restore this balance, even if the face of ever increasing pressure on the environment to provide food, fodder, fuel, industrial raw material etc.*

Keyword: global warming, climate change, environment, forest land, air and water

The perfect environment is a combination of abundant forest land, fresh air and clean water. Unfortunately, the constantly rising levels of air, water and land pollution have served as a deterrent in maintaining the earth's environment. Human activities like using non biodegradable objects like polythene that clog up water drains, discarding technological devices like refrigerators that affect our Ozone layer and increased use of vehicles that spread harmful fumes in the air are the major causes leading up to environmental damage. In an effort to rise global awareness to take possible action to protect nature UNEP has taken various activities to help in spreading awareness regarding ways to safeguard the environment. The world environment day theme for the year 2015 is "Seven Billion Dreams, One Planet, Consume With Care" and the host country is Italy while was in 2011. The day 5TH June is celebrated in the world under United Nations Environment Program for the judicious use of nature and natural resources, world economy, biodiversity and ultimately for human welfare to save the planet earth. At the end of nineteenth century the world faced two main problems-industrial revolution and population explosion which resulted in overexploitation of natural resources and growth of urbanization. It lead to industrial smoke, deforestation, pollution of natural resources, soil erosion, greenhouse gases, ultimately global warming and climatic change. The Earth's climate has always been, and still is, constantly changing. The causes of climate change are mainly by natural and human being. These are volcanic eruptions, ocean current and Earth orbital changes, solar variations, Agriculture, deforestation and greenhouse effect. Global warming is neither temporarily nor spatially uniform, the main cause of the present global warming trend is human expansion of the greenhouse effect. Global warming is the increase in the average temperature of earth's near surface air and oceans which affects the life forms on the earth surface, of since the mid of 20th century and its projected continuation. According to the 4th assessment report by Inter governmental Panel on Climate Change,2007,global surface temperature has increased 0.74+ 0.18°C during the 20th century while it increased 0.6°C during

1860-1950 only, though, it was expected to increase @0.005°C per year but it increased 0.17 °C in 1958.

It is observed that most of the temperature increased since the middle of 20th century, has been caused by increasing concentration of greenhouse gases which resulted from human activity such as the burning fossil fuel and deforestation. Global dimming are result of increasing concentration of atmospheric aerosols that block sun light from reaching the surface has partially countered the effects of warming induced by greenhouse gases. Climate model projections summarized in latest IPCC report indicate that the global surface temperature is likely to rise a further 1.1 to 6.4°C during the 21st Century. Warming of globe due to natural factors (CO₂, CH₄, N₂O, water vapor present in the atmosphere, trap the outgoing terrestrial radiations and thus warm up the earth surface) is not an unusual phenomenon. The earth is kept warm due to this, what is known as the “green house effect”, without it, the earth would be a frozen wasteland because the average temperature would have been 33°C lower than it is now. The GHG contribution in global warming is 15°C.

According to world Meteorological Organization (WMO) the year 2003 has gone down in the history as the third warmest on record. A record heat wave scorched Europe in August 2003, claiming an estimated 35000 Lives. In France alone 14802 people died from the scorching temperature –more than 19 times the death toll from the SARS epidemic worldwide. The warmest year ever was 1998 and the second warmest were 2002. Therefore, to arrest the global warming process, Kyoto Protocol was ratified in 2005 by both developing and developed nations for its implementation. In this agreement, while there is no cap on the emission of GHG for developing nations, but the developed 40 nations have to cut drastically their emission to bring down 6 percent than 1990 level during 2008-2012. If this protocol is scrupulously followed by the nations, the global warming will be halted to save the mankind from miseries.

The almost apocalyptic list of global warming and climate change includes-

- Accelerated glacial melt around snow covered areas which will eventually lead to a significant scarcity of water resources across the world and India too.
- Increased water precipitation might mean that certain areas will be flooded and face drought in the same year and long term patterns.
- Rising sea levels would mean disastrous consequences for coastal areas, inundating low lying habitation structures.
- Extreme weather events like tornados and cyclones will occur with increasing frequency and greater severity.
- An increased spread of water born diseases such as malaria, dengue etc.

Climate Change

If the Ozone layer reduces it will have many disadvantages cancer, poisonous crops and many more disease. The climatic change is visible in the form of more rainfall in upper latitude and subtropical regions, while tropical and Mediterranean regions are having less, more hot waves, floods, droughts intensity and frequency is increasing. Heavy snowfall, dangerous sea floods, all these requires new sustainable planning. There are many more such challenges before our youngster who are wise to use the development programs of twenty first century. The Universities and colleges can play a major role in science and technology, environmental science, economic cooperation etc. We have to include environmental conservation activities in our daily habits and plan according to the environment. Universities could provide leadership and effective groups for conservation, economic development, and social wellbeing. The increasing natural hazards and disasters and bio-diversity lost due to global warming. The climatic change is due to the methods of rice production, livestock farming and use of chemical fertilizer. In India 28 percent greenhouse gases are produced by the system of farming. Rice farming system, nature of land and animals produce 30 percent methane and nitrous-oxide. The modern rice planting system is considered to anti-environment but the Indian method is not. Modernization of farming and green revolution has

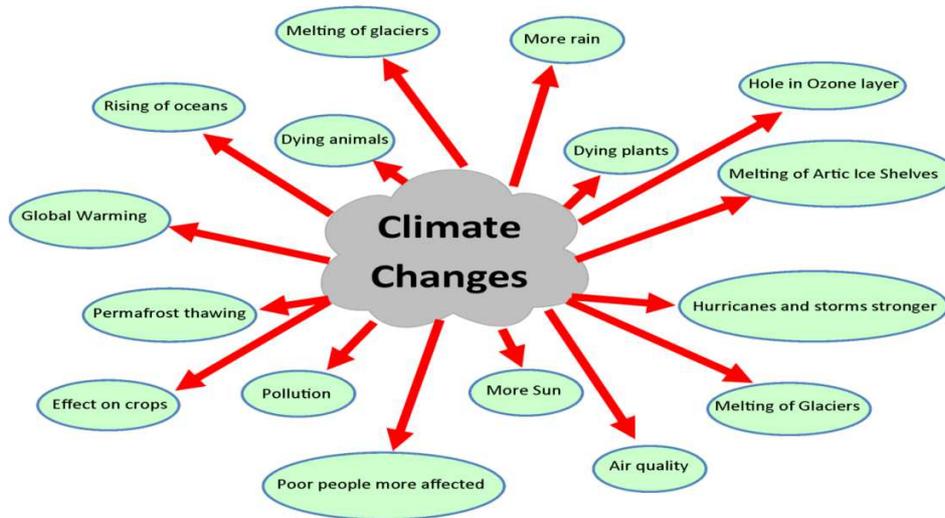
put more use of fertilizers to increase production, is the second most important cause of harmful gases. The third danger of climatic change is the gases produced by animals. The production of greenhouse gases produced is:

- China has a population of 20.19 percent -carbon production 19.12 percent of the world,
- America has a population of 4.59 percent- carbon production 18.44 percent,
- European Union (27 countries) population of 7.58 percent -carbon production 13.37 percent,
- Russian Union population of 2.2 percent -carbon production -5.19 percent,
- India population of 17.6 percent -carbon production -4.91 percent only,

Population is considered as a great destroyer of Environment. The growing population is having a great pressure not only on environment alone but also on the standard of living, education, habitat, health, food security, nutrition, transport etc related problems too. Certainly the population is at its explosion, everyday 2 lac baby are born and 7.5 crore population is increased every year on the earth resources (not applicable in African countries). Population explosion in sixties terrorized the world and Paul Alliech wrote a book on population Bomb. It was 1650 million in 1900, 2000m in 1927, 3000m in 1959, 4000m in 1974, 5000m in 1987, 6000m in 1999 and 7000m in 2011. But the population control policy of India, china and many other countries of the world have led decrease in birth rate of the world population. The fertility rate of India has decreased from 5 percent in 1971 to 2.54 in 2011, though the world growth rate is 2.1 percent (has been appreciated by UN Secretary too). The population might further decrease and one of the reasons is the girls are not willing to become a mother. It is true in case of Europe, East Asia, North America and Caribbean islands. Even then it has again become a problem for developing world that the birth rate has decreased but the population is increasing. Europe is having low birth rate and elder's population is high and by 2050 every 7th person will be of 80 years in Italy and Germany and hence, the young population will be less and pressures will be more. More Population is not dangerous for environment but more use is dangerous. The countries' having more population is poor but less resources and has low level of resources and hence have less effect on environment. The rich countries 50 crore people is 7 percent of world population but produces 50 percent of the greenhouse gases and 50 percent of the world population are poor and produces only 7 percent greenhouse gases. The greenhouse gases produced by a American or European person is more than an African village. Hence low as well as high population is equally harm-full for environment.

Efforts against Global Warming

It was really the Rio Summit in 1992 and to some extent the earlier Stockholm conference in 1972, advocated as new paradigm of Eco-development under the chairmanship of Maurice Strong, that highlighted the price that societies, locally and globally were paying for the kind of economic growth and development being pursued, and brought the concern for environment in focus of the global agenda. John Mac Conela of Sanfransisco suggested in 1969, 21st March as Earth Day in UNESCO Conference but alternatively, 22nd April was considered as earth day. The Ozone hole, acid rain, nuclear other toxic wastes, chemical and pesticide industries, the fear of global warming, pollution of rivers and oceans, deforestation and the accompanying soil erosion, and the loss of bio-diversity, are just a few highlights of the development model sweeping across the globe. However, last two decades has witnessed a number of global, national, regional and local conferences to ponder over the issue of environment and climate change which have resulted in some important international protocols in order to find out some decisive solutions. The mega earth Summit-1992 & 2002, Montreal protocol-1987, Kyoto protocol-1997, Copenhagen Accord-2009, Cancun conference -2010 etc., are a few glaring examples which shows serious concern of the global community. Among these only Kyoto Protocol on Ozone depletion was result oriented with legal international binding. The West does not want to shoulder its responsibility as it would hamper its prosperity. Clean/green technology is costly and is monopoly of developed West is not willing to transfer/help to developing world.



Climate Change and Environment

The growth of population coupled with uneven economic development is imposing environmental degradation and exploitation of natural resources. Many of our indigenous valuable floral, faunal and physical resources are on the verge of extinction. Vehicular emission and industrialization have added toxic gases to the atmosphere resulting health hazards, global warming and climate changes. The earth in terms of resources and expanding number of users of these diminishing resources today emerges as the most serious question for the generations to come.

Climate change is likely to:

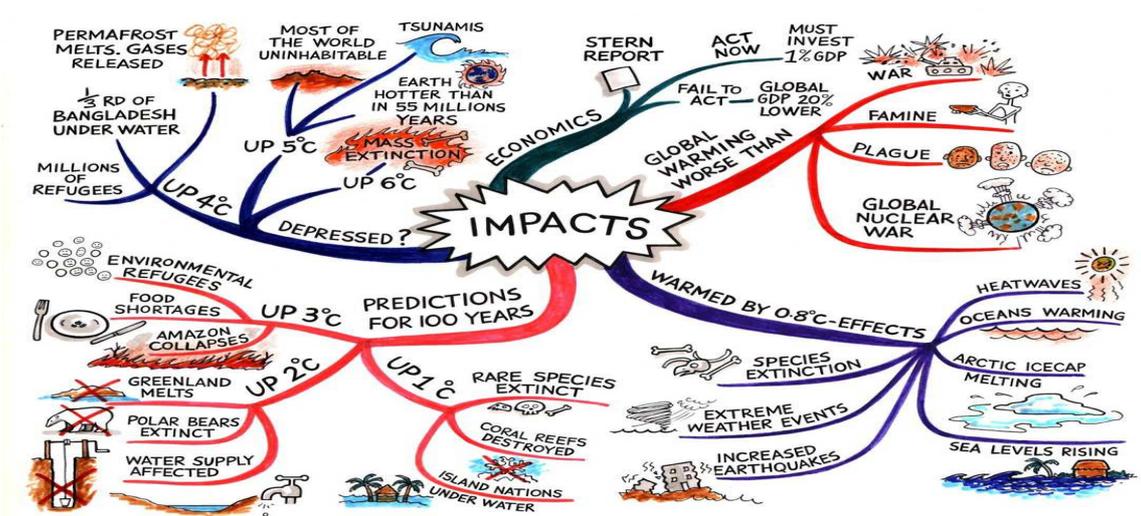
- 15 to 200 crore people displacement with in the country and out of the nation.
- 75 percent of the earnings will be spent on food while generally it is 40 percent
- 50 percent increase in malnutrition of 5years and below children
- 80 percent increase in extreme environment events- flood, cyclone, earth quake, disasters, etc.(10-18 percent torrential rainfall has already increased)
- 20 percent decrease in global GDP
- 1.5 lac people died in 2000.
- 07 percent decrease in water for irrigation.
- 18 percent desiccation in drinking water.
- 20 percent decline in agro products.
- 25 percent increase in natural disasters.
- 30 percent increase in temperature (Ocean temperature increased by 02*c during last 40 years)
- 2.5*c temperature will be high by 2050.
- 5.5m glaciers will melt after 50 years.
- One Carbon credit is equal to one ton emission of (CO₂)Carbon dioxide

Environment, etymologically means surrounding is the sum total of all external conditions and influence affecting the life and development of organisms. Most of the people associate it with either animals, scenic visitor or with pollution, sanitation and wastes. But, the environment is the entire assemblage of natural resources from which people draw their sustenance and which provides all raw materials for industrial and agricultural production. Changes in environment, therefore, affect people's lives .It emerged in the form of resource degradation and environmental pollution. Today the world has grown smaller people have become almost one community. Political and military alliances have created large multinational groups; industry and international trade have produced a global economy worldwide, communications are eliminating ancient barriers of

distance, language and race. We also being drawn to gather by the grave problems we face: over population, industrial development, dwindling natural resources and environmental crisis that threatens our air, water and trees, along with beautiful life forms on the small planet we share.

Environmental Challenges

The control of environmental pollution and or degradation is the main issue. Due to adoption of modern means of science and technology, the man is modifying the environment according to his own need and requirements. The Euro-centric model of development is synonymous with the economic growth, led by rapid industrialization, mass production and mass consumption of energy. This paradigm has opened Pandora box and led the world to devastating degradation of ecosystem. With the results the ecological system has mostly been jeopardized. The existence of life has been put into danger. Both the natural and cultural hazards have forced the large scale environmental degradation and ultimately ecological imbalances. The natural hazards included floods, droughts, desertification, water erosion and atmospheric pollution while cultural hazards include over population slums, poverty, deforestation and pollution; the environmental degradation is increasing the trends in desertification and waste land and deteriorating the agricultural products even in such areas where once the flourishing lands were found. There are so many facts about earth climate which are not disputed; these are sea level rise, global temperature rise, warming oceans, shrinking ice caps, declining Arctic sea ice, glacial retreat and ocean acidification. Climate impact had mostly on agriculture, glacial retreat, coral reefs bleaching, health etc.



Impacts of Global Warming

The global environment is facing a number of problems due to increasing biotic pressure, deforestation, over exploitation of land resources and pollution. The environmental degradation can be observed in the form of soil erosion decreasing productivity of agricultural land, climatic changes, lack of forests and forest products, decreasing capacity of pastures etc. Not only these but the pollution is at the all time high, has not only polluted the earth but affected the upper strata as well by creating a hole in the ozone(O3) layer. It may have serious implications on the human health, his activities and plants. It may also reduce crop yields significantly. Every year more than 1000 animals' species and 20,000 flowering plant species are in danger of existence and more than one third of the known bio-species have already been lost. A number of planning's and technological, polluted inputs used for human welfare are becoming an environmental problems due to the population explosion, illiteracy, poverty, economic and social inequality, materialistic and consumption oriented life system and the industrialization has polluted the total environment. Hence, the useful life saving system has been narrow down and poisoned.

- Earlier the effects were limited to wildlife, plants and natural landscape only but now a days the environmental degradation, Physical and Chemical pollution and resource deterioration is seen clearly everywhere.
- The human economic activities have affected the 20,000 crore hectare land bought under agricultural uses. It has lost 2 crore Sq. Km. area, which is more than the present agricultural area.
- The human activities such as-construction, mining, soil erosion, desertification and salinity take away as much as 50,000 to 70,000 Sq. Km. agricultural land every year.
- Erosion alone takes away 250 crore tones of soil every year. We have already lost 5 lac sq. km. area of cultivated and pasture lands under desertification.
- Every year the urbanization, in the developing world, take away 3,000 Sq. km. area.
- Carbon-di-oxide (CO₂) has increased by 36 lac tones while the 24 lac tones oxygen (O₂) has been lost from our environment. The temperature is increasing and the problem of green house effect is felt.
- Ozone (O₃) layer has lost 7 percent over the Antarctica environment and it may further loose in the coming year.

Third most deteriorating effect of industrialization is, 'Acid Rains' which has imbalanced the total environmental system. About 40 percent of the total permanent water supplying drainage is converted into waste lands. Every year more than 60 lac ha forests are cut down for various purposes. So, we are losing 100-200 crore tones oxygen (O₂) every year. According to the 'Red Data Book', 400 Birds, 138 Amphibians, 305 mammals and 193 fish species and sub-species are in danger. Similarly 25,000 plant species are also in danger. According to another report approximately 20,000 plant species and 900 animals' species of chordate group are in danger.

The ecological imbalance and environmental Issues are perceptible in the form of excessive silt load in river channels and torrents during rains, eroded and denuded hills as a consequence to over grazing, low percentage area under forest cover with much less density then optimum, gradual disappearance of humans from forests, lack of natural regeneration, drying of perennial springs and early drying of ephemeral springs, reduction in miscellaneous and broad-leaved species with ecological retrogression, an increase landslides, rock falls and debris, wild life is being fast exterminated and both man and environment are becoming poorer.

Global Warming and Population

In 1992 in the U.S. alone 14 million crimes were reported. Murder rates tripled in Germany, drug related crimes doubled in Denmark and Norway and 30 fold in Japan, such are the integral part of the development model selected. Schumacher was one of the first economists in the U.K. who raised the voice against the kind of development and economic development taking place in the west. He observed, "How can one argue that American economy is efficient if it uses 40 percent of the world's primary resources to support 6 percent of the world's population without any observable improvement. Improvement is the level of human happiness well-being and peace? Barbara ward too wrote about the bankruptcy of over development concept and processes. As early as 1962, she wrote, "The gap between the rich and the poor has become inevitably the most tragic and urgent problem of our day". According to the U.N.D.P. report "The richest fifth have 84.7 percent of G.N.P., 84.2 percent of world trade, 85.5 percent of world savings and 85 percent of domestic investment. The poorest fifth have 1.4 percent of GNP, 0.9 percent of world trade, 0.7 percent of domestic savings and 0.9 percent of domestic investment and is spite of the Rio Conference pointing out the global and environmental dangers of such disparities and inequalities, and in spite of the world forum agreeing to the need for urgent action. Nothing concrete has happened. In fact globally, the poor become poor and rich countries richer. *While, India has one of the highest numbers of milliners, there are also millions who are barely surviving.*

Pollution

Air pollution is one of the main avoidable causes of disease and death globally. It causes 8 million deaths/yr which increased fourfold across the globe and China and India are by far the worst

affected countries. About 4.3 million deaths each year, most of developing countries, are associated with exposure to household (indoor) air pollution. A further 3.7 million deaths a year are attributed to ambient (outdoor) air pollution. According to World Health Organization about 60 percent deaths are accounted only in China and India in particular is chaemia, myocardial infarction, stoke, chronic obstructive pulmonary disease and cancers. Apart from carbon dioxide, methane 18 percent chlorofluorocarbon 14 percent is responsible for global warming. Methane is increasing at the rate of 1 percent, Nitrous oxide 0.25 percent and chlorofluorocarbon 5 percent per year. According to Japan Govt. reports America produces 22.2 percent, China 14 percent, Russia 6.6 percent, Japan 4.9 percent, India 4.2 percent, Germany 3.6 percent, England 2.3 percent and other countries emit 42.6 percent carbon dioxide. If it continues the temperature will rise by 2.5 to 5.8*c in 2100. The temp has already increased by 0.6 percent in the present century. Glaciers are melting specially in the Himalayan region.

Table 1: Growth in CO² Emission during Last Five Years

Sr. No.	Country	Growth percent	Emission crore tons
1	China	44	239.5
2	India	43	59.6
3	Russia	02	44.9
4	Japan	01	33.6
5	America	- 11	140.3

Source: Earth Policy institute, 2014.

Global Warming and Oceans

A few days back 500 billion tones glacier block broke away in Larson Sea of Antarctica. This melting may increase up to 5 meter sea level. So, we have to reduce greenhouse gases 60.-70 percent at the level of 1990, below the level of 5.2 percent. Otherwise the 50 percent population will be effected by floods, sea water level will rise the salinity on productive land will increase as well ground water salinity too. Many islands will go down and coastal settlements will be submerged as produce environmental refugees. It is expected that low laying coastal systems are vulnerable to sea level rise and storm surge-the Arctic, Africa Small Islands, and Asian and African mega deltas. India is supplying even drinking water to Maldives islands through ships and planes where the water scarcity has already been felt in November, 2014. It is understood that the increasing sea level might grow to merge Maldives, Fiji, Tuvalu, Kiriviti, Vanuatu, etc islands. According to the ISRO and Indian Water Commission from 1989-91 to 2004-06, during the last 15 years India has lost about 250 sq. km. to sea as per satellite studies. Though, during this we got 177 sq. km. coastal area, however, we lost about 73 sq. km. land area. The cyclone of 1999, tsunami of 2004 and many more natural hazards are understood to be due to global warming. The sea level is rising by 3.2mm per year due to climate change. At present about 10 crore people are residing above 1000mm of sea level and according to IPCC if the sea level may rise about 203 to 406 mm by 2090 with respect to 1990.

Table 2: Per capita CO² Emission in the World (tons) 2011.

Sr. No.	Country	Per Capita Emission	percent to world Average
1.	America	16.94	376.4
2.	China	5.92	131.1
3.	France	5.04	111.1
4.	Sweden	4.75	104.4
5.	Mexico	3.96	88.9
6.	India	1.41	31.1
7.	Bangladesh	0.36	8.9
	WORLD	4.5	100.0

Source: International Energy Agency, 2011.

According to the Central Pollution Control Board of India the capital city Delhi 32 percent children had inhaling problem while in rural areas it is 18.2 percent in 2008. Not only this but 43.5 percent school goers had lungs problem and hence low efficiency while it is 25.7 percent in rural areas.

Table 3: Carbon dioxide Emission by Different Countries in the World

Sr. No	Country	Percentage of the world
1.	USA	22.2
2.	China	14.0
3.	Russia	6.6
4.	Japan	4.9
5.	India	4.2
6.	Germany	3.6
7.	England	2.3
8.	Other Countries	42.2

Source: International Energy Agency, 2015.

Not only this but pollution is more dangerous than any other problems at present in the world which kills more than 8.8 million people while others are such as- smoking kill 6.2 million, 1.2 million, mal nutrition, 3.4million T.B./malaria/HIV, 3.1million road accidents and 0.5 million people killed in riots every year (Global Allianz of Health and Pollution, WHO) and most of them come from developing and poor countries. About 8.5 million kids are killed by pollution in the world and 3000 are killed in Delhi alone while 0.5 million are die in India alone. More than 400 million people in India are suffering from pollution based diseases- heart, lungs, cancer, and many more. According to WHO report 2014 the air pollution is increasing at its poisonous level and environment is deteriorating day by day which commonly take away three years of an INDIANS life, hence it has been put in the list of most polluted countries of the world. The Scientists of University of Chicago, Howard and Yale have warned that 66 crore people are residing in unhygienic conditions where air pollution is beyond the standard. If India could manage to control the pollution we can increase 3.2 years of life of each Indian and ultimately saving 250 crore years of life. Due to this pollution the productivity will decrease and disease will increase and ultimately increase in health expenditure. The Albido will be changed and sky will become blue to WHITE. As per air quality index of WHO, World Bank, 6.20 lac people die due to pollution, 6.60 crore people inhale polluted air, which cause 23 percent children's death. The death rate is 154.8 persons per thousand due to pollution. The market of air purifiers is increasing at the rate of 50 percent annually. It is clear that 13 Indian cities are included among the twenty most polluted cities of the world where particulate matter 2.5 levels in the air is more than 60 microgram/m³.

Table 4: India's most polluted cities and their level

Sr. No.	Name of the city	Particulate matter 2.5 microgram/m ³ (60+)
1	Delhi	153
2	Patna	149
3	Gwalior	144
4	Raipur	134
5	Ahmadabad	100
6	Lucknow	96
7	Firozabad	96
8	Kanpur	93
9	Amritsar	92
10	Ludhiyana	91
11	Allahabad	88
12	Agra	88
13	Khanna	88

Source: Global Allianz of Health and Pollution, WHO

It is not the vehicles' on the road pollute (5 percent) India but the contribution of the production of power is maximum (14 percent), followed by other natural factors (11 percent), industrial pollution (7 percent), fossil fuel (7 percent) and agriculture contribute (6 percent) only in total pollution as per Nature Magazine. To control the pollution we have to increase carbon stock which is stored by plants during their survival and left out when a tree is cut down hence environmental imbalance is created. According to Forest Survey of India Report, 2013, Arunachal Pradesh has 527.45 Million m³ Uttarakhand 492.42 m m³ is second, third is Chhattisgarh with 423.42 and 384.17 is Karnataka and J&K is fifth with 377.25 mm³ Carbon Stock. Most of the rivers are polluted and their number is increasing day by day. In 2009, 121 Indian rivers were polluted which increased to 275 in 2015 by increasing the disposable waste from 38000 MLD to 62000 MLD.

Health and Climate

Nowadays we are used to for electronic goods and electronic waste is increasing but its unsafe disposal is dangerous. This waste is mostly from manufacturing sector 13 percent, domestic waste is 16 percent and 71 percent comes from government departments and industrial areas out of which only 1.5 percent is recycled, 8 percent is waste disposal in public places and remaining 90.5 percent is in unorganized sector. Most of this electronic waste is disposed by the people residing in slums who are unknown to its after effects hence 76 percent workers are ill and unhealthy.

Global Warming and Climate Change

The use of fertilizers to increase production emits carbon dioxide and coal, petrol, gases etc also jointly produce 2 billion carbon dioxide. Chlorofluorocarbon produces 14000 times more heat than the carbon dioxide. The relative concentration of green house gases is CO₂- 60 percent, CH₄- 20 percent, CFC -14 percent, N₂O- 6 percent. The concentration of CO₂ in the environment increased from 280 PPM to 368 PPM from 1956 to 2001. In the coming year the hot wave will be common in England and snow fall in Dubai hills. The effects of global warming is continued in the Himalaya as early as 1842, but it has increased after 1971 seriously. Glaciers are reducing very fast in J&K, H.P. Uttarakhand, Nepal, Tibet and China. The Gomukh glacier was receding at the 7.3 meter since 1935 and after 1971 it receded 34 meters per annum and today it has gone 19 km. back. As such, the effect of climatic change has not been mapped out. However, the World Bank Staffers estimated that environmental damage in India amounted Rs.34000 crore each year. Increase in the re-occurrence of floods, droughts, cyclones, rainfall patterns change, unprecedented heavy snowfall in USA (15, Dec, 2010) and in W. Europe (03.01.11) blocked the life too. Volcanic smoke also paralyzed life in the W. Europe, heavy rainfall in northern India in the year 2010, 2013 Uttarakhand, 2014 J&K, disturbed the system during rainy season and in 2015 heavy rainfall during March- April not only disturbed the normal life due to flood but created a problem of food security by destroying crops vegetables and fruits and their flowers too. It is also understood that above 5500 m. only snowfall occurs but due to global warming and climatic changes it rains and even as early as in November, 2014 and in early 2015 the white disaster occurred in America and so on.

Climate Change & Food Security

The contemporary world in general and India in particular, is facing a new kind of security challenge due to deteriorating stock of food grain and fast depleting water resources. 52 percent land has lost its productivity due to heavy use of fertilizers, pesticides and lack of water management practices. Land is losing Zinc, iron, magnesium, sulphate costing Rs. 520028400 crore. According to the Soil and Land use survey organization 131.15 lac hectares in U.P., 41.62 lac hectares are in Haryana, 32 lac hectares are in Punjab and 19.14 lac in H.P. land eroded and lost fertility. As much as 1736.40 lac hectares are land (52.85) is losing productivity due to salinity, water logging, deforestation and crop rotation. Water logging and soil salination has wiped out great civilization. Babylonian civilization in the present day in Iraq and once flourished Mohanjodaro civilization came to an end when the river floods brought about water logging. Uncontrolled application of water, pesticides, herbicides, weedicides and fertilizers have begun the land to go out of production and changed the food chain and habitats. Apart from this Lantana, Parthenium,

Eupatorium, water Hyacinth- are steadily populating our forests and grasslands have threatened not only livestock and crop genetic resources but flora and fauna as well.

Global Warming and Agriculture

The share of agriculture in GDP as sharply declined from 61 percent in 1950-51 to 24.2 percent in 2001-02 and 13.9 percent in 2013-14, whereas the dependence of the population has only marginally declined from 77 percent to 69 percent and 56 percent during the period. Agriculture sector provides employment to 56.7 percent of the national work force, which is the single largest private sector occupation. Agriculture accounts for 14.7 percent of total export earnings and provides raw materials to a large number of industries. Spectacular achievements have been made possible through the expansion of irrigation facilities, increase in net sown area, land reforms, use of high yielding variety seeds, fertilizers, pesticides, weedicides, farm machines, infrastructure development etc. The size of holdings has reduced from 2.28 hectare in 1970-71 to 1.57 hectare in 1990-91. So, the pressure on per unit of land has increased by 2.25 times. Per capita availability of agricultural land in the country has declined to 0.14 hectare in 2000 from 0.48 ha in 1950, which is projected to be 0.1 hectare by 2025. Therefore it is a must to evolve new approach or paradigm shift in agricultural development by raising the productivity of land and water in a manner which is sustainable over the longer term.

Global Warming and Water Resources

Regarding the water resources, oceans covers 70.8 percent area up to the depth of 3.8 km. and has 97.6 percent water of geo-sphere- 1400 million qm³. Land cover 29.2 percent area and 2.4 percent of total water – of this 78 percent is locked in glaciers, 21 percent as ground water and only 1 percent as surface water, humidity, soil moisture etc. 45 percent of the rain water is lost in sea and 20 percent percolates into ground and remaining 35 percent is lost by evaporation in India. Global warming will affect the precipitation pattern all over the globe. world's most dramatic monsoon occurs in India .due to increased temperature South Asian Monsoon will become stronger with 20.0 percent increase in rainfall in Eastern India by 2050 &10.0 percent reduction in rainfall is expected in sub Saharan African areas and yield from such areas will reduce up to 50.0 percent by 2020. In case of annual crop, the duration between sowing and harvesting will shorten, which will lead to decrease in productivity. Yield of crops like-mustered, bajara, wheat, rice corn soybean, and barley will decline by 3.0 to 5.0 percent for every one degree of temperature increase. Higher temperature, humidity, and increased rainfall will increase infection of fungal, bacterial diseases and pests on crops. Further, the adaptive capacity of dry land farmers, forest dwellers, fisher folk and nomadic shepherds is very low. The IPCC, in its report 2007, predicts that a 2.7-4.3°C temperature will increase over India by the 2080. The panel also predicated an increase in rainfall over the Indian sub-continent by 6-8 percent and that the sea level rise by 88cm by 2100.

Global Warming and Sea

Due to global warming the sea water level might rise up to 7 meters in coming centuries. If Greenland's 3000 meter thick glacial belt melts due to global warming the New York & Tokyo cities will submerge in the sea. It is estimated that the Greenland glaciers are rapidly melting, if it continuous to melt in the coming centuries the water level might rise up to 7 meters. Centre for International Climate & Environment Research, at Oslo, specialist Pal Parturd says that today the main problem is Antarctica melting snow will create a problem. Today, the only alternative is to minimize the greenhouse gases. Researchers feel that due to global warming the Siberian ice is melting and freezed greenhouse gases are coming out to increase the temperature. Due to the environmental dryness & heat the Amazon basin rain forest are decreasing. Expert Stefen Ramsforb at Postdum Institute for Climate Effect Research & expert in sea waves said any short of negligence with environment should be taken as an accident of Atomic power plant. If the cold water wave starts moving towards north Atlantic the temperature might further go down instead of increasing.

STRATEGIES FOR SUSTAINABLE DEVELOPMENT

Global Conservation and Forests

National forests are working assets especially in tropical countries. They absorb rain water and release it gradually into streams/ rivers and lakes, thereby extending water availability into the dry season when it is most needed. They also act as reservoirs, absorbing monsoon rainfall, checking the impact of torrential rainfall and thus preventing floods. World watch Institute, (paper 117, Alen Thein Dec. 1993,) that in India, forest provided water regulation and flood control valued at U.S. dollar 72 billion per year, 20 percent GDP. Every year destroyed forest lost could have provided 0.8 percent GDP per year. The right choice today is to make forest conservation our foremost national policy. When conventional and economists calculates the value of a 50 year old-

- tree- timber is 50 thousand,
- while, it contributes during its lifetime Rs. 124030 worth of oxygen,
- Rs. 2480000 in recycling value,
- Rs. 2480000 worth of air pollution reduction and
- Rs. 1240000 in erosion control,

Totaling to Rs. 6440000 along with contribution in terms of climate precipitation, pest control, and maintenance of sustainable health and preservation of all life components. After independence India has lost 89232 billion due to soil degradation. India loses more than 10 percent of its GDP on account of destruction and degradation of the countries natural resources.

Green Bonus

The third world countries and tropical regions are having more forest area which helps in controlling the climate change absorbing the carbon. But due to population growth and developmental goals these countries are having more pressure on forests hence, losing forests. To achieve developmental goals these countries must be provided green bonus by virtue of forest conservation/ preservation which help in carbon absorption. India has 690899 sq. km. forest area and conserve 60 million tons carbon each year and Uttarakhand has 24.50 thousand sq.km forest. From 1995 to 2005, 6047 million tons carbon was absorbed and hence, demand for green bonus is viable from the developed countries where forests are already existed. It is increasing at the rate of 138 million tons.

Table 5: Carbon Absorption by Indian state forests

Sr. No.	State	Absorption (m.t)
1.	Arunachal Prad.	567.205
2.	Uttarakhand	481.006
3.	Maharashtra	440.698
4.	Karnataka	416.889
5.	Chhatisgarh	404.450
6.	J&K	375.133
7.	Andhra Pradesh	370.765
8.	Odisha	358.815
9.	Himachal Pradesh	342.460
10.	Madhya Pradesh	342.767

Source: Forest Survey of India, 2015.

Community action and India on Climate Change

India's approach to the negotiations is fully anchored in the UNFCCC and the Kyoto Protocol. As a part of voluntary action to address climate change related concerns, India launched its National Action Plan on Climate Change on 30 June 2008. It outlines a national strategy that aims at enabling the country adapt to Climate Change and enhances the ecological sustainability of India's development. 'The Green India' project launched to cover six million hectare of degraded forestland through afforestation measures, is an important contribution to the objectives of National Action Plan. Meeting of National Clean Development Mechanism (CDM) Authority are periodically

held. India, being vulnerable to adverse effects of climate change, is very conscious of its global responsibilities towards climate as also the need to minimize adverse effects of climate change on its large population. Though, India's total carbon dioxide emission are about 4 percent of total global CO₂ emission, India is committed to contribute to climate protection by de-coupling the growth of its emission from the increasing economic development. India's energy intensity of production has been falling with improvement in energy efficiency, autonomous technological changes and economical use of energy. India's climate modeling studies show that its per capita emission will be around 2-2.5 tons of carbon dioxide equivalents by 2020 and around 3.3-5 tons by 2030 as compared to around 1-1.2 tons presently. Prime Minister has already stated that India will never allow its per capita emission to exceed that of developed countries.

The climate change is a real problem and that it is here today. India is highly vulnerable to the impacts of a human-induced climate change in the coming years. And in the event of such **catastrophes occurring, there is a strong belief in the Indian fraternity that we will be paying for sins committed by others. The industrialized countries are squarely, categorically, and exclusively responsible for climate change**, Prodipto Ghosh, 2005. Developing countries are not and will not be significant contributors to the problem for a long time. India is doing enough to combat this problem. In terms of per capita emission of the green house gases that may cause climate change, India is less than one quarter of the global average and is less than one-twentieth of the US per capita emission. Policies that encourages shifts in energy use from coal to natural gas, promotion of renewable energies and the adoption of more efficient technologies in the industrial sector have been put in place to curtail growth in the rate of green house gases emission. Despite its economic growth, India is facing seriously sustainability challenges including inequitable income distribution, ecological degradation and depletion of natural resources. In this rural development is the key to successfully overcoming these challenges, which can become more serious due to climate change. The partnership between different actors like local and district administration, village community, NGOs, forest and allied departments, private investors etc. will ultimately result in win-win situation for all.

1. There are some limitations for each and every human being which should not be crossed. Such as- climate change, biodiversity and nitrogen cycle limits are under threat and the four others should not be disturbed for the survival of life are phosphorus cycle, use of water resources, salinity and acidity of oceans, and land use change of the earth. We are on the tipping point and beyond that there might be serious changes which will not be reversible. We have to plan for sustainable development of the universe. To save the life over the universe the scientist (1575) of the word has appealed not to change the life saving system of the universe. Change by not wasting electricity, using efficient electrical devices and opting for public transport, thereby reducing the level of unnecessary greenhouse gases emissions.
2. proper use of natural resources by R3- reduce, reuse, recycle, don't waste energy, reduce your carbon footprints and use eco friendly products, prevent fire, save habitats and biodiversity.
3. Use second generation bio-fuel and agricultural waste: - by using new technology waste woods be changed through breaking cellulose into liquid. It might become true in near future.
4. Carbon container techniques: to store the carbon of power plants & refineries underground instead of leaving freely to the environment, so as to reduce the global warming many governments of the world planning towards.
5. Wind Energy: 30 percent of the world energy could be produced and environment may be saved from pollution and energy crisis.
6. Solar Energy: More than the world production of energy could be collected from solar energy. We have to invest in Solar Panels to collect energy to protect environment & save money.
7. Domestic Micro generator: The produced energy could be used for household use & heating water etc.

- 8 Renovation of old buildings environment friendly- proper ventilation could save energy and protect greenhouse gases emersion by 80 to 90 percent.
- 9 Separation of Carbon from burned coal- charcoal from agricultural waste burning, coal made by burnings waste could be saved for 100 years.
- 10 Tidal Energy: Tidal and wave energy could be produced at a low carbon level. The energy production system extract energy from waves is 50 meter deep water. The gravitational part is connected to sea water base and electric upper part. Neodymium-iron produced gravity, produces energy on electric coil by pressing forward & backward.
- 11 Biogas Use- Wastage Methane gas may be produced to use biogas.

Conclusion

John Mac Conela of Sanfransisco suggested in 1969, 21 March as EARTH DAY in UNESCO conference but ultimately 22 April was considered as EARTH DAY. We need to have a new paradigm of development, holistic and ecological in its approach. We need to shift from analysis to synthesis from linear to non-linear thinking, from reductionism to holism, a shift from alienation to community embeddedness. With such an approach, development, ecology and religion meet. As Gandhi remark "The whole Gamut of man's activities today constitutes an individual whole" you cannot divide social, economic and religious work in water tight compartments- the spiritual law does not work in a field of its own but express itself through ordinary activities of life. Let us listen to Gandhi- "A man who was far ahead of his times". According to Mahatma Gandhi 'Nature has enough to meet everyone's need, but no one's greed'. Hence "we must think globally and act locally". Let us make conservation a habit and follow the three green rules-Reduce, Reuse and Recycle (3 R) for saving our lovely planet, the earth. We need to understand that situation with our environment is rapidly moving from bad to worse and if immediate efforts are not made, we might come to a situation where nothing can be done in the matter. One needs to truly understand and accept his duties towards the environment and act towards it every day to make a change and save the environment.

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