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Global Warming and Its Impact on Indian Economy: An Assessment

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Abstract

This paper attempts to highlight the impact of global warming on Indian economy. The results indicate that greenhouse gases are basically responsible for global warming. It is a worldwide problem. It will affect every sector of the economy i.e. agricultural, industrial and service sector. Employment generation in these sectors will be hampering. As a result of global warming poverty, unemployment, illegal activities, migration, slum areas, diseases, flood, drought will increase. Biodiversity and economic balance will be disturbed. Government will need more fund for disaster management purpose. Thus, the paper suggests that government should take proper steps for mitigating the effects of global warming on the economy.

Introduction

Earth is unique of the universe for its atmosphere and life. Life forms a thin crust over the surface of Earth. It is made of an immense variety of organisms of which only 1.5 million species have been identified and described (Asthana & Asthana, 2006). The Earth's climate has gone through many periods of significant warming or cooling throughout its history (Reid, 2008). The global climate system is a consequence of and a link between atmosphere, oceans, the ice sheets, living organisms and the soils, sediments and rocks. The atmosphere is a mixture of different gases and aerosols collectively known as air which involves the Earth, forming an integrated environmental system with all the Earth's components (Bhargava, 2004). Human population expansion, land-use conversions and atmospheric changes have dramatically altered ecosystems and species worldwide (Karsh et al., 2008).The earth's history shows that climate is remarkably sensitive to global forcing (Hansen, 2008). The issue of environmental pollution and its protection is a matter of great concern for everyone (Bhargava & Bhatia, 2008). Human activities contributing to land degradation include unsuitable agricultural land use, poor soil and water management practices, deforestation, removal of natural vegetation, frequent use of heavy machinery, overgrazing, improper crop rotation and poor irrigation practices (Bhargave, 2004).It generates a tremendous amount of waste materials. These are discharged in various components of the environment in which they bring about undesirable changes (Asthana & Asthana, 2006).

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Global warming has emerged as one of the most important environmental issues ever to comfort humanity (Patwardha, 2008). Climate change and climate variability are uneven processes that have been occurring since the beginning of time (Flint, 2009). Climate change is a significant and lasting change in the statistical distribution of weather patterns over periods ranging from decades to millions of years (Climate change). It is already start to change existence on Earth. It poses one of the biggest challenges of international cooperation and governance (Andonova, 2009). The geologic record shows that climate sometimes changes abruptly, but this aspect of climate history has received relatively little attention in efforts to understanding the consequences of future climate change (Alley, 2008). The 21st century has been jeopardized by several 'flip-flops' (Roy, 2008). Global warming may well be the most profound moral issue ever to face the human species (Sinder, 2008). Most climate scientists accept that environmentally-damaging, anthropogenic, global warming has been a reality over the past century and that, unless societies reduce their greenhouse gas emissions, warming will become an increasing serious global concern (Clarke, 2008).

Global Warming

Since the early 20th century, Earth's mean surface temperature has increased by about 0.8°C (1.4°F), with about two-thirds of the increase occurring since 1980. Warming and related changes will vary from region to region around the globe (Global Warming, 2012). The most profound global threat facing humanity today is the prospect that economic activities will result in global warming with serious consequences for the Earth's entire ecosystem and for the way of life in rich and poor societies (Bhargave, 2004). The global climate change issue had two components: (i) depletion of ozone layer, and (ii) rise of atmospheric temperature (Dey, 2008).

Global warming is the threat related to the future of humanity on the earth and caused by the actions of current generation. The greenhouse effect caused by release of greenhouse gases can lead to harming of ozone layer that protects earth's ecosystem by controlling the flow of sun's energy on the earth. The generation of green house gases is the result of man's activities and excessive industrialization.

Table 1: Average Composition of the Atmosphere Below 25km

Component	Chemical abbreviation	Volume % (dry air)
Nitrogen	N_2	78.08
Oxygen	O_2	20.98
Argon	Ar	0.93
Carbon dioxide	CO_2	0.035
Neon	Ne	0.0018
Helium	He	0.0005
Hydrogen	H	0.00006
Krypton	Kr	0.0011
Xenon	Xe	0.00009
Methane	CH_4	0.0017
Ozone	O_3	0.00006

Source: Ministry of Environment, Government of India.

This gases mixture remains remarkable uniform in composition, and is the result of efficient biogeochemical recycling processes and turbulent mixing in the atmosphere. Carbon

dioxide (CO_2), the most important of these minor gases, is involved in a complex global cycle (Bhargava, 2004). It is also established fact that global temperatures have risen by about 100 parts per million over the past century due to human activity (Chakraborty, 2008). The concentration of carbon dioxide is 33 percent higher than it was before the industrial revolution (Kathiresan, 2008). Elevated carbon dioxide emissions from industries, factories, vehicles etc. have contributed to the greenhouse effect, causing warmer weather that lasted long after the atmospheric shroud of dust and aerosols had cleared (Knight & Fliong, 2009). Another potential scenario for rapid climate change focuses on the vast quantities of methane that are deposited below the ocean and permafrost. Methane is approximately 20 times as powerful a greenhouse gas as carbon dioxide (Chakraborty, 2008). Among climate scientists, there is no longer any serious debate about whether Greenhouse Gas emissions from human activity are altering the earth's climate (Wheeler, 2008).

Climate change affects humanity as a whole. It knows no borders and does not restrict its imprint to a particular geographic region (Rajagopalan). With the approach of 2012 and the expiration of the initial greenhouse gas targets under the Kyoto Protocol, governments are grappling with how best to advance the international climate effort in the years beyond (Bodansky & Diringer, 2009). The inability of developing countries to respond and act immediately to lessen the impacts of climate change will have serious global economic consequences (Yohe et al., 2009). The 1980s and 1990s brought proof that the global climate could indeed shift, radically and catastrophically, within a century- perhaps ever within a decade (Weart, 2008). Global warming is predicted to take place faster in the next century that at anytime for at least the last 10,000 years (Sarre, 2008).

The main objects of the paper are to analyze the possible effect of global warming on the Indian economy, and to evolutes the initiatives of government for mitigate its effects.

Economy of India

According to the World Bank, as of 2011, the Indian economy is nominally worth US$1.848 trillion. It is the tenth-largest economy by market exchange rates, and is, at US$4.457 trillion, the third-largest by purchasing power parity (PPP). India is one of the world's fastest-growing economies. The 487.6-million Indian labour force is the world's second-largest. The service sector makes up 55.6 percent of GDP, the industrial sector 26.3 percent and the agricultural sector 18.1 percent.

The effects of global warming on the Indian subcontinentare affecting all places, low-lying islands to coastal lands. Intensity of glaciers melting in Himalaya is threatening the volumetric flow rate of many of the most important rivers of India and South Asia. It will affect millions of peoples living in those parts. As a result of continuing climate change, the climate of India has become more and more volatile over the past several decades. Environmental degradation is a major reason of poverty, it affect their daily actives of life. Tribal people will be affecting more because their livelihood depends on forest. Women, being directly involved in collecting items of food from nature, are more vulnerable to the adverse impacts of degradation of natural resources. Water shortage, soil exhaustion and erosion, deforestation, air and water pollution afflict many areas. More floods, frequent droughts and forest fires, decrease in agricultural and aqua-cultural productivity, displacement of coastal dwellers by sea level rise and intense tropical cyclones, and the degradation of mangroves may be some of the likely consequences of climate change in India. The issue of climate change assumes significance because several economic activities like agriculture, forestry, tourism, energy, fisheries and transportation are in some way or the

other, dependent on weather and climate (Ranade, 2009). India is the fifth largest emitter of carbon dioxide but lacks a credible policy to address human induced climate change (Spash, 2009). Probable effects of global warming on Indian economy are as below:

Poverty and Unemployment

Human vulnerability to environmental change has an important economic dimension. The economic dimensions of vulnerability to environmental change often focus on the impact of natural disasters or other extreme events (Bhargave, 2004). India is home to a third of the world's poor, and they will be more affected from climate change. In future India will cross China over population and impact of climate change on socio, economic and ecological life will be enormous. It is a serious threat to poverty eradication. It will badly effects those people specially who are highly dependent on natural resources and have limited capacity to adopt to a changing climate (Bhargave, 2004). As a result poverty and unemployment both will increase.

Coastal Areas

The sea level has been rising at a rate of around 1.8 mm per year for the past century, mainly as a result of human-induced global warming. This rate is increasing; measuring from the period 1993-2003 indicated a mean rate of 3.1 mm/year. Global warming will continue to increase sea level over at least the coming century (Chauhan, 2011). The corresponding sea level rise at the end of the 21st Century relative to the end of the 20th Century ranges from 0.18 to 0.59 m (excluding any rapid dynamical changes in ice flows in the future). Ongoing sea level rises have already submerged several low-lying islands in the Sundarbans, displacing thousands of people. Direct land loss of low lying areas cans rapidly damage or destroy ecosystems. In addition to inundation, long-term sea level rise can cause erosion and shoreline retreat by creating a sediment budget deficit (Chauhan, 2011).

The potential socio-economic impacts of sea-level rise are (a) direct loss of economic, ecological, cultural, and subsistence values through loss of land, infrastructure, and coastal habitats; (b) increased flood risk of people, land, and infrastructure and aforementioned values; and (c) other impacts related to changes in water management, salinity, and biological activities (Bhargava, 2004). Many people in coastal areas will lose their houses and livelihoods. Economic live in coastal areas will be effected.

Flood & Drought

Flood or drought will be common phenomenon in future. Northern India will be effect more from flood for melting of glaciers in Himalaya. Floods make a massive blow on the surroundings and the social order. Floods obliterate drainage systems in cities, causing raw sewage to spill out into bodies of water. Also, in cases of severe floods, buildings can be significantly damaged and even destroyed. Many toxic materials such as paint, pesticide and gasoline can be released into the rivers, lakes, bays, and ocean, killing maritime life. It will affect the natural life. Floods may also cause millions of dollars worth of damage to a city, both evicting people from their homes and ruining businesses. Calamity such as flood and cyclone damages the communication distribution network, making the relief and rehabilitation effort extremely difficult (Ghosh, 2008).

Lake of rainfall or uncertainty in monsoon increases the possibility of drought. Less water in river or lake wills effects life of the surrounding areas. Droughts are estimated to become worst and more frequent in the light of global climate change (Isendahl & Schmidt, 2008). Drought is an extended period of months or years when a region notes a deficiency in its water supply whether surface or underground water. Reduced crop, rangeland, and forest productivity; reduced water levels; increased fire hazard; increased livestock and wildlife death rates; and damage to wildlife and fish habitat are the common effects of it. When crop productivity falls then income for farmers also will be less. It will increase prices for food, unemployment, and migration. The many effects of drought can be listed as economic, environmental, or social. Insect infestations, plant disease, and wind erosion also occur for drought. Wildlife habitat and air and water quality are usually damaged due to a lack of water and an increase in forest and range fire. During droughts many people migrate to areas outside the drought-affected location. Forage and fodder become scarce in rangelands during droughts. The decline in cereal production and the limited availability of crop residues worsen the impact of drought on the sheep population and consequently on human well-being (Bhargava, 2004).

Inflation

Shortages of food destabilize markets and precipitate price spikes will be common incident in future. Vulnerable people will be effected more because for their shortage of income and it will very hard for them to adjust with the new situation. Climate change could lead to yield variability and excessive food price volatility. High inflation will badly affect the economy.

Migration

The direct and indirect effects of climate change and their interaction with other vulnerabilities and environmental exposures may lead to mass migrations, as crucial resources may lead to mass migrations, as crucial resources become degraded and livelihoods are threatened. Loss of land mass in coastal areas due to sea level rise is likely to lead to greater permanent or semi permanent displacement of populations, which may have considerable economic and political ramifications. It may be added the risk for potential conflicts, including social unrest, political instability, and wars over decreasing water or other natural resources and possible mass migration due to land loss or degradation and extreme weather events. Such conflicts may have considerable costs both in macroeconomic terms and in human suffering (Bhargave, 2004). It will affect livelihood and demography of the area.

Illegal Activities

Global warming will affects livelihoods of common people. Poverty and unemployment will increase. Moral character of people will be decrease. For sustaining families more people will involve in human trafficking, drug trafficking, arm trafficking etc. from where they can earn more income. Crime in rural and urban areas will increase. Such types of illegal activities will have effects economy of the nation. So it can be say that overall illegal activity in society will increase.

Fresh Water

Fresh water is a natural resource of fundamental importance. Without water, life is impossible. As a solvent for organic and inorganic materials water has no parallel. The properties of water seem to be especially designed for the living organisms (Asthana &

Asthana, 2006). Lack of rainfall wills badly affects the surface and underground water. The most vulnerable areas will be those that are already water-stressed and the developing regions that lack water management systems that could act as buffers to increasing variability in water quality and quantity (Ackerman & Stanton, 2009). Himalayan glacial snowfields store about 12,000 km^3 of freshwater. The Himalayan Rivers supply an estimated 8500 km^3 of water annually. Roughly about 10 percent of this volume of water comes from the melt water contribution, which is very vital for the dry season flows (Mizra, 2009). Sustainability of water supplies in the coming decades will be affected for climate change. Various glaciers in Himalayan region will be melting fastly. Global warming is diminishing the Chhota Shigri glacier in the Pir Panjal ranges of Himachal Pradesh at 0.67 metres a year. The melting of glaciers has become a serious concern in the Himalayan region, because of the growing risk of glacial lake out-burst floods (Bhargave, 2004). North Indian rivers are basically depends on glaciers water. Therefore in near future there may be scarcity of water in the rivers and at the same time rainfall also will decrease.

Agricultural Sector

Economy of India depends on agriculture since independence. Increasing global warming has had an adverse impact on the monsoon activity over peninsular India in the last five decades resulting in decline in number of monsoon depressions and weakening of the monsoon current. The strength of low level monsoon winds through the region had decreased by about 20 per cent during the last 50 years. The production of food crops is the most climate- dependent economic activity (Burton, et al., 2009). Uncertainty in precipitation causing droughts and floods has been responsible for many famines, rural poverty and migration despite development of impressive irrigation potentials. These environmental changes, particularly temperature increase and sea level rise, could also affect fisheries directly and indirectly through changes in the availability of feed. Fodder and water availability may affect production of meat and milk. Agricultural land use due to snow melt, availability of irrigation, frequency and intensity of inter- and intra-seasonal droughts and floods, soil organic matter transformations, soil erosion, decline in arable areas, and availability of energy will be common. All these changes would have tremendous impact on agricultural production and, hence, on the food security of any region. Low-lying coastal communities will have to deal with sea level rise and the impact of climate change on marine resources. Sea level rise may lead to salinization and render agriculture areas unproductive (Bhargave, 2004).

Burden of Population

India is the seventh-largest country by area, the second-most populous country with over 1.2 billion people, and the most populous democracy in the world. Rate of population growth is also very high. Nearly 70 percent people are engage in agriculture sector and many people are in industry and service sector. In future when global warming will badly affects the three sectors than real burden of population will be realize. More people will be unemployed and social crime will be increase.

Special Category State

Ten out of 29Statesin the Indian Union are categorized as Special Category States. North-Eastern States, Jammu and Kashmir are special Category states. In north-east India eight states are identified as special category state. Their needs should first be met out of the total pool of Central assistance. Economy of these states is not good. Development basically

depends on the central government fund. Number of special category states may be increase in future as a result of global warming.

Natural Calamity Fund

Disaster can occur as a consequence of the impact of a natural or a human caused hazard. People and the environment are increasing suffering from the effects of natural disasters. There is a need for reliable and systematic data on disasters to help assess their socio-economic and environmental impacts in both short and the long term. The most expensive disasters in purely financial economic terms are floods, earthquakes and windstorms but events such as drought and famine can be more devastating in human terms (Bhargava, 2004). Storm surges are caused by storm winds that pile water onshore, and are influenced by wave setup will be more effects on coastal areas. A rise in sea level allows storm surges to reach further inland (Walmsley, 2010).

The migration of population to urban and coastal areas increases human vulnerability as population densities increase; infrastructure becomes more overloaded, living areas move closer to potentially dangerous industries, and more settlements are built in fragile areas such as floodplains or areas prone to landslides. As a result, natural catastrophes affect more people and economic losses are increased. Impacts of disasters include loss of lives and livelihoods, damage to infrastructure and communications, interruption of economic activities, and increased risk of disease outbreaks (Bhargava, 2004).Vulnerabilities of settlements in coastal regions to higher sea levels are compounded by severe wind damage and storm surge caused by tropical cyclones and extra-tropical cyclones (Bhargava, 2004). Both central and state governments will need more fund for rescue and rehabilitation of effected people.

Storms and Tropical Cyclones

Impoverished and high density populations in low-lying and environmentally degraded areas are particularly vulnerable tropical cyclones. Many of the most serious impacts of tropical cyclones in the 20th century have occurred in India because of the combination of meteorological and topographical conditions, along with the inherent vulnerability of this low-income, poverty resourced population. Tropical cyclones also can cause landslides and flooding. Most deaths are caused by drowning in the storm surge (Bhargava, 2004). This will badly affect the coastal areas. There will b more lose of physical and human capital.

Human Health

Weather and climate play a significant role in people's health. Various studies shows the correlation between fluctuations in climate conditions and the occurrence of malaria, dengue, cholera and several other infectious diseases has been reported (Bhargava, 2004). Climate change is expected to exacerbate the occurrence and intensity of future disease outbreaks and perhaps increase the spread of diseases in some areas. Water-borne diseases, such as typhoid fever, cholera, leptospirosis and hepatitis A, and Vector-borne diseases, such as malaria, dengue and dengue fever, yellow fever, and West Nile Fever may be outburst for flood. Children, elderly, poor people, and those with underlying health conditions are at increased risk for health effects from climate change.

The potential impacts of climate change on human health would increase vulnerability and reduce opportunities by interfering with education and the ability to work. A direct effect

is an increase in increase in temperature- related illnesses and deaths. Prolonged intense heat waves coupled with humidity may increase morality and morbidity rates, particularly among the urban poor and the elderly. Another direct effect will be increased death and injury from extreme weather events such as flooding, landslides and storms. Inadequate access to safe drinking water and sanitation, combined with poor hygiene practices, are major causes of ill health and life threatening diseases (Bhargave, 2004).

Farmer Suicide

India is an agrarian country with around 60 percent of its people directly or indirectly depends upon agriculture. Irrigation system is not so developed and so agriculture depends on monsoon. The failure of these monsoons leading to a series of droughts, lack of better prices, exploitation by Middlemen, all of which have led to a series of suicides committed by farmers across India. In the ten year period between 1997 and 2006 as many as 166,304 farmers committed suicide in India (Nagaraj, 2008). For uncertain weather production of food grains also will be unsure. More farmers will be suicide if alternation income will not provide.

Central Dependence of States

In India economic conditions of all states are not same. Some states are rich and other is poor. Global warming will badly affects the economy of the states. For rescue and rehabilitation purpose states will more depends on the central government. Dependents of states on central government will increase in long run.

Electricity

Demand of electricity in India is increasing continuously. As India has more rivers, there are more potentiality of hydroelectric power. India is one of the pioneering countries in establishing hydro-electric power plants. The total hydel-power potential in India is about 400 lakhs kW. About 80 percent of the developed hydel resources of India lay in the Western Ghats (Maharashtra), Tamil Nadu, Karnataka, Kerala, H.P and Punjab. Electricity plays a significant role in the economic development of a country. Industry is the largest power using sector of the Indian economy. It consumes almost half of the total power supply in the country. In agriculture, power is consume for irrigation purpose (Gupta, 2010). Hydroelectric power supply may be decrease in future for shortage of water. Increased cloudiness can reduce solar energy production. Wind energy production would be reduced if wind speeds increase above or fall below the acceptable operating range of the technology (Bhargava, 2004). It will affect industry and service sector.

Tourism

The tourism industry is more sensitive to climate change. It is a major factor for tourism. Climate, the natural environment, and personal safety are three basic factors for choosing any tourist spots and climate change affects it. It is already affecting the tourism sector. The Himalaya is one of the primary winter holiday destinations for skiing activities. Tourism is India's big industry (Viner & Agnew, 1999). In north India Jammu & Kashmir, Uttarakhand & Himachal Pradesh is more renown for tourism sector. Less snowfall and uncertain weather are already affecting the tourism sector. In South India hot weather is creating more problems to the tourist.

Indigenous Communities

Indigenous people are generally having low incomes and inhabit isolated rural environments and low-lying margins of large towns and cities. They are more exposed to social problems of economic insecurity, inadequate water supplies, and lower health standards (Bhargava, 2004). Although these societies engage in subsistence agriculture and some cash activities such as guiding tourists, much of their economy is based on subsistence hunting and gathering. Already under threat from growth in farming, mining and commercial forestry activities, under climate change the traditional forest communities would face the additional challenge of charged ecology, which could charge the availability of key species and adversely affect the sustainability of these communities (Bhargava, 2004). Unsustainable development will lead to high emissions of greenhouse gases from energy, transport and agriculture and forestry that will exacerbate climate change (Kok, et al., 2009). Livelihood of the indigenous people will be change and they may migrate in another place.

International Assistance

Government of India may require assistant from international communities in future. Natural calamities may affect more people. Cyclone or tsunami may distress the life of coastal areas. Flood and drought also will disturb life of people. Depends on the intensity, government may needs technical or financial help from other nations. In long run central government may fall in debt trap.

Forest Fire

Forests fire is the most common hazard in forests. They pose a threat to forest wealth, fauna and flora, distribution of bio-diversity and the ecology and environment of a region. It is a common feature in Garhwal Himalayas in Uttarakhand. Every year burning regularly occur during summers, with colossal loss of vegetation cover of that region. Smoke and noxious gases also impose serious health hazards. As a result of it many people are suffer from respiratory problems due to these toxic gases .It affects property and life in that region

Mangrove Ecosystems

The Sundarbans is the largest single block of tidal halophytic mangrove forest in the world. It is a UNESCO World Heritage Site covering parts of Bangladesh and India. The Sundarbans National Park is a National Park, Tiger Reserve. Mangroves are made-up of salt-adopted, intertidal evergreen trees on low energy, sedimentary tropical shorelines, extending landward in lagoons, estuary margins and tidal rivers. Mangrove ecosystems are highly vulnerable to sea-level rise induced by climate change, which will change the salinity distribution and inundate mangroves (Bhargava, 2004).

Wildlife

Climate change is only one of a long list of pressures on wildlife. Possible climatically associated sifts in animal ranges and densities have been noted on many parts and within each major taxonomic group of animals. Losses of species can lead to changes in the structure and function of affected ecosystems and loss of revenue and aesthetics. In many parts, climate change has the greatest impact on the lower income groups-those with the least ability to adopt if hunting opportunities decline (Bhargava, 2004)

Marina Fish

Climate factors affect the biotic and abiotic elements that influence the numbers and distribution of fish species. Among the abiotic factors are water temperatures, salinity, nutrients, sea level, & current conditions, all of which are likely to be affected by climate change. Biotic factors include food availability and the presence and species composition of competitors and predators. Water temperature can have a direct effect on spawning and survival of larvae and juveniles as well as on fish growth, by acting on physiological processes. Sea temperature also affects the biological production rate thus food availability in the ocean, which is a powerful regulator of fish abundance and distribution. It could have dramatic impacts on fish production, which would affect the supply of fishmeal and fish oils (Bhargava, 2004).

Biodiversity/Ecosystem

Climate has played a critical role in fluctuations of biodiversity levels (Butler, 2008). The biosphere constitutes a vital life support system for man. It exercises in a healthy and functional state is essential for the existence of human race. The onset of biological poverty or reduction in diversity of life forms is bound to have grave consequences for the entire living world (Asthana & Asthana, 2006). Climate change has a serious impact on mountain biodiversity as it causes retreat or disappearance of some of alpine species (Ranade, 2008).

India lies within the Indo-malaya ecozone and contains three biodiversity hotspots. One of 17 mega diverse countries, it hosts 8.6 percent of all mammalian, 13.7 percent of all avian, 7.9 percent of all reptilian, 6percent of all amphibian, 12.2percent of all piscine, and 6.0 percent of all flowering plant species. Habitat ranges from the tropical rainforest of the Andaman Islands, Western Ghats, and North-East India to the coniferous forest of the Himalaya. The tourism sector which is an important source of employment and economic growth for many islands will likely be affected through loss of beaches, flooding and associated damage to critical infrastructures. Mountain species have a very limited capacity to move to higher altitudes in response to warming temperatures. Climate change has serious impacts on mountain ecosystems as it causes the retreat and sometimes disappearance of alpine species that become trapped on mountain summits (Chauhan, 2011). It is likely to lead to changes in species distribution and abundance, and increase the risk of extinction and loss of biodiversity (Bhargave, 2004).Additional threats will emerge as climate continues to change, especially as climate interacts with other stressors such as habitat fragmentation (Berteaux, et al., 2008).

Economic Growth

Economic growth is the increase in the amount of the goods and services produced by an economy over time. India's economic growth is likely to rise to more than 7.5 percent in calendar year 2013 but continued government policy uncertainty could erode the country's longer-term growth prospects. Climate change will affect the growth of the nation. Natural calamity will annihilate infrastructure and human capital. It will create burden on the economy. Ultimately economic growth will be decrease.

Mitigation

Mitigation of climate change is a way for reducing the amount of future climate change. Many countries, both developing and developed, are aiming to use cleaner, less polluting,

technologies. Policies include targets for emissions reductions, increased use of renewable energy, and increased energy efficiency. Tradable permits concept also use in this direction. A country committed to a limit on its greenhouse gas emissions can meet this limit by implementing a tradable permit system that directly or indirectly limits emissions of the domestic sources covered by the commitment (Chauhan, 2011). With climate change taking place and bound to continue, a strong and immediate focus on adaptation has become a necessity (Klein, et al., 2009). Climate change mitigation poses technology as well as policy challenges (Schyns, 2009).

Much of mitigation of global warming is due to the reduction of common energy sources in favour of using renewable and sustainable energy. It has to do with the use of carbon sinks and carbon credits. Energy efficient proposals and conservation techniques also add to the mitigation of global warming. Many environmental groups encourage individual action against global warming, often aimed at the consumer. Much of this involves simply raising awareness about the issue, and offering action steps that an individual can take, from small changes in purchasing habits and daily living to more comprehensive shifts in overall lifestyle (Chauhan, 2011). The primary international agreement on combating climate change is the Kyoto Protocol, is an amendment to the United Nations Framework Convention on Climate Change (UNFCCC). Countries that have ratified this protocol have committed to reduce their emissions to reduce their emissions of carbon dioxide and five other greenhouse gases, or engage in emissions trading if they maintain or increase emissions of these gases (Chauhan, 2011). The transfer of environmentally sound technologies from developed to developing countries bas come to be seen as a major element of the global strategies to achieve sustainable development and climate change mitigation. Article 4.5 and other relevant provisions of the UNFCCC clearly define the nature and scope of the technology transfer, which includes environmentally sound and economically viable technologies and know-how conductive to mitigation and adapting to climate change (Chauhan, 2011).

Initiatives of Government

India has committed to actively engage in multilateral negotiations in the United Nations Framework Convention on Climate Change (UNFCCC), in a 'positive and forward-looking manner. In June 2008, the Prime Minister released the much awaited National Action Plan on Climate Change (NAPCC). The NAPCC outlines a strategy by which India will adapt to climate change, while maintaining a high growth rate, protecting poor and vulnerable sections of society and achieving national growth objectives. The last decade has been some divergence between the Federal and State Governments on climate policy (MacGill & Outhred, 2009).

The first codified law which a series of law for conservation of wild life and prevention of cruelty against animals dates back to 1887 when the British rulers introduced Madres Wild Elephant Preservation Act 1873 and the All India Elephant Preservation Act 1879 which were closely followed by the Birds protection Act 1887. The Wild Life Protection Act of 1972 was amended thrice (in 1983, 1986 and 1991) and a number of important acts were promulgated. These were:

1. The Water (Prevention and Controls of Pollution) Act 1974. Amended in 1988, 2003.
2. The Air (Prevention and Controls of Pollution) Act 1981, Amended in 1987.
3. Motor Vehicles Act 1938, Amended in 1988, 2007.

4. Forest Conservation Act 1980, Amended in 1988.
5. Environment Protection Act 1986
6. Public Liability Insurance Act 1991, Amended in 1992, 2008

In exercise of powers conferred by sections 6 and 25 of the Environment (Prevention) Act 1986 (29 of 1986), the Central Government has made the following rules, which cover most of the aspect of protection of environment:

1. The Environment Protection rules, 1986. Amended in 2012, 2012, 2014.
2. The Hazardous Waste (Management and Handling) Rules, 1989. Amended in 2003, 2008, 2013.
3. The manufacture storage and import of Hazardous Chemical Rules, 1989.
4. The Rules for the manufacture, use, import, export and storage of Hazardous micro-organisms/genetically engineered organisms or cells, 1989. Amended in 2010.
5. The Chemical Accidents (Emergency planning, preparedness and response) Rules, 1996. Amended in 2000.
6. The Bio-Medical Waste (Management and Handling rules) Rules, 1998. Amended in 2000, 2003, 2011.
7. The Recycled Plastics Manufacture and Usages Rules, 1999. Amended in 2003, 2009.
8. The Noise Pollution (Regulation and control) Rules, 2000. Amended in 2010.
9. The Ozone Depleting Substances (Regulation and control) Rules, 2000.Amended in 2014.
10. The Municipal Solid Wastes (Management and Handling rules) Rules, 2000. Amended in 2013.
11. The Batteries (Management and Handling rules) Rules, 2001.Amended in 2010, 2011.

The United Nations Conference on Environment and Development held at Rio de Janeiro in June 1992 in which India participated also advised the States to develop laws regarding liability and compensation for the victims of pollution and other environmental damages. It was deemed expedient to develop and codify the principles of strict civil liability in respect of all such cases where damage is caused while handling hazardous substances. In pursuance of the powers conferred by Section 22 of the National Environment Appellate Authority Act 1997, the Central Government has made the following rules,

1. The National appellate Authority (Appeal) Rules, 1997.
2. The National Environment Appellate Authority (Financial and Administrative Powers) Rules, 1998.
3. The National Environment Appellate Authority (Salary, Allowances and Conditions of Service of Members) Rules 1998.
4. The National Environment Appellate Authority (Salary, Allowances and Conditions of Service of Chairperson and Vice Chairperson) Rules 1998 (Asthana & Asthana, 2006).

Awareness about environmental degradation across different strata of society has increased significantly since the 1992 summit. However, the action taken to deal with the issues involved has not been commensurate with the magnitude of the problems. Although there is a global consensus for action, contention over appropriate measures remains serious because of disagreements about the timing and scale of future change, the severity of its impacts, the choice of appropriate policy instruments, and the size of the incentives needed to promote needed reductions in carbon emissions (Wheeler, 2009). A major treaty on climate change was negotiated at Kyoto, Japan in December 1997. With this, a global alliance to wage a war against climate change- particularly against global warming was formed (Dey, 2009).

Member of the lending community have already begun to adopt climate change policies in which the institution agrees to measure, report and reduce its own energy consumption and CO_2 emissions. A Kyoto reduction, by itself, is inadequate to achieve a stabilization of climate change by 2011 (Sathaye, et al., 2009). As the environmental, economic and security implications of global warming are better understood, there are growing calls to place emissions reduction targets within a binding legislative regime that contains both market-based measures and regulatory interventions (Stephens, 2008). With respect to climate change, long-term monitoring as been central in demonstrating that long-term environmental changes are underway and that recent rapid change in climate may be important driver (Brooker, 2008).

Concluding Observations

Global warming is an international problem. More or less economy of every country will be affect for it. The potential risks and impacts of climate change on human society have been identified at global. The direct risks and impacts of climate change will depend largely on the density of human populations and characteristics of settlements on the coastal strip. Environmental change may have impacts on health, habitat and infrastructure, economy, society and culture, increasing vulnerability. Human health is increasing determined by environmental conditions. Impoverished populations living in rural and periurban areas are at high risk from degraded environmental conditions. As the planet warms, oceans expand and the sea level rises, floods and droughts become more frequent and intense, and heat waves and hurricanes become more severe.

As a result of global warming agricultural, industrial and service sectors will be affected. Poverty and unemployment will be increase. Natural disasters like flood, drought, cyclone, high tide will badly affect the economy. Biodiversity and economic balance will be disturbed. Agriculture and industrial production will be fluctuating. Various types of diseases may emerge and people will migrate to better place for livelihoods. Economic growth of the nation will be more uncertain because it will depend on climate.

Government of India already implemented various acts for maintaining biodiversity and environment. Campaigners should provide potential solutions and tactics to offset health problems from climate change, since an optimistic approach can keep people from tuning out. Fortunately, strategies for mitigating climate change also tend to help reduce its impact. Seasonal weather forecasts and early warning methods help reduce the possibility of yield losses from climate variability and extremes. Conservation of forests provides opportunities for both mitigating and adapting to climate change while at the same time conserving biodiversity.

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