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Climatic Challenges And Environmental Pollution In India

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5.CLIMATIC CHALLENGES AND ENVIRONMENTAL POLLUTION IN INDIA

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ABSTRACT

Global climate change is a change in the long-term weather patterns that characterize the regions of the world. The term "weather" refers to the short-term (daily) changes in temperature, wind, and/or precipitation of a region. In the long run, the climatic change could affect agriculture in several ways such as quantity and quality of crops in terms of productivity, growth rates, photosynthesis and transpiration rates, moisture availability etc. Climate change is likely to directly impact food production across the globe. Increase in the mean seasonal temperature can reduce the duration of many crops and hence reduce the yield. In areas where temperatures are already close to the physiological maxima for crops, warming will impact yields more immediately. Drivers of climate change through alterations in atmospheric composition can also influence food production directly by its impact on plant physiology. The consequences of agriculture's contribution to climate change, and of climate change's negative impact on agriculture, are severe which is projected to have a great impact on food production and may threaten the food security and hence, require special agricultural measures to combat with.

Although India has a rich and long history of environmental laws dating back to the 1970s, it still ranks very low on air and water pollution levels compared to the rest of the world resulting in higher rates of infant mortality and lower life expectancy rates. Poor sanitation conditions and sewage problems compound the problem affecting the health of ordinary citizens in India. The reasons for this disconnect between enlightened environmental laws and high levels of pollution could be traced to existing environmental laws, discrepancies in the environmental guidelines for businesses to follow between the central government and at the state levels, and the existence of a large number of SMEs who neither have the resources nor the technical skills to adhere to the existing environmental laws. Using extensive secondary research, this paper suggests a series of steps to help the country achieve safe air and water pollution levels resulting in improved health conditions for its citizens. The cornerstone of the prescription for improvements in the environment is a collaborative arrangement that brings together the various government agencies, the citizens, SMEs, large domestic companies, and NGOs to participate in a collaborative arrangement to educate, streamline effective policies, develop the necessary institutional infrastructure, and provide adequate funding for improving the environment.

KEY MESSAGES

• Climate change (increases in temperature, changes in precipitation and decreases in ice and snow) is occurring globally; some of the observed changes have established records in recent years.

• Observed climate change has already led to a wide range of impacts on environmental systems and society; further climate change impacts are projected for the future.

• Climate change can increase existing vulnerabilities and deepen socio-economic imbalances across the world.

• Damage costs from natural disasters have increased; the contribution of climate change to these costs is projected to increase in the future.

• The combined impacts of projected climate change and socio-economic development can lead to high damage costs; these costs can be reduced significantly by mitigation and adaptation actions.

• On-going and planned monitoring and research at national level can improve assessments of past and projected impacts of climate change, thereby enhancing the knowledge base for adaptation.

INTRODUCTION

India is both a major greenhouse gas emitter and one of the most vulnerable countries in the world to projected climate change. The country is already experiencing changes in climate and the impacts of climate change, including water scarcity, heat waves and drought, severe storms and flooding, and associated negative consequences on health and livelihoods.

With 1.2 billion but growing population and dependence on agriculture, India probably will be severely impacted by continuing climate change. Global climate projections, given inherent uncertainties, indicate several changes in India's future climate.

Global observations of melting glaciers suggest that climate change is well under way in the region, with glaciers receding at an average

rate of 10–15 meters per year. If the rate increases, flooding is likely in river valleys fed by these glaciers, followed by diminished flows, resulting in water scarcity for drinking and irrigation.

• All models show a trend of general warming in mean annual temperature as well as decreased range of diurnal temperature and enhanced precipitation over the Indian subcontinent.

A warming of 0.5 degree C is likely over all India by the year 2030 (approximately equal to the warming over the 20th century) and a warming of 2-4degree C by the end of this century, with the maximum increase over northern India.

Increased warming is likely to lead to higher levels of tropospheric ozone pollution and other air pollution in the major cities.

• Increased precipitation including monsoonal rains is likely to come in the form of fewer rainy days but more days of extreme rainfall events, with increasing amounts of rain in each event, leading to significant flooding.

Drizzle-type precipitation that replenishes soil moisture is likely to decrease. Most global models suggest that the Indian summer monsoons will intensify. The timing may also shift, causing a drying during the late summer growing season.

Climate models also predict an earlier snowmelt, which could have a significant adverse effect on agricultural production. Growing emissions of aerosols from energy production and other sources may suppress rainfall, leading to drier conditions with more dust and smoke from the burning of drier vegetation, affecting both regional and global hydrological cycles and agricultural production.

CLIMATE CHANGE

Climate change is a change in the statistical distribution of weather patterns when that change lasts for an extended period of time (i.e., decades to millions of years). Climate change may refer to a change in average weather conditions, or in the time variation of weather within the context of longer-term average conditions. Climate change is caused by factors such as biotic processes, variations in solar radiation received by Earth, plate tectonics, and volcanic eruptions. Certain human activities have been identified as primary causes of ongoing climate change, often referred to as global warming.

Climate change has emerged, in recent times, as an important area of both international as well as domestic policy making and development planning. The recent Assessment Report of the Inter governmental Panel on Climate Change (IPCC) has shown that climate change would have significant impact on myriad economic sectors and ecosystems. Climate variability and change can slow down the pace of development either through adverse impacts on natural ecosystems or erosion of the adaptive capacity of people and society. Climate change is, therefore, not only a major global environmental problem, but an issue of great concern to a developing country like India.

ENVIRONMENT AND HEALTH

Indoor and outdoor air pollution linkages to health burden, especially among women children and elderly in rural, urban and semi-urban areas. Water pollution linkages to health burden through indiscriminate use of chemical fertilizers and pesticides leading to non point source water pollution.

IMPACT AND IMPLICATIONS OF CLIMATIC CHANGE

Climate changes noted in the IPCC Assessment reports include recession of glaciers, thawing of permafrost, lengthening of mid- to high-latitude growing seasons, pole-ward and altitudinal shifts of plant and animal ranges, decline in some plant and animal populations, early flowering of trees, and changes in insect populations and egg-laying in birds. Associations between changes in regional temperatures and the observed changes in physical and biological systems have been documented in many aquatic, terrestrial, and marine environments.

RESPONSES TO CLIMATE CHANGE

The serious consequences of climate change, including especially the consequences for India, lead naturally to the question of what should be our response. Two types of responses need to be considered. The first relates to adaptation, i.e., measures that have to be taken given the very high likelihood that climate change will occur and will have adverse effects. The second relates to mitigation, i.e., steps to be taken that might reduce the extent of climate change.

ENVIRONMENTAL ISSUES

There are many environmental issues in India. Air pollution, water pollution, garbage, and pollution of the natural environment are all challenges for India. Nature is also causing some drastic effects on India. The situation was worse between 1947 through 1995. According to data collection and environment assessment studies of World Bank experts, between 1995 through 2010, India has made one of the fastest progresses in the world, in addressing its environmental issues and improving its environmental quality.

The natural environment with its numerous living and non-living resources is man's most precious heritage. The basic goal of environmental conservation is the management

of human use of these natural resources, so that they may yield the greatest sustainable benefits to the present generation while maintaining their potential to meet the needs and aspirations of future generations. Like other nations, India too bears the scars of damage done to its natural environment resulting in a wide array of environmental problems affecting the wellbeing of its citizens. While in the developed countries, environmental problems are largely the by-products of affluence marked by resource wasteful life-styles. The stress on India's environmental resources comes mainly from the pressures for satisfying the basic human needs of a large and growing population. Environment protection is the key to ensure a healthy life for the people. Environmental problems are on the increase and are more prominent in densely populated cities. Exploding urban migration, as experienced in the last decade, is bound to widen the gap between demand and supply of infrastructural services such as energy, housing, transport, communication, water supply, sewerage and solid wastes disposal and recreation for communities. The release of high level of sulphur dioxide, carbon monoxide, oxides of nitrogen and suspended particulate matter by industries and vehicles to atmosphere is adding to air pollution.

The area around Manali near Chennai, the belt of Vaniyambadi to Ranipet in Vellore District due to tanneries, textile and dyeing industries in and around Tiruppur and Erode towns, Cuddalore SIPCOT are most prone to industrial pollution in Tamil Nadu.

ENVIRONMENTAL AWARENESS AND EDUCATION

The Environment Education in School System project initiated in 1999 strengthens environment education in the formal school curriculum through infusion of appropriate education material. Introduction of environmental concepts in Business/ Management Education is another focus area. A committee comprising representatives from management institutions, AICTE,UGC, industry experts, and MoEF is working on this. During the Eleventh Plan, the programme of Environmental Education, Training, and Extension may be continued with further linkages with the publicity and awareness mechanisms of State forest departments. This may include a manual on public participation in all activities of MoEF. Public transport like railways, buses, and even airways can be extensively used for environmental awareness through well designed awareness material. Information generated by student activities on local environmental issues may be integrated with the database under the National Environmental Monitoring Programme (NEMP). Capacity building programmes such as training of trainers, should also be focused on.

The National Museum of Natural History (NMNH), New Delhi, and three regional museums at Mysore, Bhubaneshwar, and Bhopal will be made more effective in natural history education and awareness with the introduction of the state-of-the-art education and interpretation methods. The MoEF has contemplated setting up of a new regional museum at Sawai Madhopur with focus on the life forms of the region, the details of which are being worked out.

NATIONAL ENVIRONMENTAL MONITORING PROGRAMME (NEMP)

The Steering Committee on Environment and Forests for the Eleventh Plan has suggested a unified NEMP for ecology, environmental chemistry, public health, and socio-environmental studies. This programme would track the status and change in the socially relevant biophysical parameters and their social impacts, wherever possible. NEMP may have sub-programmes on forest cover and ecosystem services, apart from air and water pollution.

The programme may have linkages with educational, scientific, and social organizations working in the relevant fields. Accordingly, the existing programme for Environment Information System (ENVIS) will be reshaped to provide information in interactive formats for effective use. Real time sharing of data on environmental parameters collected under NEMP will be implemented.

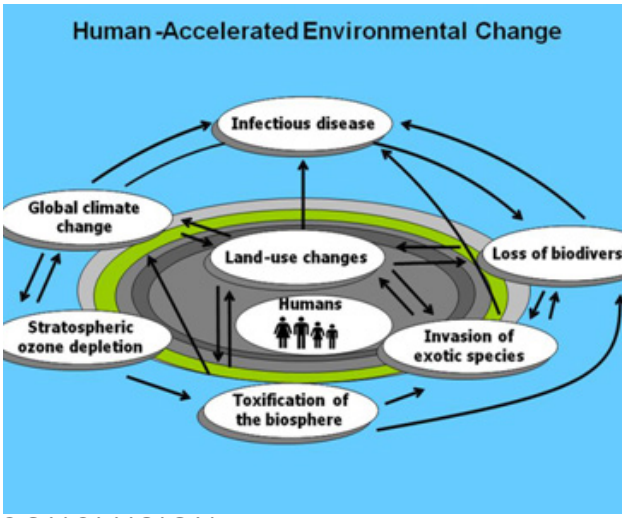
ENVIRONMENTAL RESEARCH AND DEVELOPMENT

The MoEF supports Centres of Excellence in research which needs to be strengthened.

During the Eleventh Plan period, environmental policies and programmes will need strong research backup. The identified research priorities will be met by a combination of open, competitive research grant programmes, and dedicated support to special organizations and centres of excellence. An 'Environmental Research Grants' programme should focus on the relevant areas such as clean technologies, preventive strategies, hazardous substances management, and so on. There should be special programmes on Ecosystem Health, Pollution and Health, Ecological Footprint, NTFP regeneration ecology, Invasive species, Fire Ecology, and Forest- Watershed Services.

• Documentation of traditional and community knowledge should be a special area of research.

• Special mechanisms may be set up for co-ordination and management of research amongst agencies like Indian Council of Forestry Research and Education
(ICFRE), ICAR, CSIR, DBT, DST, and UGC, as well as multilateral and bilateral donors and private foundations.



CONCLUSION

Climate change and loss of biodiversity undermines sustainable development. However, there is no dichotomy between economic progress and protecting our environment by limiting climate change and loss of biodiversity. Indeed, the cost to mitigate climate change is less than the cost of inaction if one takes the ethical position of not discounting future generations, and delaying action can significantly increase costs. Efficient resource use (e.g., energy or water) saves money for businesses and households. Valuing and creating markets for ecosystem services can provide new economic opportunities. A green economy will be a source of future employment and innovation. Governments, the private sector, voluntary and civil society at large all have key roles to play in the transition to a low-carbon economy, adaptation to climate change and a more sustainable use of ecosystems. If we are to achieve our dream, the time to act is now, given the inertia in the socioeconomic system, and that the adverse effects of climate change and loss of biodiversity cannot be reversed for centuries or are irreversible (e.g., species loss). Failure to act will impoverish current and future generations.

Climate change, the outcome of the "Global Warming" has now started showing its impacts worldwide. Climate is the primary determinant of agricultural productivity which directly impact on food production across the globe. Agriculture sector is the most sensitive sector to the climate changes because the climate of a region/country determines the nature and characteristics of vegetation and crops. Increase in the mean seasonal temperature can reduce the duration of many crops and hence reduce final yield. Food production systems are extremely sensitive to climate changes like changes in temperature and precipitation, which may lead to outbreaks of pests and diseases thereby reducing harvest ultimately affecting the food security of the country. The net impact of food security will depend on the exposure to global environmental change and the capacity to cope with and recover from global environmental change.

Coping with the impact of climate change on agriculture will require careful management of resources like soil, water and biodiversity. To cope with the impact of climate change on agriculture and food production, India will need to act at the global, regional, national and local level. The rapid economic growth experienced by India is resulting in adverse and harmful environmental conditions that are affecting the people of India as well the wider global population. In the case of India, this is further exacerbated by the high population density and growth rates. The existing environmental laws, although cover a wide spectrum of environmental concerns, they seem to be ineffective due to lack of enforcement, the lack of resources, and technical challenges faced by a large number of Indian companies, especially the SMEs. Under these conditions, India has to adopt some sustainable actions that need to address the myriad issues facing the country including environmental degradation in order to sustain its prospects for continued economic growth.

Sustainable development, that is, both a prosperous economy and a healthy environment that in many respects is the goal of diverse interest in the area of environmental issues, is the key for the future of India and the world. Sustainable development implies managing the diverse interests of a prosperous economy and simultaneously maintaining a healthy environment. Based on extensive literature search, we recommend that India undertake a new approach in the fight against environmental pollution. The key element of this new initiative is the shared and cooperative participation of the people, the government, the industrial sector, and NGO's. This type of approach seems to have worked for a few countries and it appears to be a doable solution for India too.

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