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Global and national climate change concerns in India

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Abstract
One of the most important global environmental challenges affecting food production, water supply, health, energy, etc. is climate change. Tackling climate change requires sound scientific understanding and coordinated action at national and global levels. This paper addresses these challenges. Historically, much of the responsibility for increases in greenhouse gas emissions has rested with the industrialized world, although developing countries are likely to be the source of an increasing proportion of future emissions. The climate change projected in different scenarios is likely to affect food production, water supply, coastal settlements, forest ecosystems, health, energy security, etc. The adaptive capacity of the communities most affected by climate change in developing countries is low. Efforts made through the provisions of the UNFCCC is clearly insufficient to meet the challenge of climate change. The most effective way to counteract climate change is to embark on a sustainable development path by switching to environmentally sustainable technologies and promoting energy efficiency, renewable energy, forest protection, reforestation, water conservation, etc. The most important issue for developing countries is shrinking. The vulnerability of their natural and socioeconomic systems to projected climate change. India and other developing countries will face the challenge of promoting mitigation and adaptation strategies, considering the costs of such an effort and considering their impact on economic growth.

Keywords: Adaptation, cost, India, mitigation, vulnerability

Introduction
India, the seventh largest country in the world by area, is home to over 1.21 billion people. Its geographic location in the subtropics, surrounded by the Himalayas to the north, the Indian Ocean to the south, the Arabian Sea to the west, and the Bay of Bengal to the east, allows it to experience diverse climatic conditions and varied biogeography. Because of this unique geography, the country is also exposed to many extreme climate events such as hurricanes, floods and droughts that have endangered lives, damaged infrastructure and slowed economic and social progress. These threats are expected to become even more pronounced as climate change changes, increasing the risk of extreme weather conditions, sea level rise, glacial retreat and melting ice.

India's vulnerability to climate change is driven by underlying socio-economic issues such as poverty and inequality, the resource needs of an ever-growing population, and the development priorities of an emerging economy. Although India currently ranks as the third largest economy in the world (World Bank, 2014), the benefits of economic growth over the past few decades have not been felt everywhere. Millions of Indians still live in poverty, lack adequate access to essential resources such as productive land, water and energy, and rely on climate-sensitive livelihoods such as agriculture, livestock and fisheries. This situation increases India's vulnerability to climate variability and change. India is aware of this risk and has initiated various plans and programs to adapt to climate change. Such initiatives are diverse, large-scale, both in context and content, and involve a wide range of stakeholders, from national governments to donor-supported community-based actions.

Climate change is one of the most important global environmental challenges facing humanity, impacting food production, natural ecosystems, freshwater supplies, health and more. According to the latest scientific assessments, the Earth's climate system has changed significantly since the pre-industrial era, both at a global and regional level. Additional evidence suggests that most of the observed warming (0.1 °C per decade) over the past 50 years is due to human activities.

India's climate has changed significantly in the last few decades. During the period 1971-2007, the mean temperature across the subcontinent increased by about 0.2 °C per decade, although the north-western region of the country shows an overall cooling trend. ENSO events have had significant impacts on temperature anomalies in some seasons. As for the rainfall thus, the observed changes in precipitation patterns are quite diverse in different regions of India, and there is a tendency for the number of one-day extreme rains to increase in many parts of the country (Government of India [GOI], 2012). In addition, a comprehensive statistical analysis of precipitation observations (1951-2011) shows changes in wet and dry extremes during the monsoon season. The study found a statistically significant decrease in peak-season precipitation as well as an increase in daily-scale precipitation variability. A statistically significant increase in the frequency but decreased intensity of dry attacks and an increase in the intensity of wet attacks were also noted (Singh, Tsiang, Rajaratnam & Differnbagh, 2014) [14].

The Intergovernmental Panel on Climate Change (IPCC) estimates that the average global temperature will rise between 1.4 and 5.8 °C by the year 2100. (C) may increase between This unprecedented increase is expected to have severe impacts on global water systems, ecosystems, sea levels and crops. Production and related processes. The effects will be particularly severe in tropical regions, which primarily include developing countries such as India. The problem of climate change is part of the larger challenge of sustainable development. Therefore, climate policy can be more effective when consistently embedded in broader strategies aimed at making national and regional development paths more sustainable. The impacts of climate variability and change, climate policy responses and associated socio-economic development will affect countries' ability to achieve the Sustainable Development Goals. The pursuit of these goals will in turn have an impact on the opportunities and success of climate policy. In particular, the socio-economic and technological characteristics of different development paths will strongly influence emissions, the rate and magnitude of climate change, climate change impacts, adaptation potential and mitigation potential.

The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) confirms these projected climate changes for India. An increasing trend in mean annual temperature and a significant increase in temperature extremes and frequency of heat waves is observed in India (Christensen *et al*., 2013) [2]. For example, the recent heat waves in India killed over 1,800 people, with daily temperatures exceeding 46.6 °C (Inani, 2015) [5]. In addition to such extreme temperatures, the report also forecasts more frequent and heavier rainy days in the high-emissions scenario by the mid-21st century, noting that the increase in monsoon-related extreme rains could be due in large part to the very likely it would be. India. The IPCC estimates a global mean sea level rise of 26 cm to 55 cm under a low emissions scenario and 45 cm to 82 cm under a high emissions scenario (IPCC, 2013); Both scenarios pose significant risks to India's densely populated coastal regions and the vast expanses of their economies.

The United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992 gave rise to the FCCC (Framework Convention on Climate Change), which provided the framework for eventual stabilization of greenhouse gases in the atmosphere with shared but distinct responsibilities. And identifies the associated skills and social and economic conditions.

Historically, industrialized countries have been the main contributors to CO_2 emissions. According to one estimate, developed countries account for about 83% of the increase in cumulative rted CO_2 emissions associated with fossil fuels since 1800. In the 1990s they accounted for about 53% of the 6.3 GtC/year released as CO_2 from fossils. Fuel combustion. These countries contributed little to CO_2 emissions from vegetation burning, mainly due to deforestation of tropical forests during this period. According to another estimate, developing countries were responsible for only 37% of cumulative CO_2 emissions from industrial sources and land-use change over the period 1900-1999, while developed countries accounted for 63%, but their higher population and economic development is due to the rate at which CO_2 -Emissions of fossil fuels from developing countries will soon match or even exceed those of developed countries. Large countries like China and India could match United States year 2000 greenhouse gas emissions within two to three decades. Looking at CO2 emissions from fossil fuels alone, countries as a group will soon overtake developed countries in their contribution to population and economic growth in the coming decades. Historically, much of the responsibility for increased emissions has rested with the industrialized world, although developing countries are likely to be the source of an increasing share of future increases.

Developing countries face immediate concerns related to forest and land degradation, freshwater depletion, food security, and air and water pollution. Climate change will exacerbate the effects of deforestation and other economic imperatives, leading to water scarcity, land degradation and desertification. Rising global temperatures will cause sea levels to rise. Populations living on small islands and/or low-lying coastal areas face severe social and economic disruption from sea level rise and storm surges. Is a particular threat that can destroy cities and destroy the livelihoods of large coastal areas?

The widespread retreat of glaciers and ice caps in the 21st century will also increase land surface temperatures and increase water pressure. By 2025, two-thirds of the world's population, much of it in developing countries, could be suffering from moderate to severe water stress. Estimates of the impact of climate change on crop yields are mostly negative for tropical regions, even when accounting for adaptation and direct impacts of CO_2 on plant processes. Climate change and sea level rise will alter ecological productivity and biodiversity, putting some endangered species at risk of extinction.

While the ability to forecast regional differences in impacts is still emerging, the impacts of climate change are expected to be more severe in tropical regions. This applies to all sectors that are likely to bear the brunt of climate change - sea levels, water resources, ecosystems, crop production, fisheries and human health. The populations of developing countries are more vulnerable because their infrastructure is not strong and widespread enough to withstand the damaging effects.

Mitigation and Adaptation

In the global debate on climate change, reducing the

vulnerability of their natural and socio-economic systems to projected climate change is of paramount importance for developing countries. Over time there has been a clear shift towards adaptation in discussions about global climate change. Adaptation can complement mitigation as a cost-effective strategy to reduce climate change risks. It is predicted that the impacts of climate change will vary within and between countries. Properly designed mitigation and adaptation policies can promote sustainable development and equity both within countries and between generations.

One way to balance the focus on adaptation and mitigation strategies is to compare the costs and benefits of both strategies. If climate change adaptation can be done at negligible costs, it may be more cost-effective than any alternative strategy, at least in the short term. Of course, quantifying the benefits of adaptation and the resulting harm that can be avoided is difficult. In addition, many mitigation and adaptation measures have significant additional benefits that need to be assessed. Side effects can be an important to play a role in decision-making regarding the implementation of a mitigation or adaptation strategy.

The effects of climate protection measures will only be felt by future generations in the long term. However, the effects or benefits of adaptation measures are immediate and tangible for those implementing the measures. The areas where remedial actions are implemented may differ from the areas where the impacts occur. The current generation in developed countries can invest in climate action and the next generation especially in developing countries can be the main beneficiaries. The choice between mitigation and adaptation strategies has spatial (geographical) and temporal (different generations) dimensions. An optimal mixture of mitigation and adaptation strategies can escape the climate negotiations due to spatial and temporal dimensions as well as different perceptions of industrialized and developing countries.

India is a large developing country with about 700 million rural population directly dependent for their livelihood and livelihood on climate-sensitive sectors (agriculture, forestry and fisheries) and natural resources (such as water, biodiversity, mangroves, coastal areas, grasslands on the plains of). In addition, the adaptability of dryland farmers, forest dwellers, fishermen and nomadic pastoralists is very low10. Climate change is likely to impact all natural ecosystems as well as socioeconomic systems, India's National Communications Report to the UNFCCC shows.

The latest high-resolution climate change scenarios and forecasts for India are based on the Regional Climate Modeling (RCM) system known as PRECIS, developed by the Hadley Center and implemented for India using IPCC scenarios A2 and B2. They show the following:

- An annual mean increase in surface temperature by the end of the century of 3 to 5 °C in the A2 scenario and 2.5 to 4 °C in the B2 scenario, with more warming in northern parts of India.
- A 20% increase in summer monsoon precipitation is forecast for India as a whole, and a further increase in precipitation for all states except Punjab, Rajasthan and Tamil Nadu, which saw slight decreases.
- Extreme high and low temperatures are also expected to increase, as is extreme precipitation, particularly over India. The west coast and west-central India show significant growth.

Forests

Climate impact assessments and climate projections for 2085 indicate that 77% and 68% of the forest network in India could experience a change in forest types in the A2 and B2 scenarios, respectively. The signals show a shift towards wet forest type in the north-eastern region and to dry forest type in the north-western region without human influence. Increasing atmospheric CO2 concentration and global warming could lead to a doubling of net primary productivity in the A2 scenario and an almost 70% increase in the B2 scenario.

Water Supplies

The water cycle is likely to change and drought severity as well as flood intensity are likely to increase in different parts of India. In addition, a general reduction in the amount of runoff available is projected.

Agriculture

Dynamic crop model simulations indicate a decrease in crop yield as temperatures rise in different parts of India. Although this is offset by a moderate increase in temperature and an increase in CO2 at higher temperatures, a negative effect on crop productivity is predicted due to a shorter harvest duration.

Coastal Area

Simulation models show an increase in tropical cyclone frequency in the Bay of Bengal; Particularly violent events are expected in the period after the monsoon. Sea level rise is expected to displace populations in coastal areas, increase flooding of low-lying areas, and reduce crop yields due to flooding and salinization.

Human Health

Malaria is likely to occur in many states texist and new areas could become susceptible to malaria and the length of the malaria transmission window is likely to increase in the northern and western states and decrease in the southern states.

Climate Change and Sustainable Development

There are many ways to pursue sustainable development strategies that contribute to climate protection. A few examples are presented below.

- In addition to reducing greenhouse gas emissions, the introduction of low-cost, energy-efficient technologies in power generation, transmission distribution and end-use can reduce costs and local pollution.
- The transition to renewable energy, some of which is already cost-effective, can improve sustainable energy supply and reduce local pollution and greenhouse gas emissions.
- Forest protection, reforestation, afforestation and the introduction of sustainable forest management practices can contribute to biodiversity conservation, protection of watersheds, creation of rural jobs, increased income for forest dwellers and an increased carbon sink.
- Efficient, fast and reliable public transport systems such as subways can reduce urban congestion, local pollution and greenhouse gas emissions.
- Adopting a participatory approach to forest management, rural energy, irrigation water management and rural development in general can

promote sustainable development activities and ensure a long-term reduction in greenhouse gas emissions or an improvement in the carbon sink.

- Rational energy pricing based on long-run marginal cost theory can level the playing field for renewable energy, increase the uptake of energy efficient and renewable energy technologies, and improve utility economics. Ultimately, reducing greenhouse gas emissions can lead to deficits.

Conclusion

India is a large developing country with almost two-thirds of its population directly dependent on climate-sensitive sectors such as agriculture, fisheries and forestry. Projected climate change is likely to impact food production, water supply, biodiversity and livelihoods under different scenarios. Therefore, India has a significant share in scientific progress and in an international understanding to promote climate protection and adaptation. This requires advanced scientific understanding, capacity building, networking and extensive consultation processes.

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