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A CRITICAL ANALYSIS ON PERSPECTIVES ON ADDRESSING CLIMATE CHANGE THROUGH SUSTAINABLE DEVELOPMENT

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ABSTRACT

Climate change is one of the most significant environmental concerns on a worldwide scale, having ramifications for agricultural production, water supply, health, energy, etc. Climate change mitigation necessitates a solid scientific understanding and coordinated national and international action. This paper addresses these concerns. Historically, the industrialised world has been primarily responsible for the increase in greenhouse gas emissions; however, developing countries are anticipated to be the source of an increasing amount of future emissions. The expected climate change under various scenarios is likely to affect agricultural production, water availability, coastal settlements, forest ecosystems, health, energy security, and other factors. In developing countries, the adaptive capacity of communities likely to be affected by climate change is low. The UNFCCC and the terms of the Kyoto Protocol are manifestly insufficient to address the problem of climate change. Adopting a sustainable development route by transitioning to ecologically sustainable technology and promoting energy efficiency, renewable energy, forest conservation, reforestation, water conservation, etc. is the most effective strategy to combat climate change. Reducing the susceptibility of their natural and socioeconomic systems to the anticipated climate change is the problem of greatest relevance for emerging countries. India

and other emerging nations would be faced with the problem of promoting mitigation and adaptation techniques, bearing the expense of such an endeavour and its effects on economic development.

INTRODUCTION

Climate change is among the major significant environmental concerns impacting the globe today, influencing productivity of the crops, and availability of water, human healthcare, and energy production, among many other things. Meanwhile, the issue of global climate change presents mankind with an unparalleled dilemma. Climate change necessitates in-depth knowledge and understanding and a synchronized national and international response. The adaptation ability of populations that is expected to be affected by the climate change is low in developing countries. Climate change would worsen deforestation and other economic pressures, leading in greater water shortages, soil erosion, and desertification. Rising sea levels will be caused by climate changes. Small Island and/or low-lying coastal populations are particularly vulnerable to significant socio-economic disruptions caused by sea-level rise and storm surges, which have the potential to destroy towns and disrupt huge coastal livelihoods.

Sustainable development difficulties like increasing level of poverty, starvation, stagnation of economy, malnutrition, and illness, and modern ones like environmental

destruction as well as globalization, are prompting international leaders to seek innovative solutions. The notion of sustainable development, or 'development which lasts', is one fundamental method that is gaining traction. Switching to environmentally friendly technology and promoting energy conservation, promoting the use of renewable energy, conserving natural resources, promoting reforestation, as well as conservation of water, among other things, seems to be the most effective method for tackling climate change. Since the Earth Summit of 1992 which was held in Rio de Janeiro and the acceptance of the Agenda 21 of the UN and the other Conventions that resulted from the UNCED-1992, sustainable development has been an aspect of all climate change strategies' discussions taking place globally. Climate change vulnerabilities, effects, as well as adaptation are the primary parts of the challenge of the climate change that resonate from a development standpoint. **[Jayant Sathaye, P. R. Shukla and N. H. Ravindranath. (2006)]**

Sustainable development can be defined as "a process for enhancing the variety of possibilities that will enable individuals and communities to realize their goals and full potential over time while maintaining the resilience of economic, social, and environmental systems." To put it another way, sustainable development necessitates (i) possibilities to improve economic, social, and ecological systems, as well as (ii) increased adaptability. The Brundtland Commission's globally recognized and widely referred definition is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Sustainable development does not prohibit the use of limited natural resources, but it does require that any such usage be well balanced. Economic growth, social equity and environmental sustainability are three key

components in achieving sustainable development. **[Mohan Munasinghe (2003)]**

The Kyoto Protocol was established by the United Nations Conference of Parties in 1997 which was held at Kyoto as the first step toward tackling climate change. Although these worldwide concerns necessarily entail solutions to global level as well as worldwide environmental governance, yet regional and local action remains an important component of several problem responses; recognition of such interconnections and the need to "think globally-act locally" is one of the defining characteristics of environmental politics. **[John Baylis (2014)]**

India is a large developing nation with an estimated 700 million people living in rural areas who are dependent on climate-sensitive sectors such as agriculture, forests, and fisheries and natural resources such as water, biodiversity, mangrove, coastal regions, and grasslands for survival and living. Moreover, dry-land farmers, forest inhabitants, fisherman, and nomadic shepherds have limited adaptability. Climate change is expected to have an impact across all natural ecosystems and socio-economic systems, according to India's National Communication Report to the UNFCCC. As a consequence, India should be interested in technological advancement as well as global collaboration to improve mitigation and adaptation.

RESEARCH METHODOLOGY

In this paper, the author has used some primary and secondary sources of data as per the nature and requirement of the topic. Qualitative research has been done as the research aims and objectives are exploratory in nature. Information has been gathered from various journals, research papers, articles and reports, etc to substantiate the research.

APA citation style has been used to cite the articles, books etc.

RESEARCH OBJECTIVE

Climate change is among the major significant environmental concerns impacting the globe today, influencing productivity of the crops, and availability of water, human healthcare, and energy production, among many other things. However, there are a number of obstacles that we encountered while implementing any strict approach to tackle climate change. Therefore,

- To draw the nexus between climate change and sustainable development.
- To study the approaches to tackle climate change.

RESEARCH QUESTION

Why India should be concerned about climate change as well as what are the possible impacts of climate change in India?

REVIEW OF LITERATURE

[Sathaye, Shukla, and Ravindranath (2006)] discuss the worldwide environmental issues that climate change has brought forth. According to them, fighting climate change necessitates extensive knowledge and understanding and also synchronized national and international action. Under different scenarios, climate change is likely to have an influence on agricultural production, coastal regions, natural vegetation, water system, health, as well as energy supplies. The adaptation capacity of the communities that is expected to be affected by climate change is poor in developing countries. Adopting a sustainable path of development is often recognised as one of the most effective technique for combating climate change. India, like other developing countries, will face the dilemma of boosting mitigation and adaptation strategies while also bearing the costs of such measures and their economic consequences. In

[Mohan Munasinghe (2003)] the researcher finds that India has a major stake in technological advancement as well as international understanding in order to improve mitigation and adaptation. This necessitates more scientific understanding, capacity growth,

networking, and comprehensive consultation systems.

[Liberatore (2010)] examines the connection between international relations and sustainable development. International cooperation and sustainable development are said to be inextricably linked. The language and concepts of sustainable development affected the formation of key international conventions as well as the redefining of international relations and security agendas. When coping with global environmental concerns, international collaboration is a crucial component of achieving sustainability. The growing number of international environmental accords is used to demonstrate the link between international relations and sustainable development. It is mentioned that globalization processes, such as trade flows, "local" responses to such processes, and the concept of economic and ecological interdependence are all explored in light of existing and future forms of international cooperation and sustainable development policies. In the concluding section, a forward-looking view on the role of global coordination in achieving sustainable development is proposed.

[Mensah (2019)] expands the discussion of sustainable development by exploring into the framework and its significance for human cognition and behaviour in pursuit of it. The researcher did this by doing a thorough literature review that incorporated components of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines as well as the Recursive Content Abstraction analytical approach. It is asserted that sustainable development has become a prominent term in today's development discourse. Despite its broad use and acceptance, many people are still confused about the concept's definition and background, as well as what it entails and implies for development theory and practice. In **[John Baylis (2014)]** it has been discovered

that the entire concept of sustainable development revolves upon inter-generational and intra-generational equality, which is essentially built on three distinct yet interconnected pillars, namely the environment, economy, and society.

FACTS

1. The Intergovernmental Panel on Climate Change (IPCC) predicts that by 2100, the world's average temperature would rise by 1.4 to 5.8 degrees Celsius. The impact will be more devastating in tropical areas, which are mostly dominated by developing nations like India.

[Daniel L Albritton, R T Watson, and David Jon Dokken (2001)]

2. The Kyoto Protocol of 1997 mandates industrialized nations (referred to as Annex B countries in the Protocol) to lower their greenhouse gas emissions by a weighted average of 5.2 percent compared to 1990 levels. By the completion of the five-year term, 2008 to 2012, the reductions are to be achieved. The Kyoto Protocol does not impose any restrictions on developing nations' greenhouse gas emissions. **[Jayant Sathaye, P. R. Shukla and N. H. Ravindranath (2006)]**

3. The Kyoto reductions alone are insufficient to achieve climate change stability by 2100. In order to start to balance long-term greenhouse gas emissions, a continuous and bigger drop, similar to that specified in the Kyoto Protocol for the period 2008–2012, will be required in the future.

4. However, IPCC analyses show that developed nations alone will not be able to attain this decrease. Even if their emissions were to be reduced to zero in the near future, existing trends of rising emissions from developing nations alone might push atmospheric concentrations over the 550 ppm stability threshold. For a successful global effort to halt the expansion of greenhouse gas emissions, all countries, including the developing nations such as India, must participate.

[Mohan Munasinghe (2003)]

5. Concerns about worldwide climate change are fueled by rising CO₂ concentrations in the atmosphere. The burning of fossil fuels and other human actions are the principal causes of rising level of CO₂ and other greenhouse gas concentrations. Between 1990 and 1999, the combustion of fossil fuels emitted an estimated 6.3 GtC per year, while forest vegetation burning released another 1.6 GtC per year. The absorption of 2.3 GtC/year each by increasing vegetations and the seas compensated for this. This left a 3.3 GtC/year carbon balance in the atmosphere.

6. In 2000, from the six main GHGs, CO₂ accounted for 63 percent of carbon equivalent emissions, followed by methane (24%), nitrous oxide (10%), and other gases (3%). As a result, in addition to CO₂, global mitigation efforts must concentrate on the two greatest and fastest-growing GHGs. **[Daniel L Albritton, R T Watson, and David Jon Dokken (2001)]**

7. Industrialized nations are believed to be accountable for around 83 percent of the increase in cumulative fossil fuel-related CO₂ emissions since 1800, according to one estimate. They accounted for around 53 percent of the 6.3 GtC/year emitted as CO₂ from fossil fuel burning in the 1990s. According to another estimate, developing nations attributed for only 37% of cumulative CO₂ emissions from industrial channels and land-use change from 1900 to 1999, while industrialized nations accounted for 63%. However, due to their higher population and economic growth rates, developing countries' fossil fuel CO₂ emissions are expected to soon catch up with or surpass those of industrialized nations.

8. High-resolution climate change scenarios and forecasts for India, based on the Hadley Center's Regional Climate Modelling System, PRECIS, and applied to India using IPCC scenarios A2 and B2, show an average yearly surface temperature increase by the end of the century ranging from 3 to 5°C under A2 and 2.5 to 4°C under B2, with temperature rise more

emphasised in the northern parts of India.

9. All states expect a 20% increase in summer monsoon rainfall, with the exception of Punjab, Rajasthan, and Tamil Nadu, which are expected to see a minor drop.

Land degradation affects around 1900 million hectares of land worldwide, including 500 million hectares each in Africa and Asia-Pacific and 300 million hectares in Latin America. Warming and water stress caused by climate change might worsen land degradation and lead to desertification. [**Mohan Munasinghe (2003)**]

ANALYSIS

Climate change is a subset of the broader issue of sustainable development. As a consequence, climate strategies can become more effective when they are embedded inside bigger plans aimed at creating national and regional development trajectories more sustainable. Climate variability and change, climate policy solutions, and concurrent social and economic growth will have an influence on nations' ability to meet sustainable development targets.

Each path of socioeconomic expansion (driven by population, economy, technology, and government) produces a different amount of greenhouse gas emissions. These emissions accumulate in the environment, increasing concentration of greenhouse gases and interfering with the dynamic balance among solar radiation incident and energy re-radiated by the earth. As a result of these changes, the greenhouse effect grows greater, increasing the radiative forcing of the climate system. The consequent climate changes will have a long-term impact on both human and environmental systems. Such repercussions will eventually have an impact on socioeconomic growth routes, completing the cycle. [**John Baylis (2014)**]

Climate change and sustainable development are linked in a dynamic cycle with significant time lags. For example, both effects and

emissions seem intricately bound to underlying socio-economic and technological development pathways. Adaptation minimizes the influence of climatic stresses on humans and natural systems, whereas mitigation reduces the quantity of greenhouse gas emissions that may be emitted. Development paths have a tremendous influence on the ability to adapt to and mitigate climate change in any place. Adaptation and mitigation strategies are thus inextricably tied to changes in the climate system and the prospects for ecological adaptation, food production, and sustainable economic growth. As a result, the effects of climate change are part of a wider concern on how complex social, economic, and environmental subsystems interact and affect prospects for sustainable development. Extreme socio-economic disparity within communities and across nations may jeopardize social cohesiveness, which is necessary for long-term sustainability and successful policy responses. Furthermore, environmental, social, and economic factors, as well as institutional capability, are all linked to critical impact thresholds and susceptibility to climate change consequences.

India is a vast developing nation with such a diverse range of climatic zones. Agriculture, forestry, and fishing are climate-sensitive economic sectors that sustain a huge population. Due to a lack of understanding of many essential processes in the climate system, the prevalence of numerous climatic and non-climatic pressures, regional-scale fluctuations, and non-linearity, climate change vulnerability and influence studies in India assume a high degree of ambiguity in the assessment. The costs of failing to address climate change or adapting to it are unclear, but the implications for human well-being are enormous. Early adaptation activities are so prudent and consistent from the standpoint of the "precautionary principle."

The hydrological cycle would most certainly be disturbed, escalating the severity of droughts and floods in various areas of India. In different

parts of India, simulations using dynamic crop models indicate a reduction in crop yield as temperature rises. However, with moderate temperature increases, this is mitigated by an increase in CO₂, and at higher temperatures, agricultural yield is expected to suffer owing to shorter crop durations. In the absence of human intervention, there appears to be a trend towards wetter forest types in the northeastern region and drier forest types in the northwest region. In the A2 scenario, raising atmospheric CO₂ concentrations and climate warming might result in a doubling of net primary productivity and a nearly 70% rise in the B2 scenario. As a result, India has a vested interest in scientific advancement and international cooperation to promote mitigation and adaptation. [Jayant Sathaye, P. R. Shukla and N. H. Ravindranath (2006)]

CONCLUSION

Climate changes are among the most serious worldwide environmental concerns confronting humanity, influence food productivity, natural habitats, water supplies, and public health, among other things. According to the scientific study, the Earth's climate system has changed with both regional and global scales from the pre-industrial age. Climate change and rising sea level will have an impact on ecological production and biodiversity, threatening the extinction of some sensitive species. This holds true for all domains that might be impacted by climate change. People in developing nations are more vulnerable because their architecture is insufficiently solid and comprehensive.

Climate-friendly initiatives should be emphasized in developing countries as part of the Millennium Development Goals' sustainable development objectives, or as component of the National development goals and targets. India is a major developing country where nearly two-thirds of the population is dependent solely on climate-sensitive

industries including agriculture, fisheries, and forests. Climate change is projected to have an influence on food production, water availability, biodiversity, and livelihoods in a variety of situations. As a consequence, India should be interested in technological advancement as well as global collaboration to improve mitigation and adaptation. Improved scientific knowledge, capacity building, networking and extensive consultation mechanisms are all required for this.

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