

Chapter 1

Recent Trends, Issues, and Challenges in Water Resource Development and Global Climate Change

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ABSTRACT

Climate change impacts are being felt in many parts of the world and have become an issue of major concern. Tropical countries particularly those in the Asian region are at greater risk and vulnerable to the impacts of climate change as indicated by the report of IPCC. With regard to India there are several impacts forecast which could have adverse consequences on the natural resources and ecosystems of the country making them vulnerable and reducing their capacity to cope with a changing climatic regime.

This introductory chapter of the book provides an insight to the recent trends, issues and challenges in water resource development in context to the global climate change.

INTRODUCTION

The impacts of Climate Change are currently being felt across many parts of the world never before. It is pertinent to note that tropical nations particularly those in the Asian region are at risk and vulnerable to the impacts of climate change both in terms of loss of life, productivity, economic growth and changes in the natural ecosystem. A recent report by the Intergovernmental Panel on Climate Change (IPCC) has indicated that some of the worst impacts of climate change are likely to be faced by tropical nations. With regard to India there are several impacts forecast which could have adverse consequences on the

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natural resources and ecosystems of the country making them vulnerable and reducing their capacity to cope with a changing climatic regime.

In recent times, the rapid expansionist approach of humans coupled with the strong developmental economy in many urban centers has had a deleterious effect on the natural resource base of the Indo Gangetic Plain affecting biodiversity and livelihoods. The change in climate variability has further exacerbated the changes in the region increasing the vulnerability of the local people. The rapid retreat of mountain glacier systems which are considered the lifeline of river basins and ecosystems needs to be checked in order to provide adequate sustenance for a large majority of people living in the fertile tracts of the region. According to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change average global temperatures may rise by 1.1-6.4°C by the next century. Such changes in annual surface temperatures can have serious consequences on the stability of the glacial systems.

It is a well-known fact that Climate Change and freshwater issues are closely linked through ecological systems. In 2005, WWF brought out a report highlighting the impacts of Climate Change on glaciers and subsequent implications for river basins in the Indian subcontinent. Regionally, the repercussions can be quite devastating affecting the economy of countries like subcontinent nations like India, China, Nepal, Pakistan, and Bangladesh. For a region where more than a billion inhabitants depend on agricultural and water as a primary source of livelihood the implications are profound.

The Millions at Risk report by Martin Parry, co-chair of the IPCC's working group two outlines this clearly and these issues are further highlighted in the "Millennium Ecosystems Report" launched in March 2005.

The South Asian region is considered to be one of the area's most prone to degradation of natural resources due to intense human activities. The predominance of agriculture as major source of livelihood activity across much of South Asia is a key factor in assessing economic growth across the region. Given regional climate scenarios, it is perceived that future food and water security can be seriously undermined in the entire region.

GLACIERS AND CLIMATE CHANGE: PERSPECTIVES FROM THE HIMALAYAS

One of the most important and visible indicators of global climate change is the recession of glaciers in many parts of the world. About three-quarters of the Earth's fresh water is held in ice sheets and mountain glaciers. Glaciers serve as a natural regulator of regional water supplies. The Himalaya mountain range is covered by 33,000 km² area of glaciers which provides 8.6×10^6 m³ of freshwater to rivers draining from the mountains annually (Dyurgerov and Meier, 1997).

The Himalayan range of mountains stretching across an arc from Afghanistan in the West to Myanmar in the East is no exception. The youngest chain of mountain ranges is also home to some of the world's loftiest mountain peaks which have for centuries been the cynosure of the adventurer and mountain lover. The Himalayan ecosystems are perhaps one of the most fragile ecosystems in the world with a wide and diverse range of habitats and floral and faunal values. According to projections by glaciologists and climatologists who have been studying the glacial systems of the Himalayas, the freshwater shortages projected for the future is likely to have long term implications for regional food security. Apart from this there are also potential implications for hydropower generation given the large capital investments being made in the sector.

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