Chapter 9
Information and Communication Technologies (ICT) in Building Knowledge Processes in Vulnerable Ecosystems:
A Case for Sustainability

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ABSTRACT

Changes in precipitation, temperature, glacial melt patterns and sea level rise are being seen as increasingly affecting the world's ecosystems and natural resource base. Recognizing the value of information available from the broader community and also the changing framework of traditional knowledge and local perceptions, an integrated approach to building knowledge based scientific information is proposed through the use of effective ICT based tools and strategic information databases and networks.

Technological advances have a major role to play in developing a sound, efficient, and sustainable pathway for a region or country in the face of increased economic growth. The increasing conflicts arising between economic growth and natural processes or green ecosystems can only be bridged if sustainable and innovative technologies are adopted for sharing information and diffusion across different sectors of society.

The present chapter explores the use of some of the current state of the art technologies like ICTs including tools like Remote Sensing and GIS as a means for providing sound and efficient decision making across various sectors.

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INTRODUCTION

Since the last industrial revolution, emissions resulting from anthropogenic activities have led to a substantial increase in the atmospheric concentration of greenhouse gases. The resultant warming of the earth's atmosphere, has consequently led to a rise of about 0.8 ° C in the average global surface temperature.

As a result of these changes,widespread ecological and socio economic impacts of climate change is likely to threaten the future growth and economic activities of several countries in the Asia Pacific region. Some indicators and triggers of global warming include increased extreme weather events (including more flooding, drought, frequent heatwaves,cyclones, depressions), increased agricultural losses, sea ice melt, retreating glaciers, sea level rise, coral bleaching, and decline in biodiversity. Communities in both developed and developing countries are already suffering from these impacts, and tropical countries are likely to be more vulnerable than developed countries.

Scenarios compiled by the Intergovernmental Panel on Climate Change (IPCC 2007b) suggest than unless humans dramatically reduce greenhouse gas emissions, we will see a doubling of pre-industrial carbon dioxide concentrations resulting in an increase of the earth's temperature from between 1.1 to 6.4°C (depending on estimates for low and high scenarios), with recent modeling suggesting upwards of 11 °C by the end of the century (Stainforth et al, 2005).

The last decade has been observed as the warmest with India and South - East Asia experiencing frequent extreme climatic events. While recent climate models predict an increase in rainfall patterns regional change may be different (Rupa Kumar et al, 2006).

The Indian subcontinent harbours some of the most ecologically diverse and fragile ecosystems where the local environments are under threat from a variety of factors. Recognising the fact that climate change is now an added stress factor to the survival of several million people across some of India's diverse landscapes, several initiatives have been taken up at various levels of governance ranging from local to global. The United Nations Framework Convention on Climate Change (UNFCCC) through its Conference of Parties (COP) focuses on Impacts and Adaptation, mitigation and policy interventions to address the threat of climate change. The science and technology panel of the United Nations Convention to Combat Desertification (UNCCD) advocates use of a communication based system through an interface of top down and bottom up approach to tackle preparedness against extreme events like drought.

BACKGROUND

India is an agriculture based developing economy, surrounded by a long coast line and a mountainous Himalayan range in the north. Given this, the country is vulnerable to any major changes in the overall climate. There is an urgent need for developing strategic interventions to address the adaptation needs of local communities and ecosystems based on impact studies and the use of appropriate technology and communication based solutions and strategies. Regional climate variability and the various uncertainties involved in projecting future climate scenarios make local adaptation attributes a very complex issue and often region specific.

Civil society interventions often have strong linkages to field and grass roost based sustainable development projects with a particular focus on some of the vulnerable ecosystems of the Indian sub continent like the Himalayas, Sundarbans and the coastal regions and agriculture.

Himalaya

The vast number and range of glaciers and perennial river systems originating from the Himalaya