

## PITAMBER SHARMA

is a former **Vice-Chair** of the National Planning Commission for the Government of the Federal Democratic Republic of Nepal (2008). Author of numerous books and papers, his most recent published works include the books ***Towards a Federal Nepal - An Assessment of Proposed Models*** (with N. Khanal and S. Tharu, 2009), and ***Unravelling the Mosaic - Spatial Aspects of Ethnicity in Nepal*** (2008). Between July 1989 and December 2000, he served as the **Regional Planner** for the Mountain Enterprises and Infrastructure Division at the International Centre for Integrated Mountain Development (ICIMOD), Nepal. From June 1982 to December 1984, he was the **Chief Advisor** for the National Commission on Population. In 1972, he joined the Central Department of Geography at Tribhuvan University as a Lecturer, became a Professor in 1993, and resigned in 1998.

Sharma is a **Life Member** of the Nepal Geographical Society and the former **Chief Editor** (1990- 2000) of its journal ***The Himalayan Review***. He is a **Board Member** of the *Resources Himalaya Foundation*, a non-profit organization engaged in research and training on aspects of environment and development.





# Climate Change Implications, Planning, and Federalism in Nepal

PITAMBER SHARMA

The political debate on the restructuring of the state in Nepal has to-date revolved around the issue of ethnic and linguistic “homelands”. The problem of ethnic federalism notwithstanding, climate change will alter the environmental, and therefore economic, relationships of these homelands, and make highland-lowland inter-dependence a much more critical element in future development discourse of federal units than has been the case in the past.

The fourth assessment report of the Inter-governmental Panel on Climate Change (IPCC) published in 2007 came out with a number of key conclusions. The major conclusions were that the warming of the earth’s climate system was unequivocal, caused most likely by anthropogenic green house gas concentrations. During the 21<sup>st</sup> century world average temperatures could rise by 1.1 to 6.4 degrees centigrade, sea level rise would be between 18 to 59 cm depending on the extent to which environmentally focused policies and programs are put in place. Further, the past and future anthropogenic gas emissions will continue to contribute to global warming and sea level rise for more than a millennia due to the timescales associated with climate processes and feed-back.

A cursory survey of available climate change literature indicates that rise in global average temperature and increased frequency and variability of extreme events (or extremes in the hydrological cycle) are the two key processes associated with climate change. Winters will get warmer, summers less hot. Vulnerability to natural disasters (droughts, floods, dangers of erosion, landslide and flash floods) will increase. From all accounts the effects of climate change are likely to be more dramatic in the Himalayas. The Himalayan ecosystem comprises of a complex, fragile and unique geomorphology that is highly sensitive to rising temperatures and changing precipitation patterns. Snow cover will be reduced and glaciers will melt and recede as zonal vegetation belt shift upwards due to warming. Rising temperatures will mean increased photosynthesis, resulting increases in biomass production and productivity, changes in biological phenomena and soil-carbon stock. Mountains are a storehouse of biodiversity. Bio-diversity hotspots with endemic genetic resources and species habitat will be threatened by climate change. Warming would mean that there will be less snow and more precipitation in the form of rain. In the Himalayas the impact would not be limited to mountainous countries like Nepal, but would affect 1.5 billion people residing in the 9 major river basins that depend on the Himalayan “water towers” for sources of fresh water. The Himalayan ecosystem is a critical determinant of the climate of the Indian sub-continent as a whole.

There has been very little research on the impacts and implications of climate change in Nepal. On the basis of available literature we can only infer about the broad directions of the impacts. By all accounts high mountains are warming faster than the low hills and the plains. With the rise in the rate of mean annual temperatures the local natural resource base and the environment in higher altitudes will be severely impacted. This impact would not be limited to snow and glacial melt but would encompass the vegetation and forest regime as a whole.

Climate change modifies rainfall, evaporation, run-off and the processes associated with soil erosion and moisture storage. Rising temperatures, increased evaporation and transpiration will induce moisture stress. The demand for irrigation will increase. Water will be a highly contested resource: the competition for water use will intensify particularly between agriculture, urban and industrial uses. Water table in the plains would rapidly fall as more and more water is pumped up. In the plains intensified evaporation will also accelerate the hazards of salinization. The variability of climate with spells of high temperature, droughts, storms and floods can impinge upon crop production. Climate change would therefore affect the entire agricultural system from crop suitability and yields, to food security and the viability of livelihoods based on the natural resources base. New patterns of crop diseases will emerge at higher altitudes. Poor nutrition and declining food security would make a larger proportion of the population increasingly vulnerable to disease.





Warming of the mountains would also provide scope for the extension of crop-producing areas in higher altitudes with poor soil. In high altitudes the competition between arable agriculture land and forest will intensify. However, not all of the changes will be negative. Certain climatic types in certain places will be lost, but certain novel climates will be created in other places. Mountain rangelands will benefit while mountain shrubs and meadows will be threatened. Livelihoods such as nomadic herding will change. The highlands will experience changes in agricultural practices. The shift in comparative advantage of agriculture production could result in changes in trade patterns between the highlands and the lowlands. There has always been a critical interdependence between upstream and downstream livelihoods. New challenges will emerge in maintaining this interdependence. Agriculture development strategies and priorities will be affected by climate change. More and more investment would be required for agricultural research and infrastructure.

The meaning and nature of resources will change. Accelerated melting of glaciers and snow from the high mountain peaks would mean that the mountains will no longer remain the water towers for the lowlands. This will also induce changes in the strategy for water usage for energy. Run-off the river hydro-power projects may lose their appeal as costly high dam, multi-purpose projects become "attractive." Drinking water will increasingly become a priority. As the middle hills become hotter and the cold deserts of the trans-Himalaya become warmer, mountain eco-tourism will be threatened.

Extremes in the hydrological cycle leading to increased landslides, sediment transport, accelerated soil erosion and torrential rains will impact major infrastructures like roads, irrigation systems and hydel projects. The planning considerations for such infrastructures in the mountains will need comprehensive rethink. Population growth, improvements in accessibility, intensification of agriculture and changes in the nature of economic activities and occupational structure are the drivers of rising urbanization in Nepal. Climate change is likely to accelerate this process as urban areas become the refuge for people seeking alternative opportunities. Increased pollution and green house gas (GHG) emission, scarcity of water, and pressure on sanitation services will demand new and environment friendly ways of planning for transportation and sustainable human settlements.

In the Nepal context, although less recognized by political decision-makers, the ecosystem services between the highlands and the lowlands has always been of critical significance. These ecosystem services include the functions that the highlands perform for maintaining the stability of the ecology and the human systems in the lowlands. These services include climate regulation, storehouse for fresh water, slope stability, carbon storage and carbon sequestration, genetic diversity,

and not the least food security. Climate change makes the maintenance of these functions more critical for the economic systems in the highlands as well as the lowlands. The economic value of these environmental services, and by implication the true costs of environmental degradation as a result of climate change, is now increasingly being realized by policy makers and researchers. Already economic valuations are being developed with reference to a number of key services such as biodiversity conservation, controlling deforestation, carbon storage and sequestration, watershed management for reliable water flow and soil productivity, maintenance of landscape and ecotourism, and agricultural services in terms of soil maintenance and nutrient recycling. In some countries such as China some form of payment for environmental services in the form of grain subsidies by lowland areas for tree cover in the highlands (or *grain for green*) is already established. Such mechanisms would be of increasing relevance and significance for countries like Nepal.

The twin challenge of climate change is to take mitigation measures to prevent, reduce and slow green house gas emissions, and at the same time make focused response to the effects of climate change and reduce vulnerabilities. Reducing vulnerabilities call for greater conservation efforts and protection of fragile ecosystems, biodiversity and water resources. It means strengthening ecosystem services, creating the institutional infrastructures and capabilities of preventing and mitigating natural hazards and disaster risks. Climate change is about responding to losses in opportunities and at the same time recognizing and taking advantage of new prospects and opportunities. For countries like Nepal, the challenge is like learning to walk even as the need to run increases. Climate change is not a problem to be solved, it is a continuous pursuit of learning to adapt. In doing so, every plan and programme in every sector has to be appreciated afresh through the filters of climate change. Climate change calls for a more disciplined, professional and robust national planning exercise than has been conceived hitherto.

For countries like Nepal, REDD (reduced emissions from deforestation and forest degradation) is the central and the most attractive component of the global climate protection regime. The funding through REDD is tied to the country's capacity to implement reforestation and afforestation programmes and to monitor and measure the maintenance of sustainable forests. The implementation of REDD requires the build-up of technical capabilities, but it is more than a technical issue. It requires government structures and institutions that address the needs of forest users and local communities and address the issues of equity and justice with respect to carbon benefits. It also requires that the overall development path of the country follow a trajectory of sustainable development with environmental conservation at its base.



Nepal's contribution to GHG emissions and therefore to the warming of the earth's atmosphere is miniscule. Indeed there is a case for the rich countries and countries with high GHG emissions to pay back to countries like Nepal for the harm global warming is doing to their ecology and livelihood systems. For countries like Nepal, it is not enough to approach the issue of climate change only from a technical, market based perspective. There is also an ethical, human rights issue at heart which should, and needs to be addressed.



Climate change also may have implications for federalism, particularly the restructuring of the state in Nepal. The above discussion shows that the response to climate change would make it imperative to consider the following:

- Increase the effective size of protected areas particularly in the hill-mountains for sustained bio-diversity conservation
- Promote connectivity conservation between ecological zones to enhance natural catchments and safeguard environmental integrity
- Strengthen ecosystem services between the highlands and the lowlands and ensure that highland communities derive benefits from conservation which helps the lowlands
- Ensure that the REDD regime is worked out in such a way that the carbon benefits from one federal unit is not cancelled out by deforestation and degradation by another unit
- Create governance and institutional structures that facilitate the process of planned adaptation to climate change and effective response to risk and disaster vulnerabilities

The political debate on the restructuring of the state in Nepal has to-date revolved around the issue of ethnic and linguistic “homelands”. The problem of ethnic federalism notwithstanding, climate change will alter the environmental, and therefore economic, relationships of these homelands, and make highland-lowland inter-dependence a much more critical element in future development discourse of federal units than has been the case in the past. Will the appreciation of the implications of climate change inform the current debate on the restructuring of the state, or will we be guided by narrow sectarian concerns and loose sight of the more realistic, larger picture? That is the question which the constituent assembly will have to answer, and that will determine the political infrastructure necessary to deal with the implications of climate change.