

A Review on the Sustainable Development of the Indian Himalayan Region linking the Ecological and Economic factors

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ABSTRACT: *In the mountain ecosystems of the world, the Indian Himalayan region occupies a special location. Not only are these geodynamically young mountains significant from the climate point of view and as a provider of life, providing water to much of the Indian subcontinent, but they also contain a wide range of flora, fauna, human populations and cultural diversity. Much of its people are oppressed, despite the abundance of natural resources, and still live at a subsistence level. The unscientific use of natural resources leads to a rise in the deterioration of the ecosystem and worsens the effects of natural hazards. In order to restore the balance between economic interest and ecological imperatives with due regard to socio-cultural values, new paradigms need to be created.*

KEYWORDS: *Ecological role, economic valuation, Indian Himalayan region, socio-cultural acceptance, sustainable development.*

INTRODUCTION

The Global Agenda for Sustainable Development has brought mountains to a sharp focus with the growing awareness that the natural resources of mountain areas are important for both upland and downland people. If economic up-liftment is to be accomplished, development needs that address local desires and national compulsions have to be met. Development measures, however, often include demand for re-sources as well as improvements to existing natural systems. Given the fragility and vulnerability of the Himalayan habitats due to the uniqueness of mountain specificities, construction in the mountains must therefore have a different approach. Development initiatives that disregard the imperatives of mountain specificities would inevitably result in abuse of resources and eventual accelerated environmental degradation, which would be devastating not only for the local population, but also for the inhabitants downstream[1]. Such adverse effects of unplanned development, insensitive to mountain specificities, are already becoming widespread, with the most frequent occurrences of landslides, river obstructions and flash floods in the mountains and intermittent floods in the plains being the most frequent.

The influence of climate-induced changes, the effects of unsustainable practices and waste generation on mountain systems is frightening, in addition to the negative impacts of localized construction activities. Global warming and its effects on the recession of glaciers have far-reaching effects in both time and space[2]. Therefore, the extreme vulnerability of mountain habitats and their components to both human and climate-induced changes is of great concern. Therefore, it is not surprising that the complexity of these issues continues to attract significant global attention, such as the WSSD (World Summit on Sustainable Growth, Johannesburg, August 2002) and the Bishkek Global Mountain Summit (October 2002)[3][4]. These events have reached a consensus that unique approaches and services for maintaining

livelihood needs and improving the quality of life will be needed for the mountains. This will entail an integrated approach that takes due account of closely interconnected aspects of human socio-cultural/socio-economic structures and components/processes of the natural ecosystem.

Uniqueness of the Himalayas

The Himalaya is the most dynamic and diversified of the global mountain system, separating the northern part of the Asian continent from South Asia[5]. As a distinct geographical and ecological unit, the region features prominently in the planet Earth's main biophysical settings. This vast mountain range (over 2500 km in length, between 80 and 300 km in width and rising from low-lying plains to over 8000 m asl) has developed its own distinctive climate and influences much of Asia's climate. The great variation in topographical characteristics causes enormous variability within the region in climate and habitat conditions. A marked difference in climate and physiography and, subsequently, in the distribution pattern of biotic elements has resulted in temperature and spatial variations induced by diversity in geological orogeny. This spatial location and heterogeneous dispersion of elements of biodiversity have resulted in the region's biogeographical trends being complex. The eastern Himalayas (including northeastern India), which host about 8000 flowering plant species, are considered to be a cradle of flowering plants, while the western Himalayas support more than 5000 flowering plant species[3]. As a whole, the Indian Himalayan Region (IHR) supports almost 50 percent of India's total flowering plants, of which 30 percent are endemic to the region. There are over 816 species of tree, 675 edibles and almost 1743 medicinal value species contained in the IHR.

Conservation and fair use of biodiversity in the Himalayan region will offer tremendous economic benefits to local populations in view of the increasing threat to biological diversity and can indeed lead to sustainable development. The area is known as the 'Earth Water Tower'. About 10-20 percent of the region is protected by glaciers, while 30-40 percent is still covered by seasonal snow cover, ranging from 0.48 to 2.20 million km². Trends such as decreasing regulatory impacts of glaciers, streams and rivers are gradually occurring in the area, despite the vast water supplies (1,200,000 million m³ annual flow of Himalayan rivers)[6]. This region has a total geographical area of approximately 530,795 km² populated by 3,593,100 persons, comprising 16.16% of the total area and 3.73% of India's total population. The IHR (about 67 percent) literacy rate (7 years and above) is slightly higher than the national average (65.4 percent) reported in the 2001 census. The forests show phenomenal biodiversity that is used to meet people's diverse needs. In some Central Himalaya oak forest stands, 545-782 t ha⁻¹ yr⁻¹, the forest biomass value is normal for the area.

The Himalaya serves as a 'sink' for carbon dioxide with its vast green cover. Annual carbon sequestration projections for the western and northeastern Himalayan forests are estimated at 6.49 mt, with a value of US\$ 843 million[7]. This is one of the significant ecosystem resources of the forests of the Himalayas[8]. The stunning scenery, numerous rivers and streams that cascade down the mountain slopes, the diversity of cultures and religions, and the vibrant festivals of indigenous/ethnic groups present powerful attractions for people from all over the world, whether they are nature-lovers, visitors, or seekers of peace and truth.

Interrelationship between the ecological and the socio-economic activities

The issues in the Himalaya are complex, with intricate connections between social, economic and environmental issues. The solutions cannot, however, be dealt with in isolation. To cite an example, the agricultural and forest ecosystems are so intricately inter-related and inter-

dependent that without considering the cropland, it is pointless to speak about forest management in isolation. In the Central Himalayan region, the cost of subsistence agriculture is estimated to be high for the forest ecosystem[9]. For example, seven units of energy are expended from the forest by the use of firewood, fodder and vegetable manure for each unit of energy obtained in agronomic production. For the conservation of agriculture, a higher ratio of forest to cropland (5.18: 1) is required, compared to the current ratio of 1.66: 1. Due to the decrease in this ratio, issues have arisen, suggesting that the carrying capacity of forests has already been surpassed. Similarly, without addressing the problems of animal husbandry, fodder and fuel, pasture growth or revegetation of wasteland is not feasible. The traditional agri-silvi-pastoral mode of subsistence of the inhabitants of the area is no longer environmentally and economically viable.

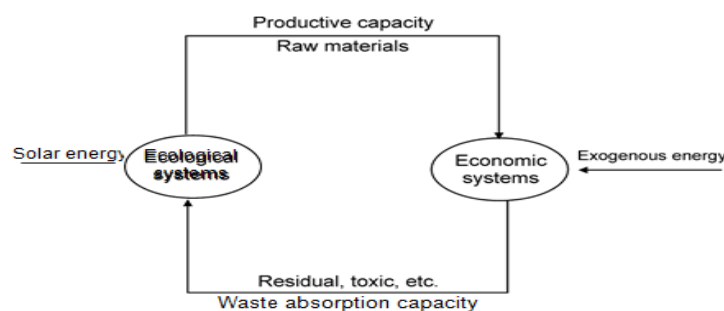


Figure 1: Shows the relation between the ecological and the economic activities

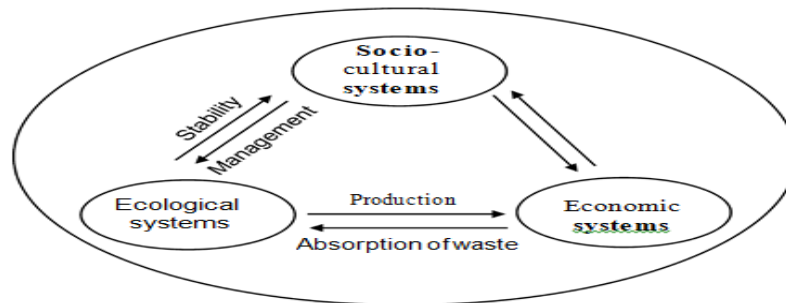


Figure 2: Superimposition of socio-cultural system on relationship of ecological and economic systems (after Singh2'). Arrows between socio-cultural and economic systems represent 'aspirations' and 'value systems'

Sustainable Development

Simply stated, sustainable development means the use of the ecological system in a way that meets current needs without compromising the requirements or choices of future generations. Sustainable development policies need to be based on accurate and detailed data relating to geological, socio-cultural and socio-economic resources, as well as the environment[10]. After they have been carefully assessed, these techniques should integrate conventional expertise and existing production systems. Sustainable development should strive to maximize human well-being or the quality of life without jeopardizing the ecosystem that supports life. I economic variables: per capita income, job stability, in-coming distribution; (ii) ecological variables: ecological degradation, environmental quality, use of renewable and non-renewable resources, human-initiated energy consumption; (iii) social variables: ecological degradation,

environmental quality, use of renewable and non-renewable resources, in-coming energy consumption.

CONCLUSION

In the past, the special majestic Himalayas have provided enormous ecosystem products and services and will be able to provide the same with proper planning and management in the future as well. We must consider, however, the fact that the entire IHR faces anthropogenic pressure that contributes to the overall deterioration of its environment. When signs of environmental degradation become evident, the only alternative left most often is to respond to the situation and try expensive corrective steps to solve the problems. However, it is much easier to be able to predict the issue and initially take preventive action. Proper education at different levels, a long-term database and a holistic approach will move us closer to sustainable growth, ensuring a greater quality of life, enhanced economic status and minimizing detrimental effects on the environment that supports life. It is also important to experiment and formulate ways and means to ensure that its bio-cultural diversity and social structure is not destroyed by creation. The Himalayan region should not be burdened with the back-ward-dragging legacy of the past, nor should it be limited by errors committed by larger states. I dream of a revolution that sweeps the area of the Himalayas and a new age of abundance and prosperity that marks the start of the next millennium. Our current also embodies our future. It is just the future we need to worry about.

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