

Population Dynamics and Sustainability Issues in the Indian Himalayan Region

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7.1 INTRODUCTION

Mountains cover one-fifth of the earth's surface and are unique in their ecological systems, culture, ethnicity, and economy. Though only 10% of the world's population lives in mountains, the mountains are even more important for people who live in lowlands (Ives 1987). Half of the world's population is dependent in one way or another on mountain ecosystems. Various studies show that about 65% of the planet's freshwater comes from mountains. Thus, the actions of people living in mountains, which are directly linked to the population size, are important. The environmental situation subsisting and evolving in the Himalayan regions of India is very well known. The phenomenon of a recurring environmental crisis, population explosion, land-use changes, disasters, and climate change in the Himalaya are the major drivers of environmental change. In addition, human's intervention has disturbed the natural equilibrium driven by a strong interaction among socio-economic and biophysical factor as well as in accelerating land degradation. It is also fueled by ever-increasing population pressure, fragile economy and intensive cultivation of land in the mountains. No doubt, these practices have resulted in a great increase in productivity, but they have resulted in large-scale land degradation and deforestation (Ives 2004). These drivers have drastically affected the population dynamics and livelihoods options for the mountain communities and increased their socio-economic and environmental vulnerabilities over the last few decades. In general, population in the Himalayas is comparatively backward and underdeveloped and the majority of the population lives below poverty line. In this context, sustainability issues in the Himalayas are getting more attention.

The first reference of the Himalayas perhaps dates back to the fifth-century epic poem of 'Kumarsambhava' by a Sanskrit poet, *Kalidasa* (Pandit, *et al.* 2014). The Himalaya (Sanskrit '*Hima*' – snow, '*Alaya*' – house) constitutes a

unique geographical and geological entity comprising diverse social, cultural, and environmental setup. It holds unique and important biodiversity elements known for their economic and ecological importance. The Himalayas are the youngest chain of mountains in the world extending from east to west for more than a length of 2500 km and a width of 250–300 km, covering a geographical area of about 5 lakh km² (about 16.2% of the country's total geographical area) and are inhabited by 52.77 million people in 2011 (Census of India 2011) with several ethnic groups.

The Himalaya is a rich depository of natural resources and home to millions of people with rich biodiversity. In the Eastern Himalayas (biodiversity hotspot) alone about 10,000 types of plants, 750 kinds of bird species, and more than 300 species of mammal were identified and documented. The region though has a great biodiversity, agro-biodiversity, and natural resources, yet threatened environmentally because of various environmental change drivers. It is also a region of fascinating cultural values, ecological values, and spiritual heritage, where millions of people from diverse cultures and religions, live alongside these unique species (Pandit 2013).

7.2 POPULATION DYNAMICS IN THE HIMALAYAS

The increase in population in the Himalayan region was noticed decades ago in the works of Ives and Messerli (1989), Ives (2004), Kaith (1960), and Eckholm (1975). The phenomenon of population growth is always undisputed and the Himalayan region is not an exception. According to the Census of India from 1961 to 2011, Himalayan population grew from 19.9 to 53.8 million. The upwards trend is completely normal and understandable; however, the rate of growth is not. The annual growth of 3.3%, as witnessed in the last 50 years (1961–2011), is over three times higher than the world's average of 1.096%. However, in the last 50 years, the rate of growth increased, crossing even the 5% a year as seen in some Himalayan regions, including Sikkim Himalaya (5.53%), Arunachal Pradesh (5.43%), and Kashmir (5.04%). The lowest rate of growth was recorded in Kumaun Himalaya (2.65%). Population density in the Indian Himalayan states excluding Arunachal Pradesh was about 22 persons/km² in 1911 which increased about 4.5 times and recorded as 96 persons/km² in 2011 (Census of India 2011). Mortality rates in the Himalayas declined drastically during 1970s and 1980s, while fertility rates remain more or less stable at high levels. All these factors contributed to a rapid rise in population and growth rates which were historically never experienced over such a short period of time. Unfortunately, this fast growing population hindered the desired socio-economic growth and development in the region.

The increasing demographic pressure causes indiscriminate exploitation of precious natural land resources which leads to devastating ecological imbalances,

threatening the means of survival through environmental degradation. Due to fast-growing population and fragmentation of farm-owning families, pressure on natural resources increased and the traditional management of agricultural land slowly transformed causing imbalances and further degradation of natural resources. This resulted in declining trend in livelihood opportunities and agricultural productivity, out migration to more productive areas in the plains and urban areas increased where seemingly there are more employment opportunities.

Anthropogenic stress on natural ecosystem triggered large-scale disasters throughout the Himalayas. Undirected spread of subsistence agriculture to support the growing undernourished population and corresponding increase of grazing pressure that outstrips the carrying capacity of the forests, continue to abridge the supportive ecosystem by various means. Adding to the predicament of the Himalayan region, as noted by many studies, males and youth leave old family members and women in the villages to migrate to plain areas in search of better employment opportunities.

7.3 SUSTAINABILITY ISSUES AND CHALLENGES

In the last few decades, the Himalayas are experiencing surge in population growth, livestock population, and high dependency on the natural resources such as forest, sloping land, water, and traditional agriculture system (Sati 2006). Looking at the complexities of the various challenges community face, they may be grouped into three major categories such as environmental challenges, socio-economic challenges and agronomic challenges. The environmental challenges include climatic challenges such as erratic rainfall, cold wave; hailstorm, frost and other include water scarcity, loss of soil due to landslides, pollution caused by emerging industries. The socio-economic challenges include population pressure, small and fragmented land holdings, existing poverty, higher investment cost, lack of alternative source of income while, the agronomic challenges include the problems related to cultivation and production such as soil erosion, low production, pests and diseases, human wildlife conflict and loss of indigenous knowledge system. This in turn is leading to degradation of land resources and consequent decline in the productivity of the land and farm fields. The loss of indigenous ecological knowledge and overexploitation of natural resources for short-term benefits also resulted in environmental degradation (Mishra and Rai 2013). High rates of population growth and wide spread poverty also resulted in resource degradation. The major barriers in sustainability in the Himalayan region are therefore the high growth rate of population, deforestation, operation of roadways, urbanization, and other infrastructure development activities that cause disturbance to soil, vegetation and slope instability. These drivers of change pose further potential for accelerated degradation in the region.

In the Himalaya, in addition to rainfall, springs have been traditionally playing a vital role in providing water security to nearly 80% of the rural households this water is used for irrigation in the agricultural fields for crops (paddy and vegetables) (Sharma 2000). These springs get recharges from the sub-surface flow or from the rain water that percolates down. The communities used to conserve these springs by reducing the speed of the running water, by developing the catchment of the springs, using soil moisture conservation works, vegetative and social measures. But recently because of population pressure and excessive deforestation old natural water springs are either drying up or on the verge of extinction. This in turn has raised the problem of potable water in the interior of the Himalayas. Landslides adversely affect utility services, such as roads, power generation, reservoirs, human settlements, trade, tourism, and other developmental activities. These processes not only affect the land/soil but also cause loss of biodiversity including base resource, and human life. The situation becomes more vulnerable with climate change and global warming, and disasters, which emerged as topmost concern as they threaten sustainability and decrease carrying capacity of the Himalayas. As per the Intergovernmental Panel on Climate Change (IPCC 2018) report, the Himalayan glaciers would disappear by 2035.

Slow and gradual encroachment by overzealous human has disturbed the hitherto undisturbed nature beyond recognition, bringing the ecosystem to jeopardy. Human intervention has disturbed the natural equilibrium driven by a strong interaction between socio-economic and biophysical factors as well as accelerating land degradation (Dhar 2000). In this context, it is very important to track and monitor the net change in population growth to achieve sustainable development in the Himalayas.

7.4 CONCERNS FOR FUTURE

Humans are an integral part of the environment. Humans impact the environment and are, in turn, impacted by it. The quality of life of human beings hinges on the quality of the environment matrix in which they live. At this moment, it is important to ponder upon the consequences of the staggering number of human beings in the Himalayan region, which has a finite space and more or less finite resources. The science of ecology envisages that it is wiser to keep a track of ever-increasing human population and its impact on environment. This growth can be a big challenge for the region, especially when one considers the quality of life and standard of living of the inhabitants. Environmental education must be promoted through formal and non-formal education systems and programmes on awareness at the grassroots level regarding the consequences of population growth must be organized. Communities that have lived for centuries in the region appear to be struggling

for their survival today as they are losing their traditional knowledge system and dwindling natural resource base. Though agriculture being the major source of the food supply, majority of the farmers has pursued efforts to enhance the land productivity, conserve soil and water, and increase soil fertility to cope with shrinking landholdings caused by the population growth. In this regard, they have improved terraces, intensified agroforestry practices and participated in gully control, and waterway construction activities.

International co-operation and efforts for the sustainable Himalayas is the need of the hour, and it is required for all the sectors to participate together for an inclusive growth. The inhabitants of the Himalayas have rich repository of traditional ecological knowledge and the majority of the population sustains itself through traditional farming systems, agroforestry, and animal husbandry. Majority of the livelihood options in the Himalayan region depends on farming systems, and farming systems are highly location specific and dependent on surrounding natural resource base. Since centuries, agriculture has shaped the thought, the outlook, the culture, and the socio-economic life of the inhabitants. The Himalayas must be protected and provisions should be made for organic farming, cash crop, and agroforestry for harmonizing economic and ecological sustainability. Deforestation, forest fire, and ecosystem degradation data can be prepared through satellite imagery in geo-spatial environment for environmental auditing.

Watershed development, joint forest management, and community management programmes must be implemented for sustainable food production and livelihood support to rural communities. The United Nations-backed programme 'Reducing Emissions from Deforestation and Forest Degradation (REDD)' is one such mechanism that can ensure the participation of local communities as stakeholders with economic benefits.

The efforts of national and international institutions such as the International Centre for Integrated Mountain Development (ICIMOD) facilitating communication and negotiation regarding REDD across the Himalaya need to be widened and strengthened for better results (Pandit 2013). Setting up of bio-cultural heritage landscape can also protect rich biodiversity and cultural identities of indigenous communities of the Himalayas. The Sustainable Development Goal 15 Target 1 provides a wide platform for integrated development in the mountains and explicitly mentions mountains among the ecosystems to be conserved, restored, and sustainably used in line with the international agreements (UNDP 2018). Engagement of regional NGOs, local communities, and civil society in research, training, and raising awareness along with collaborations with government institutions may further help to safeguard the Himalayas.

7.5 CONCLUSION

Looking at the pace of degradation of the environment in the Himalaya's, immediate actions are required to safeguard the terrain. The ongoing progress of land degradation in the region does not allow us to wait eternally for 'the best solution'. The rapid growth in the population presents negative impact on the sustainability of the environment and economy in the region; therefore, population control is a must. Government must develop a strategy to motivate communities to conserve and protect natural resources. All that is needed is to make immediate investments towards environmental conservation. Both technology and capital can play a crucial role in this process. It is evident that avoiding better practices and more sustainable land management systems can lead to increased poverty in the future. Thus, we should heed the former U.S. President Franklin D. Roosevelt's warning that "A nation that destroys its soil destroys itself."

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