Roundtable on Emergent Initiatives: Indian Himalayan Region

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The Indian Himalayas (IHR), the world's youngest, most tectonically dynamic, and most marginalised mountain range, is one of 36 global biodiversity hotspots with numerous unique floral and faunal species spread across 13 Indian states/union territories. About 4.8% of the world's mountain population lives there. The region supplies 13% of the world's population and 61% of India with freshwater from snow and glaciers. Forest cover is 40%, barren/unculturable/wasteland 19.3%, snow and glacier 18.9%, and built-up and plantation regions the least, showing the ecosystems relative intactness. It supports 50% of India's forests, over 50% of its flowering plants, and 38% of its terrestrial faunal biodiversity at the intersection of the Palearctic, Afro-Tropical, and Indo-Malaya worlds.

The entire Himalayan range is extremely vulnerable to climate induced disasters as pointed out by IPCC(Intergovernmental Panel on Climate Change) VI report. It has estimated that the frequency of disasters in the Himalayan range is increasing rapidly. More precipitation in a short period of time is the general pattern across the region, also with long spell of drought. Adaptation is the key in the Himalayan region and for that disaster risk reduction must be the guiding principle in carrying out developmental trajectory. However, given the financial architecture the focus is on developing infrastructure even bypassing the basic environmental norms.

The IHR is under increasing pressure from urbanisation and development, which is compounded by an influx of high intensity tourism, unsustainable infrastructure and resources (land and water) and further aggravated due to climatic variations like precipitation (intensity and duration of snowfall) and rise in temperature. This has led to scarcity of water, deforestation and land degradation, biodiversity loss and increased pollution from wastes including plastics. These pressures, in many areas, have the potential to disrupt lives and livelihoods drastically, impacting the socio-economic-ecological fabric of the Himalayas.

IHR agriculture system relies on locally accessible natural resources and complex farm, forest, and animal systems. It exemplifies stability, variety, and long-term sustainability. Agriculture practices may vary across the Himalayas, but its fundamentals are the same. The contribution of IHR to India's agricultural output has been tiny, even if the areas where crops were sown and irrigated have increased. Both fruit yield and the area under cultivation have decreased. While urbanisation and population growth are on the rise, agricultural output remains an issue in the region. Additionally, the preservation of agrobiodiversity is also being significantly threatened.

Geologists and environmentalists routinely express concern about the delicate state of the Himalayas and highlight the importance of utmost caution while building dams, roads, power stations, or tunnels. Despite these warnings, uncontrolled infrastructure expansion and the unrelenting rise of revenue from tourism and pilgrimages continue. Experts have regularly highlighted worries about the terrain's carrying capacity and slope-cutting activities that defy geological principles. The Himalayan development strategy ought to incorporate an understanding of the region's vulnerability as well as the need of protecting the ecology. In the last decade, tourism in western Himalayan states like Jammu & Kashmir, Ladakh, Himachal Pradesh, and Uttarakhand has grown significantly. All-weather mountain roads, helicopter services, tunnelled railway lines, and multi-story luxury hotels boost tourism in Himalayan states. These massive infrastructures further negatively impacted the Himalaya ecosystem.

Urbanisation is another IHR development symbol. New urban settlements and urban population have grown exponentially in the last two decades. Urban Local Bodies increased from 245 in 2001 to 320 in 2022. The 2011 IHR urban population was 40% higher than in 2001. The influx of visitors to the mountains and the continued expansion of urban settlements are putting pressure on the environment

of these regions, as per the International Centre for Integrated Mountain Development (ICIMOD) and the World Bank. One of the main features linked with urbanization in the Himalayas is complete absence of building typologies framework. This should be based on the basis of geological foundational principles, in order to minimise disaster risk. The natural environment of the Himalayan region is being disrupted by the accumulation of solid waste, which is being deposited in the region as a result of the increased frequency of mountain visits. The IHR is experiencing a continuous rise in air pollution, untreated sewage, and solid waste due to the absence of appropriate management.

Over the past few decades, tourism at the IHR has continued to expand and diversify. The average annual growth rate from 2013 to 2023 is anticipated to be 7.9%. (ref: Niti Ayog: Sustainable Tourism in the Indian Himalayan Region). Additionally, current tourism in the IHR replaces eco-friendly and aesthetic infrastructure with inappropriate, unsightly, and dangerous construction, poorly designed roads and infrastructure, inadequate solid waste management, air pollution, degradation of watersheds and water sources, and the loss of natural resources, damaging biodiversity and ecosystem services. Ecotourism is guaranteed long-term survival via environmentally friendly tourism. The Himalayas entail limiting disturbance to the local natural environment and nevertheless benefiting the local people. Tourists visiting the isolated Himalayan regions could either purposefully or inadvertently use the local resources.

Why SDGs framework?

The way to move ahead should be guided by strong principles of international frameworks which are duly adopted by our federal and provincial governments as well. Though these frameworks may be lacking in many aspects, still adherence to such frameworks is a linear way of moving ahead. In this background it is pertinent that the Sustainable Development Goals(SDGs) as adopted universally across the globe should be our way forward. Of the 17 SDGs more than nine goals (*poverty- 1, hunger -2, health and well-being-3, quality education- 4, gender equality-5, clean water and sanitation – 6, clean energy -7, sustainable cities and communities – 11, climate action -13*), are directly linked to the Himalayan region.

The Roundtable

Recognising these challenges and the opportunities for sustainable development in the IHR, Club of Rome and Development Alternatives intend to bring together governments, communities, organisations, academia, experts and private sector to deliberate and discuss the potential pathways that aligns with national and state priorities and provides a platform for collaborative actions.

Outcomes

Session 1: Himalayan Issues- Challenges and Opportunities

Theme 1	**Bio-diversity in IHR**
1) The importance of community engagement in biodiversity conservation 2) Facing challenges like climate change, lack of awareness, and policy gaps. 3) The need for sustainable use of bioresources, recognizing rural technologies for livelihood enhancement and strengthening local governance capacities in biodiversity management. (*The community-driven conservation strategies, improved coordination between governance bodies, and climate change impact assessments)*	
Theme 2	**Food and Nutrition Security Challenges in the Indian Himalayan Region (IHR)**
1) Prioritize food and nutrition security, especially for high-risk groups like children, pregnant women, and nursing mothers.	

2) Promote climate-resilient agriculture with millet, sorghum, and buckwheat,,etc.,to increase agrobiodiversity and reduce food imports. Enhancing local food systems helps increase economies and alleviate lack of food and nutrition 3) Irrigation and water management improvements to reduce water scarcity and boost agricultural productivity. 4) Nutrition education to encourage healthy eating and discourage processed meals. Regulations on harmful food and beverage marketing to reduce unhealthy diets and chronic diseases connected to poor nutrition. 5) Fortifying staple crops addresses micronutrient deficits. Investing in agricultural innovation boosts production and climate resilience.	
Theme 3	**Outcomes: Livelihood Challenges in the Indian Himalayan Region (IHR)**
1) The IHR Forests are being assessed for their ecosystem services, which are crucial for sustainable development, to be taken care. 2) Land regeneration projects, such as afforestation and watershed management, help to create green jobs and alleviate poverty. Community-based conservation models improve resource management. 3) Livelihood diversification encourages sustainable practices and eco-certification. Traditional livelihoods to meet market demands and provide sustainable employment opportunities. 4) Market linkages for MSMEs to be strengthened, and climate-resilient livelihood strategies are being developed to address climate change impacts. 5) Programs promoting youth entrepreneurship to address low business ownership rates. 6) Conservation activities are being integrated with economic initiatives to enhance biodiversity protection and income generation. 7) Tourism represents both an opportunity and a challenge. This area is having a major impact on the Himalayas from an environmental, social, and economic standpoint. Ecotourism and sustainable tourism models to be expanded with a focus on lesser-visited Eastern IHR.	
Theme 4	**Sustainable Infrastructure**
1) The need for a re-evaluation of traditional development models in the IHR, advocating for regionalized policies, promoting sustainable tourism, evaluating hydroelectric projects, promoting urban planning reforms, ensuring environmental accountability in infrastructure. 2) Strengthening the role of civil society and indigenous voices in decision-making processes. 3) It also calls for a shift towards eco-friendly practices, improved waste management, and increased participation from local communities and indigenous groups.	

Session 2: Region Specific key issues

Theme 1	**Spring rejuvenation**
1) Spring rejuvenation in the Himalayas is crucial as many are drying up. Strategies include assessing springs, developing the spring shed, protecting the catchment from pollution, monitoring discharge and water quality. 2) Using an aquifer-based approach, and using artificial recharge methods like trenches and ponds to catch surface flow and increase infiltration.	
Theme 2	**Water – Air**
1) The Himalayas are facing challenges in water and air quality due to glacier melt, air pollution, water quality threats, drying springs, water-induced hazards, and fragile ecosystems. 2) Glaciers are melting rapidly due to global warming, affecting water availability. 3) Air pollution from the Indo-Gangetic plain and Tibetan plateau accelerates global warming, while cyanobacterial blooms threaten waterways.	

4) Rivers are not only the lifeline of the Himalayas, but also for millions downstream. How we view the future of Himalayan rivers—mapped the surviving free flowing rivers.	
Theme 3	**Technology for Conservation**
1) The Himalayas to utilize various technologies for conservation, Eg Technology Intervention for Mountain Ecosystem (TIME) program by the Wildlife Institute of India, Project Elephant, , Snow Leopard Conservation, and Environmental DNA (eDNA). 2) This will help in natural resources, reduce conflict, map and restore forests, study and protect snow leopards, and collaborate with other conservation specialists in Asia.	
Theme 4	**Climate Resilience measures for Agriculture**
1) The Indian Himalayas addresses climate change impacts by shifting to more effective cropping systems, changing farming practices, transitioning to sustainable energy, conserving forests, reducing disaster risk, building climate-resilient infrastructure, and engaging communities. 2) Other factors influencing farm-level adaptation decisions include technological, financial, and information resources, institutions, social setup, and strong local interactions. These efforts aim to mitigate the region's impact on climate change.	
Theme 5	**Tree Plantation and Agro Forestry**
1) Tree plantation and agroforestry in the Himalayas are essential to improve livelihoods, conserve biodiversity, and maintain ecological sustainability. 2) Agroforestry systems include farm, forest, huge cardamom, mandarin, crops/mixed trees, slash-and-burn, and tea-garden to be looked upon differently with more innovative approaches.	
Theme 6	**Improvement in Sustainable Heavy Infrastructure Models**
1) The Himalayas require sustainable infrastructure to balance development and preservation, including tunnelling, dams, hydroelectric projects, seismically-resilient infrastructure, green highways, mountain city urban planning, climate-resilient airports, and low-impact military infrastructure. 2) Tunnels to reduce land use, deforestation, and erosion, while sustainable dams create power with minimal environmental and social repercussions. Reclamation and earthquake-resistant bridges. 3) Green highways have wildlife corridors, erosion prevention, and climate resilience. 4) Sustainable mountain city urban development requires climate-resilient, resource-efficient infrastructure, including sustainable drainage, smart water distribution, and energy-efficient utilities-solar power, energy-efficient terminals, and advanced drainage.	