

PROCEEDINGS OF THE INSTITUTE LEVEL MONTHLY SEMINAR HELD ON 30.06.2020 AT HIMALAYAN FOREST RESEARCH INSTITUTE, SHIMLA

In the series of monthly seminar, a talk on “**Climate Change in Indian Himalayan Region – Impact on Forest Ecosystems and Implications for Forestry Research**” under the theme “**Biodiversity Conservation and Ecological Security**” was delivered by Sh. Satya Prakash Negi, IFS & Head, Extension Division on **30th June, 2020**. All the Scientists, Forest Officers, Officers of Technical services, other technical and project staff were present/connected through Google Meet during this webinar.

Dr. S.S. Samant, Director, HFRI chaired the proceeding of the monthly research seminar. **Dr. Sandeep Sharma, Group Coordinator Research (Link Officer)** welcomed the Director and all the participants and apprised them about the overview of the topic and requested all participants to actively participate in the discussion and provide valuable suggestions.

The outline of the presentation made by the speaker was as below:

- ✓ The Himalaya
- ✓ Indian Himalayan Region (IHR)
- ✓ Why IHR Matters?
- ✓ Significance of Forests & Biodiversity of IHR
- ✓ Climate Change in IHR
- ✓ Impact on Forest Ecosystems
- ✓ Major Issues
- ✓ Implications for Forestry Research in IHR
- ✓ Identification of Forestry Research Needs in IHR (Contemporary Issues)

The speaker gave a brief background about the importance of Himalaya in general and Indian Himalayan Region in particular. Highlighting the importance, Sh. Negi informed that IHR constitutes 16.23 % of India’s land surface (ISFR, 2019) covering 12 Indian Himalayan States that covers ten States fully and hill districts of the two States (G-SHE), and supports 04% of the India’s population (Census, 2011). IHR is a forest dominated landscape (ISFR, 2019) and the Himalaya including IHR is an indicator of global climate change (FAO, 2009) as widespread retreat of glaciers are observed from the mountain areas. He briefly spoke about the diverse benefits provided by IHR as below:

- ✓ Ecosystem Goods & Services
- ✓ Hotspots for Biodiversity

- ✓ Cultural Diversity and Cultural Significance
- ✓ Spiritual Value
- ✓ Tourism
- ✓ Adventure/Recreational/Aesthetic Value

Speaking about the **significance** of forests & biodiversity of IHR, he said that the IHR is a forest dominated landscape as the Forest Cover of IHR is about 41.23% of the total geographical area of the IHR and this Forest Cover of the IHR contributes about 30.89% of the Total Forest Cover of the country (ISFR, 2019). Himalaya including IHR is a part of IHR is part of global biodiversity hotspots of the world (CI, 2020), and 25 out of 34 world's biodiversity hotspots are situated entirely or partially within mountain regions. The mountain regions provide refuge to many endemic or threatened plant species and animal and host a high genetic diversity of species. Further highlighting the importance of IHR, the speaker described IHR as Water Towers (NMHS, 2020) as many lakes, rivers and glaciers originate in IHR which benefit not only the inhabitants of IHR but also downstream population too depends on water from IHR. The forests of IHR influence quality & quantity of water by intercepting precipitation, improving soil infiltration, and bioremediation of water. He further highlighted the significance of the forests of IHR that protects against natural hazards like preventing or slowing down rock fall, landslides, debris flows, and avalanches etc. by acting as physical barriers; and roots of the trees stabilizes soil and prevent soil erosion, reduces flood etc. He spoke about the significance of forests of IHR as source of livelihood (NMHS, 2020) that provides wood, feed, food and other economically important NTFPs and acts as 'safety nets' during lean period. He talked about the forest dominated attractive landscapes of IHR that have recreation and spiritual values which acts as a magnet for tourism. He also highlighted the impact of climate change on Himalayan ecosystem and possible forestry centric mitigation measures.

Speaking on the **changes in IHR**, the speaker elaborated the Major Drivers of Changes that are taking place in IHR under the headings and sub-headings as below:

❖ **Developmental activities:**

- Agricultural/Horticultural expansion
- Industrial development
- Human settlements
- Infrastructural developments- Roads, Multipurpose Projects etc
- Mining
- Shifting Cultivation

- Encroachments
- ❖ **Globalization:**
 - Market forces
 - Increasing demand
 - Herbal boom
- ❖ **Climate Change:**
 - Will have practical ramifications on local ecosystems
 - Warming in the Himalaya is more than the global average
 - Mitigation measures and resilience strategies w.r.t. climate change
- ❖ **Invasive Alien Species:**
 - Destroying endemic species
- ❖ **Forest Fire:**
 - Destroying habitats and species
- ❖ **Population Growth:**
 - Over-exploitation of natural resources to meet demand
 - Carrying capacity

He said that in IHR there is **extraordinary pressure on forest lands and forest ecosystem** leading to:

- ✓ Over-exploitation
- ✓ Deforestation
- ✓ Forest Degradation
- ✓ Habitat Fragmentation
- ✓ Forest Fire
- ✓ Pest, Disease and Invasive Species
- ✓ Poor Regeneration in Natural Forests
- ✓ Biodiversity Loss...

Sh. Negi stressed that all the pressures are 'Anthropogenic' i.e. manmade! And are accelerating the changes in IHR adversely affecting ecosystem functioning.

Speaking on the **major issues in IHR**, he said that forests of IHR are storehouse of biodiversity. Adverse effects of changes in IHR means affect on ecosystem Goods and Services which will have serious repercussion for survival of humanity. He deliberated on the **major issues in IHR** under the following headings and sub-headings as below:

❖ **Water Scarcity**

- Upstream as well as downstream population
- Threatens livelihood and survival

❖ **Environmental Degradation:**

- Landslides, floods and droughts
- Threatens livelihood and survival

❖ **Food Security**

- NTFPs

❖ **Migration:**

- Limited economic opportunities of livelihood

The speaker elaborated in detail about the **implications for forestry research** due to the above changes in IHR and consequent negative impact on functioning of forest ecosystems; and stressed that still it is an opportune time to rethink and reorient our forestry research in IHR to contribute in long-term national and international goals of environmental/forest conservation, enhancing resilience and ability of vulnerable species/ ecosystems to adapt to the changing climate, and enabling forest dependent local communities for better adaptation so that forests provide needs of the present generation as well as future generation in sustainable manner. Speaking on the **contemporary forestry research needs** in IHR in general and western Himalayan region in particular, he enlisted some of the **contemporary research topics** as below:

Sr. No.	Forestry Research Topics
1.	Quantification and valuation of forest ecosystem services : (Singh, 2007; Joshi & Negi, 2011; Sutherland <i>et al.</i> 2009) <ul style="list-style-type: none"> ✓ Contribution of IHR forests to the national accounting system ✓ Nation must willing to pay and conserve IHR forests
2.	C- Sequestration potential of various forest types:(IPCC Reports)
3.	Studies to adequately understand risks of forest habitat loss, cost of restoration and re-introduction vis-à-vis benefits of conservation (Negi <i>et al.</i> , 2012)
4.	Forest Fire: (Semwal & Mehta, 1996) <ul style="list-style-type: none"> ✓ Soil erosion

	<ul style="list-style-type: none"> ✓ Nutrient leaching ✓ Loss to the native biodiversity ✓ Invasion of weeds ✓ Long-term ecological consequences of pine needle removal to make fuel briquettes
5.	<p>Land use and land cover change:</p> <ul style="list-style-type: none"> ✓ RS & GIS technology towards assessment of patterns and intensity of land use and land cover change in IHR ✓ Development of scenarios/models at spatial and temporal scales
6.	<p>Impact of climate change on forest ecosystems:(Singh <i>et al.</i>, 2010)</p> <ul style="list-style-type: none"> ✓ Shifts in boundary of forest ecosystems, upward movement of tree lines ✓ Scenarios/Modeling of shifts in boundaries ✓ Potential corridors for movement of forest species ✓ Change in species mix and composition of vegetation types ✓ Identification of vulnerable forest ecosystems /forest types
7.	<p>Understanding trends of natural regeneration and suggest appropriate silvicultural measures in old-growth forests (Singh <i>et al.</i>, 1997; Rawal <i>et al.</i>, 2011)</p>
8.	<p>Relevance and effectiveness of community conserved/managed forests under changing scenarios (Pathak, 2009)</p>
9.	<p>Inter-specific and intra-specific interactions of important forest ecosystems under changing scenarios of habitat degradation</p>
10.	<p>Forest hydrology - Soil & water conservation: (Singh, 2007; Negi, 2001;Negi <i>et al.</i>, 2012)</p> <ul style="list-style-type: none"> ✓ Broadleaved or conifer? ✓ Evergreen or deciduous?
11.	<p>Impact of IAS: (Negi and Palni, 2010)</p> <ul style="list-style-type: none"> ✓ On native biodiversity ✓ Overall ecosystem processes ✓ Potential areas of IAS under changing climate scenario and likely impact on forest ecosystems structure/function
12.	<p>Forest biodiversity based industrial potential for livelihood: (Tolia, 2011) (e.g. Leh berry juice/ Rhododendron juice/Herbal tea)</p>
13.	<p>Effectiveness of the existing PAs:</p> <ul style="list-style-type: none"> ✓ Status of biodiversity within the PAs ✓ Linking biodiversity with socio-cultural milieu and livelihood security (...livelihood of local people living in and around PAs!)
14.	<p>Risks of potential insect-pest and diseases & their control:</p> <ul style="list-style-type: none"> ✓ Under changing climate ✓ Developing scenarios for their distribution and severity ✓ Bio-control
15.	<p>Understanding the intensity and consequences of potential impacts of changes under continued anthropogenic pressure:</p> <ul style="list-style-type: none"> ✓ On the structure on functions of biodiversity elements in forested

	landscape ✓ Impact on livelihood
16.	Forest Certification (ensures sustainability of forests): Initiate Forest Certification process in selected Forest Divisions/ Nurseries of Himachal Pradesh by liasioning with: ✓ HPFD, and ✓ Certifying agencies like Forest Stewardship Council (FSC), Programme for the Endorsement of Forest Certification (PEFC), IIFM-Bhopal etc.

At the end of the presentation, during discussion, the house was unanimous in its opinion on the need to reorient and rethink on forestry issues on the emerging trends and contemporary issues. Dr. Samant, Director, HFRI appreciated the efforts of Sh. Negi to highlight the importance of IHR regions, issues and concerns and exhorted the researchers of the institute to reorient their research endeavour in this direction. Dr. Ranjeet Kumar, Scientist-E, Sh. P.S. Negi, Scientist-C and Sh. Subhash Chander, Scientist-D all agreed in tandem for the issues and concerns appreciated the presentation made by Sh. Negi.

In the end, Dr. Sandeep Sharma, GCR (Link Officer) thanked the speaker for deliberating on such an important issue. He also thanked Director, HFRI, Shimla and all present/connect for this webinar for their active participation in the monthly seminar.

Glimpses of Seminar




