



# ENVIS Newsletter

## on Himalayan Ecology

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The ENVIS Centre on Himalayan Ecology collects, collates, compiles and builds quantitative and qualitative databases of information on various aspects of Himalayan Ecology. The information is disseminated regularly, free of cost, to various users such as DICs, universities/ institutes, other ENVIS centres and experts/ individuals working in the fields related to Himalayan Ecology.

### Editorial

ENVIS Newsletter on Himalayan Ecology is an annual non-priced publication of the ENVIS Centre, which was established at the headquarters of the G.B. Pant Institute of Himalayan Environment and Development (GBPIHED) in the financial year 1992-93 with the fiscal support from the Ministry of Environment and Forests, Government of India, New Delhi.

The fourth volume of this Newsletter contains two articles received from the researchers of this Institute. The opinions expressed in these articles of the Newsletter do not necessarily reflect the official views of the GBPIHED or the editors. The content of the Newsletter may be quoted or reproduced for non-commercial use provided the source is duly acknowledged. Contributions to the next volume of the Newsletter in the form of research/popular article(s) and news item(s), etc., related to Himalayan Ecology, are welcome. The matter supplied by the individual/organization may be edited for length and clarity. Request for subscription of the Newsletter may be sent to the Executive Editor of the Newsletter. The comments/suggestions for the improvement of the Newsletter are welcome.

P.P. Dhyani  
*Executive Editor*

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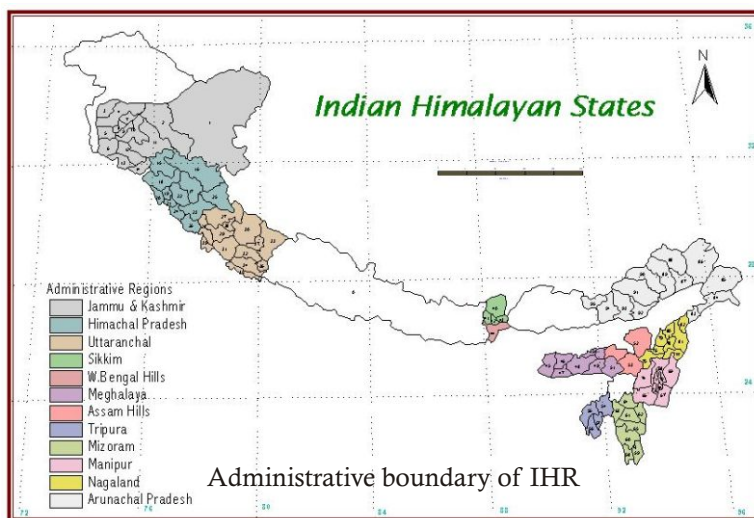
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## Himalayan wastelands: A waste or pool of land?

As per the report of the Technical Task Group constituted by the Planning Commission in 1987, the wastelands are the degraded lands, which can be brought under vegetative cover with reasonable efforts and which are currently underutilized, and the land, which is deteriorating for lack of appropriate water and soil management or on account of natural causes. Land degradation is an important global issue because of its adverse impact on agronomic productivity, the environment, and its effect on food security and the quality of life. The wastelands are the degraded lands, which are currently underutilized due to lack of appropriate water and soil management measures. The productivity of these lands is very low and people owing these lands are poor. This apparent uncultivated land has received a great attention of several aid agencies, planners and environmentalists in the recent past. Development of wastelands is an important programme now and different wastelands development schemes are being implemented, which include checking land degradation, increasing bio-mass availability and putting wastelands to sustainable use, etc. However, for many, it is a wasted opportunity and hence a wasted land.

According to the Wasteland Atlas of India (2000), the wastelands contribute about 19.42% of country's total geographical area (TGA). About 24% of total wastelands is spreading in forest area and remaining 76% of the wastelands is among non-forest area in the country. A significant share of this wastelands has been contributed by the Himalayan region in the country as the region is having about 33.81% wastelands to its TGA. However, this figure has reduced marginally to 31.62% in 2005. The state/region-wise wastelands of Indian Himalayan region (IHR) as per NRSA<sup>#</sup> estimate (2005) is as follows:



**Table 1. Wastelands distribution in IHR**

State/region	Wastelands (km <sup>2</sup> )	% to TGA
Jammu & Kashmir	70356.52	31.66*
Himachal Pradesh	28327.17	50.88
Uttarakhand	16097.46	30.10
Sikkim	3808.21	53.67
West Bengal hills	92.96	2.95
Meghalaya	3411.41	15.21
Assam hills	5760.33	37.60
Tripura	1322.97	12.62
Mizoram	4469.88	21.20
Manipur	13174.74	59.01
Nagaland	3709.40	22.37
Arunachal Pradesh	18175.95	21.70
IHR	168707.00	31.62

\*Total area of Jammu & Kashmir is used for calculating percentage;

<sup>#</sup>National Remote Sensing Agency

The wastelands in Manipur, Sikkim and Himachal Pradesh have contributed above 50% of their respective TGA whereas the West Bengal hills has a least share (<3%) of its wastelands to TGA of the region. More than 40% area of total wastelands for the state of Sikkim and Himachal Pradesh is snow covered and/or glacier area whereas for Manipur it is occupied by shifting cultivation (*Jhum*) area. For other larger states like Arunachal Pradesh and Uttarakhand the snow cover/glacier area is the major contributor (>56%) of the total wastelands and for Jammu & Kashmir it is barren rocky/stone waste followed by snow cover/glacial area of the state.

The Himalayan wastelands are decreasing. The total decline of IHR wastelands during the period 2000-2005 is about 6.5%, which is mainly because of significant decrease of the shifting cultivation land (*Jhum land*) in the state of Meghalaya, Nagaland and hill regions of Assam (Figure 1).



**Figure 1.** Change in % share of wastelands (2000-2005) to the TGA among IHR states/regions

Agriculture is the mainstay of India's economy. Land and water, therefore, are of critical importance, particularly for the IHR where total arable land is very less. Vast tracts of the land are, however, degraded, which can be brought under vegetative cover with reasonable efforts. Redressing these lands is regarded as a powerful tool of attacking the issues of poverty and backwardness of the region. The watershed activities under the Integrated Wasteland Development Programme are expected to result in improved productivity of wastelands, improved availability of fuel wood and fodder, increased water availability, reduction in migration from rural areas, and overall improvement in the economic status of the rural people of IHR.

S.N. Nandy, P.P. Dhyani and P.K. Samal

### Receding glaciers: Indication of global warming

The Himalayas are the youngest mountain chain on the earth and believed to be still evolving. The Himalayan glaciers are also experiencing recession. The rate of recession and amount of volume change are irregular for glaciers across the region. This is mainly due to the variance in the physiographic features across the region. Due to its extremely active geodynamic condition, even small tampering with the geo ecological balance can initiate environmental changes that may eventually lead to alarming proportions.

The Himalayas, a series of parallel and converging ranges, form the highest mountain region in the world. The Indian Himalayan region (IHR) stretches over 2,500 km from Jammu and Kashmir in the west to Arunachal Pradesh in the east. The Himalaya confers many gifts to the region like snow and ice that are spread area in higher altitude. There are plenty of glaciers here, which are providers of life giving water to the Indian subcontinent. Snow and glacier covered mountains in the Himalayas are the perennial sources of rivers and streams, which flow out of them. This region is, therefore, immensely rich in water resources and possesses huge potential for hydropower generation and irrigation for agriculture. However, this region too is witnessing the global phenomenon of receding glaciers, which is an area of concern for the environmentalists as it has the potential of impacting the life in this region. The impacts of climate change are already visible. Examples of climate change include: the shrinking Arctic ice cap; accelerating sea level rise, and receding glaciers worldwide.

The Earth has warmed up by approximately 0.75°C since pre-industrial times. Eleven of the warmest years in the past 125 years occurred since 1990, with 2005 being the warmest on record. While this could be a result of many factors, there is overwhelming consensus that this is due to emissions of greenhouse gases, such as carbon dioxide, from burning fossil fuels. A recent study by UNEP (United Nation Environment Programme) reports that the global temperature has increased by 0.6°C in last century and there is a possibility of 1.1°C rise in the forthcoming 25 years. Scientists have now established that the earth's temperature is rising. This heating process that raises the earth's temperature is known as the global warming. Without remedial measures, many scientists fear that the global temperatures will rise 1.4 to 5.8°C by 2100.

Recently a revised report was issued by the IPCC (Intergovernmental Panel on Climate Change), a body under the United Nations, which is made up of more than 2500 scientists of the globe. The IPCC found new and stronger evidence that most of the last 50 years are attributable to human activities, and that about three quarters of the anthropogenic emissions of CO<sub>2</sub> during the past 20 years are due to fossil fuel burning.

Glacial melt is also expected to increase under the changed climatic conditions. This would lead to increased summer flows in the rivers for a few decades followed by a reduction in the flow as the glaciers may disappear if the global warming will increase. Melting glaciers would not only lead to formation of glacial lakes and make the region susceptible to glacial lake outbursts endangering lives of many but would also lead to a major climatic and cultural change in the region. The perennial rivers emanating from the Himalayas have for centuries controlled the livelihood, culture, trade and occupation of people in the Himalayan plains.

The receding rate of Himalayan glaciers confirm to the indicators of global warming and climatic change. The rate of receding is faster in Himalayan glaciers due to the unique characteristics. They are covered by thick pile of debris. Moraines in the ablation zone of the Himalayan glaciers indicate that they are melting at a faster rate, and summer temperature is also slightly higher than European glaciers. In addition, the climate and meteorology of the Himalayas determine the water resources. Indian summer monsoon is the dominant controlling factor for snow accumulation and ablation on the entire southern Himalayas. It causes snowfall and ablation simultaneously and any seasonal/climatic change or variation would impact the snow fall and result in glaciers melting faster in the Himalayas.

### Retreat of glaciers in the Himalaya

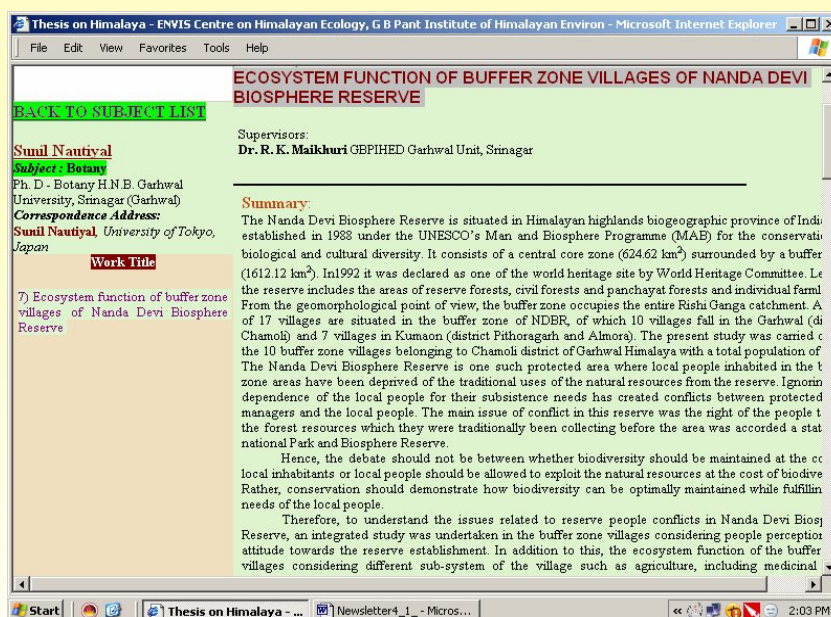
Glaciers	Basins	Year of Observation	Retreat rate/year
Bilare Bange	Sutlej	1962-97	2.6
Shaune Garang	Sutlej	1962-97	26.4
Janapa Garang	Sutlej	1962-97	19.9
Milam	Gori Ganga	1966-97	30.3
Dokariani Bamak	Ganga	1962-97	16.7
Gangotri	Ganga	2004-2005	12.12
Chipa	Dhaulti Ganga	1961-2000	26.92
Meola	Dhaulti Ganga	1961-2000	34.62
Jhulang	Dhaulti Ganga	1962-2000	10.53
Meru Bamak	Ganga	1977-2000	17.2
Miyar	Chenab	1961-96	16.43

The retreat of Himalayan glaciers has been mainly attributed to global warming. As a result of this recession, new glacier lakes are being formed. Glacial lake outburst flood (GLOF) also causes massive devastation in downstream area (such as flash floods) in terms of destruction of agriculture land, loss of human lives, and damage of roads, bridges, villages and infrastructures. At present the world attention is drawn to find a way to resolve the global warming problems.

**M.S. Miral and Kireet Kumar**

## Thesis database

In continuation of research and development (R&D) work carried out in different parts of the Himalaya, the records of Ph. D. theses have been compiled and included in the ENVIS website. These R&D works have resulted in the award of Doctor of Philosophy degrees by various universities. The work-area of these theses is in the Indian Himalayan region (IHR) or part of it on different aspects of science/technology/ humanities. Currently the database contains about 262 records, which can be accessed through Institute's website at : <http://gbpihed.gov.in/envis/thesis/himthesis/himthesis.html>.



Major subject	No. of thesis
Agro-forestry	2
Anthropology	3
Botany	49
Chemistry	5
Civil engineering	1
Earth science	43
Economics	3
Environmental Sciences	7
Forestry	55
Geography	39
Geology	32
Geophysics	1
Hydrology	1
Military Science	1
Physics	6
Plant Physiology	2
Sociology	1
Wildlife Science	3
Zoology	8



Besides above, abstracts of 14 Ph.D. theses of Institute's researchers are also included in our website at <http://gbpihed.gov.in/envis/thesis/thesis.html>

## On-going R&D projects in the Indian Himalayan region

G.B. Pant Institute of Himalayan Environment and Development (GBPIHED) has sponsored 112 R&D projects to various institutions/universities/NGOs for the support of location-specific R&D activities in the Indian Himalayan region (IHR) under its Integrated Eco-development Research Programme (IERP). During the year 2005-2006, following 30 projects were sanctioned and funded.

R&D Thrust Areas: Technology Development & Research (TDR)/ Technology Demonstration & Extension (TDE)	Name of the Principle Investigator (PI) and Association
Soil conservation and maximization of forage production in Kumaon hills	<b>Mr. Chandra Bhushan,</b> Zonal Agricultural Research Station, GBPUA&T, Majhera, Garampani, Nainital, Uttarakhand
Rehabilitation of degraded wasteland as germplasm resource center in temperate region of Garhwal Himalaya, Uttarakhand	<b>Dr. B. P. Nautiyal,</b> Society for Himalayan Environment and Biodiversity Conservation, Srinagar, Uttarakhand
Screening, selection and cultivation of medicinal plants of heavy demand to uplift the financial status of rural population	<b>Dr. Rakesh Kumar,</b> Dolphin Institute of Biomedical and Natural Science, Dehradun, Uttarakhand
Demonstration of low-cost rural technological packages and water conservation measures for agricultural development in four micro-watersheds of Pinder catchment in Uttarakhand	<b>Mr. B.M. Kandpal,</b> SIMAR, Haat Kalyani, Dewal, Chamoli Garhwal, Uttarakhand
Conservation of community forests of Uttarakhand by capacity building of local communities in carbon monitoring and trade	<b>Dr. Y.S. Rawat,</b> Department of Botany, D.S.B. Campus, Nainital, Uttarakhand
Demonstration and extension of fodder grass production among rural women in Pithoragarh district of Uttarakhand state	<b>Mr. R.S. Bisht,</b> Swati Gramodyog Sansthan, Pithoragarh, Uttarakhand
<i>Lahoul (thande marusthal) kshetra main bahupayogi prajatiyon ki paudhshala viksit karna evam sanrakshan praroop sthapit kar janjagriti lana</i>	<b>Mr. L.C. Dhissa,</b> Sadprayash, Raghunathpur, Kullu, Himachal Pradesh
Development of high grade medicinal and aromatic plants in Uttarakhand	<b>Dr. C.S. Mathela,</b> Department of Chemistry, D.S.B. Campus, Kumaun University, Nainital, Uttarakhand
Habitat utilization and geographical distribution of Himalayan Mouse-hare ( <i>Ochotona roylei</i> ) with special reference to its feeding behaviour and impact on high altitude medicinal plants	<b>Dr. S.N. Bahuguna,</b> Department of Zoology, HNB Garhwal University, Srinagar, Garhwal, Uttarakhand
Status, multiplication and conservation of some high altitude medicinal herbs used in 'Ashtaverga'	<b>Dr. M.C. Nautiyal,</b> HAPPRC, HNB Garhwal University, Srinagar, Garhwal, Uttarakhand
Forest structure, composition and diversity in relation to socio-economic status of the people along a disturbance gradient in Dudhatoli area of Garhwal Himalaya	<b>Dr. C.M. Sharma,</b> Department of Forestry, HNB Garhwal University, Srinagar, Garhwal, Uttarakhand
Developing sacred groves in Uttarakhand using religious beliefs and traditional values of communities : A field test of conservation and restoration practices	<b>Dr. Ashish Tiwari,</b> Central Himalayan Environment Association (CHEA), Nainital, Uttarakhand
Establishment of demonstration unit and germplasm resource centre for commercial cultivation of highly valuable <i>Stevia rebaudiana</i> Bertoni	<b>Dr. Hemlata Bisht,</b> Uttarakhand Paryavaran Vikas Samiti, Srinagar, Garhwal, Uttarakhand
<i>Sthaniya sansadhano ke aikikrit prabandhan evam takniki hastantaran dwara mahila udhamita vikas</i>	<b>Dr. Sunil Pandey,</b> Neo Integrated Development of Himalaya (NIDHI), Pithoragarh, Uttarakhand

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Study of traditional system of medicine and its role in providing community healthcare and health education in hill communities

Traditional health care systems in Garhwal Himalaya : A historical study of change and continuity

Planning and promoting ecotourism at selected tourist destinations of Almora, Bageshwar and Nainital of Kumaon Himalaya for community development

Studies on bird fauna of habitats established with invasive vegetation in Garhwal Himalaya

Search for therapeutic agents of herbal origin to target diabetes and cancer

Water quality indices : Monitoring and assessment of ecosystem health in the Kosi riverine system

Promotion of Satawar production in Muwani valley of Pithoragarh district

*Vikas khand Salt va Syalde Almora ke pachas gramon mein paramparik chikitsa padhati punruthan evam prasar karyakaram*

*Banjarbhoomi punarsthapana hastantaran dwara gramin nirbal verg ka samajik unnayan*

*Janpad Chamoli Garhwal mein paramparik fasalon (less known crops) ki jan sahbhagita dwara sambardhan evam vikas karana*

Environmental restoration using plant-microbe interaction : Rhizoremediation

Cultivation and development technologies of fodder etc. at Vivekananda Ashrama, Shyamla Tal (Champawat)

Eco-restoration and conservation initiatives at Danda Shrinagraja in the Garhwal Himalayas

Development of horticulture and vegetable garden for food security in the Himalayas at village Jaspur, Taknar (10,000 ft)

*Unnat chara pradarshan evam prasar*

Integrated project on land usage for upliftment of socio-economic condition of the tribal communities

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