

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

LOK SABHA
UNSTARRED QUESTION NO. 3613
TO BE ANSWERED ON 8.08.2017

Research on Himalayas

3613. DR. RAMESH POKHRIYAL “NISHANK”

Will the Minister of ENVIRONMENT, FOREST AND CLIMATE CHANGE be pleased to state:

- (a) the number of research projects related to Himalayas that are under progress in the country;
- (b) the locations of the projects along with the amount sanctioned for the said projects;
- (c) whether the research work on Himalayas is being carried out in collaboration with foreign research agencies;
- (d) if so, the details thereof;
- (e) whether any co-ordination mechanism between different agencies/ departments is in place to ensure sustainable development on ground level in hilly States in the country and if so, the details thereof; and
- (f) the details of new research achievements related with agriculture, horticulture and livelihood?

ANSWER

MINISTER FOR ENVIRONMENT, FOREST AND CLIMATE CHANGE

(DR. HARSH VARDHAN)

(a) and (d) This Ministry has nominated the G. B. Pant National Institute of Himalayan Environment and Sustainable Development (GBNIHESD) as nodal Institute for implementing the National Mission on Himalayan Studies (NMHS). Under NMHS, 42 research projects are being funded in different Himalayan States. In addition, GBNIHESD is engaged in 17 research projects in the Indian Himalayan States with funding from various agencies and 45 research projects under its Integrated Eco-research Development Programme (IERP). Details of the projects along with the location and sanctioned amount are annexed (Annexure-I, Annexure-II and Annexure-III).

With foreign collaboration, three research projects sponsored by two agencies are being carried out by GBNIHESD under financial support of the Food and Agriculture Organisation (FAO) and the International Centre for Integrated Mountain Development (ICIMOD). Details of these projects are annexed (Annexure-IV).

(e) and (f) Other Ministries/ Departments are also engaged with different schemes/programmes in the Himalayan region. The Steering Committee with Members of other Ministries monitor the programmes. The research organisations work in tandem to ensure sustainable development in the Himalayan region. Under NMHS the type of projects taken up include 7 for supporting livelihood one related to agriculture and three in the area of horticulture.

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### **Annexure-I**

#### **Details of on-going research projects sponsored by the various funding agencies**

| <b>S.No.</b> | <b>Name of the Project</b>                                                                                                                                                                                              | <b>Duration</b> | <b>Funding Agency</b>                                     | <b>Total project outlay</b> | <b>Project Location</b>                         |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------|-----------------------------|-------------------------------------------------|
| <b>1</b>     | <b>MoE&amp;S-Dr. Sandipan Mukherjee :</b> Investigation of Alternative Atmospheric Layer Scaling Properties Over Complex Terrains of Himalaya.                                                                          | 2015-2018       | Ministry of Earth Sciences New Delhi.                     | 36,35,600.00                | G.B.P.N.I.E. S.D Kosi Katarmal - Almora.        |
| <b>2</b>     | <b>MoEF &amp; CC (KCS) Project:</b> Assessing the floristic Diversity and Ecosystem Values of selected High altitude Wetlands of Indian Trans Himalaya.                                                                 | 2015-2018       | Ministry of Environment Forest & Climate Change New Delhi | 23,07,900.00                | G.B.P.N.I.E. S.D Kosi Katarmal - Almora.        |
| <b>3</b>     | <b>ENVIS Center (SS) Project:</b> Himalayan Ecology and development”                                                                                                                                                    | 1992 onward     | MoE&F New Delhi                                           | 11,90,000.00 (yearly)       | G.B.P.N.I.E. S.D Kosi Katarmal - Almora.        |
| <b>4</b>     | <b>MoE&amp;F (RSR) Botanical Garden Project:</b> Development of Botanical Garden                                                                                                                                        | 2013-2018       | Ministry of Environment Forest & Climate Change New Delhi | 82,03,000.00                | G.B.P.N.I.E. S.D Kosi Katarmal - Almora.        |
| <b>5</b>     | <b>MoE&amp;F-AES (SSS) Project:</b> All India Coordinated Research Project on Sacred Grove Ecosystem Service Assessment: Assessment of Ecosystem Services in sacred groves of Himachal Pradesh, North Western Himalaya. | 2012-2017       | Ministry of Environment & Forest, New Delhi               | 33,08,880.00                | G.B.P.N.I.E. S.D Mohal Kullu- Himachal Pradesh. |

|    |                                                                                                                                                                                                                                                                                                  |           |                                       |                |                                                 |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------|----------------|-------------------------------------------------|
| 6  | <b>MoEF&amp;CC-(R.C. Sundriyal)</b> - Ecosystem Services in changing biodiversity state: A comparative study of Western and Eastern Himalayan forest stands.                                                                                                                                     | 2016-2019 | MoE&F New Delhi                       | 31,99,560.00   | G.B.P.N.I.E. S.D North East Arunachal Pradesh.  |
| 7  | <b>DST-RKM (G.Unit):</b> Enhancement of livelihood options based on locally available resources in disaster affected villages in kedar valley of uttarakhand                                                                                                                                     | 2016-2020 | DST, New Delhi                        | 31,89,980.00   | G.B.P.N.I.E. S.D Srinagar - Garhwal unit.       |
| 8  | <b>ICSSR-RKM (G.U.) NEWProject:-</b> Identifacation of land and Bio-Resources , Based Potential options for livelihood Enhancement and Diversification through simple technological Intervetions for sustainable development of the disaster affected rural landscape of Kedar vally Uttarakhand | 2017-2019 | ICSSR, New Delhi                      | 25,00,000.00   | G.B.P.N.I.E. S.D Kosi Katarmal - Almora.        |
| 9  | <b>DST- S. Shashni (H. P. Unit):-</b> Standardization of Post Harvest Technology for Wild Rose Hips and Promotion a Sustainable Livelihood option among Poor Self Help Women Groups in Kullu Valley, Himachal Pradesh.                                                                           | 2015-2018 | DST, New Delhi                        | 22,39,000.00   | G.B.P.N.I.E. S.D Mohal Kullu- Himachal Pradesh. |
| 10 | <b>DST-SERB-PKS(N.E Unit)</b> Assessment of floral biodiversity and resource utilization pattern with special reference to climate change in the high altitude wetlands of Arunachal Pradesh of Eastern Himalalaya vide                                                                          | 2015-2018 | DST-SERB, New Delhi                   | 2,675,190.00   | G.B.P.N.I.E. S.D North East Arunachal Pradesh.  |
| 11 | <b>JNU-NMSHE (Task Force-5) Project:</b> Traditional Knowledge System network programme on convergence of Traditional Knowledge systems for Integration to sustainable Development in the Indian Himalayan.                                                                                      | 2015-2020 | J.N.U New Delhi                       | 1,99,55,200.00 | G.B.P.N.I.E. S.D kosi katarmal - almora.        |
| 12 | <b>IHCAP-(SSS) Swiss Project:-</b> Indian Himalayas Climate Adaptation Programme.                                                                                                                                                                                                                | 2014-2017 | CCD New Delhi & SDC Switzerland       | 28,67,040.00   | G.B.P.N.I.E. S.D Mohal Kullu- Himachal Pradesh. |
| 13 | <b>ISRO-GBP-JCK-I (H.P.) Project:</b> Aerosols Climatology over the northwestern Indian Himalayan region, Himachal                                                                                                                                                                               | 2005-2016 | Physical Research Laboratory Dept. of | 1,05,13,635.00 | G.B.P.N.I.E. S.D Mohal Kullu- Himachal          |

|     |                                                                                                                                                      |                       |                                          |              |                                          |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------|--------------|------------------------------------------|
|     | Pradesh.                                                                                                                                             |                       | Space,<br>Ahmedabad                      |              | Pradesh.                                 |
| 14  | <b>UCB-(IDB) :</b> Quality Plants Production & Promotion of Cultivation of Selected Himlayas Medicinal Plants for Livelihood Enhancement             | 2016-2019             | UCB- Biotech Bhawan Haldi, U.S. Nagar    | 9,03,600.00  | G.B.P.N.I.E. S.D Kosi Katarmal - Almora. |
| 15. | <b>PDF-B-GEF- Pollinator (LoA-III) project:-</b> Conservation and Management of pollinators for sustainable agriculture, through ecosystem approach. | 2014-2016             | F.A.O of the United Nations, Rome, Italy | 61,22,928.00 | G.B.P.N.I.E. S.D Kosi Katarmal - Almora. |
| 16. | <b>ICIMOD-Kailash Main (RSR) Project:</b> Kailash Sacred Landscape Conservation and Development Initiative (Programme Implementation)                | 2012-2016             | ICIMOD, Nepal                            | 45,22,000.00 | G.B.P.N.I.E. S.D Kosi Katarmal - Almora. |
| 17. | <b>ICIMOD-KLCDI-HKB Project (Addendum phase):-</b> Khangchendzonga Landscape Conservation & Development Initiative (KLCDI) India.                    | 2015 (April-December) | ICIMOD, Nepal                            | 66,85,512.2  | G.B.P.N.I.E. S.D Sikkim Unit             |

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Annexure-II

Research Projects under Integrated Eco-development Research Programme (IERP) of GBNPIHESD

S No	No of research projects related to Himalayas	Duration	Total fund outlay (Rs.)	Location
1.	Development of aerobic symbiotic diazotrophic and phosphatic bio-fertilizer for sustainable agriculture in central Himalaya by Dr. B. R. Maurya , Department of Soil Science and Agricultural Chemistry, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, U.P	2015-18	14,15,920/-	Uttarakhand
2.	Exploration and conservation of ecologically and economically important threatened plant species occurred in sacred groves of Assam by Dr. (Mrs.) Ashalata Devi , Department of Environmental Science, Tezpur University, Napaam, Sonitpur, Assam	2015-18	9,96,600/-	Assam
3.	Cultivation and productive	2015-18	8,62,000/-	Jammu and

S No	No of research projects related to Himalayas	Duration	Total fund outlay (Rs.)	Location
	potential of milky mushroom (<i>Calocybe indica</i> P&C) on different lignocellulosic wastes of Jammu division by Prof. Geeta Sumbali , Department of Botany, University of Jammu, J&K)			Kashmir
4.	Enhanced withanolides production in root cultures including transgenic roots of <i>Withania somnifera</i> (Ashwagandha) under micro/macro environment of rhizogenesis by Dr. Sanjeev Agarwal , Department of Biochemistry, CBSH, GBPUA&T, Pantnagar, U. S. Nagar, Uttarakhand	2015-18	10,82,150/-	Uttarakhand
5.	Assessment of diversity, bio-ecology and conservation strategies of wild silk moths (Oak tasar worm, <i>Antheraea spp.</i> (Lepidoptera: Saturnidae) in western Himalayan region of Uttarakhand, India (PI: Dr. P.C. Joshi , Department of Zoology and Environmental Science, Gurukula Kangri University, Haridwar, Uttarakhand)	2016-19	13,38,260/-	Uttarakhand
6.	Study of landslides and their significance on environment in the state of Sikkim by Dr. Varun Joshi , Guru Govind Singh Indraprastha University, Dwarka, New Delhi	2016-19	13,96,157/-	Uttarakhand
7.	तकनीकी हस्तांतरण द्वारा पशुचारा प्रबंधन एवं प्रसार (अन्वेषक: श्री जी०आर० टम्हा , युवा कल्याण विकास समिति, मटेला, अल्मोडा, उत्तराखण्ड)	2016-19	5,89,050/-	Uttarakhand
8.	Development of green campus in schools of Manipur, Northeast India by Dr. H.B. Singh , CSIR-North-East Institute of Science & Technology, Lamphelpat, Imphal, Manipur.	2016-19	9,84,500/-	Manipur
9.	Conservation by transplantation of rarest of rare perennial tuberous herb <i>Eremostachys superba</i> , in Siwalik and lower Mussoorie hills of Uttarakhand Himalayas by Dr. Y.P.S. Pundir , DBS (PG) College, Dehradun, Uttarakhand	2016-19	6,76,200/-	Uttarakhand

S No	No of research projects related to Himalayas	Duration	Total fund outlay (Rs.)	Location
10	Exploring Nettle as an alternative nutrition-rich field crop in Uttarakhand by Dr. Vasudha Pant , Green Hills Trust, Kranti Kuteer, East Pokharkhali, Almora, Uttarakhand.	2016-19	7,17,150/-	Uttarakhand
11	Bio-methanation of food waste at Sahstradhara tourist destination by high rate modular digester in collaboration of Sahstradhara destination management committee (SDMC) by Mr. Vipin Kumar , HIFEED, Ranichauri, Tehri Garhwal, Uttarakhand.	2016-19	14,74,000/-	Uttarakhand
12	Habitat study and exploration of species diversity of <i>Cordyceps</i> for their pharmacological effects on selective physiological parameters and artificial culture of selected species by Dr. Chandra Singh Negi , Department of Zoology, LSM Govt. Post Graduate College, Pithoragarh, Uttarakhand	2016-19	19,25,000/-	Uttarakhand
13	A study on some antioxidant and antimicrobial activity bearing aromatic and medicinal plants of North-West Himalaya: their active constituents, activity and impact of environmental factors on their active constituents by Dr. Girish Chandra Shah , Department of Chemistry, Kumaun University, S.S.J. Campus, Almora, Uttarakhand.	2016-19	12,99,500/-	Uttarakhand
14	Root-associated ectomycorrhizal fungi of Kashmir Himalayan conifers and effect of <i>in-vitro</i> mycorrhization of conifer seedlings on their growth and survival under field conditions by Prof. Zafar A. Reshi , Professor, Department of Botany, University of Kashmir, Srinagar, J&K	2016-19	15,43,500/-	Jammu and Kashmir
15	Sustainable management of land through improved <i>Albizia procera</i> plants in mid Himalayan region by Dr. (Mrs.) Neerja Rana , Department of Basic Science, Dr. Y.S. Parmar University of Horticulture and Forestry, Nauni, Solan, H.P.	2016-19	12,43,000/-	Himachal Pradesh
16	Organic farming promotion through sensitization, awareness	2016-19	10,89,000/-	Himachal Pradesh

S No	No of research projects related to Himalayas	Duration	Total fund outlay (Rs.)	Location
	generation and capacity building of farmers for sustainable agro-ecological systems, Improved livelihood for healthier Himalayan region by Dr. Yasmin Janjhua , Department of Business Management, Y.S. Parmar University of Horticulture and Forestry, Nauni, Solan, H.P.			
17	Vulnerability of disturbances, resource mapping & ex-situ conservation of endemic & relict species <i>Betula utilis</i> D. Don (Himalayan birch) in Sindh forest division of Kashmir by Dr. P.A Sofi , Faculty of Forestry, SKUAST of Kashmir, Benhama, Ganderbal, J&K.	2016-19	12,81,500/-	Jammu and Kashmir
18	Microbial keratinases – An economic, ecofriendly and innovative approach for waste management by Dr. Sunita Devi , Department of Basic Science, College of Forestry, Dr. YS Parmar University of Horticulture and Forestry, Nauni, Solan, H.P.	2016-19	19,68,560/-	Himachal Pradesh
19	Diversity and conservation of wild edible and medicinal mushrooms of Uttarakhand Himalaya by Dr. Rajendra Prasad Bhatt , Department of Botany & Microbiology, H.N.B. Garhwal University, Srinagar, Uttarakhand	2016-19	13,20,000/-	Uttarakhand
20	Biodiversity, habitat association and GIS mapping of Noctuid moths Noctuidae: Lepidoptera of Chirpine forest of Jammu Province (Jammu & Kashmir) India by Dr. Pawan Kumar , Forest Protection Division, Himalayan Forest Research Institute, Conifer Campus, Panthaghati, Shimla, H.P. .	2016-19	12,50,000/-	Himachal Pradesh
21	Conservation of <i>Pinus gerardiana</i> through mycorrhizal biotechnology by Dr. Ashwani Tapwal , Forest Protection Division, Himalayan Forest Research Institute, Conifer Campus, Panthaghati, Shimla, H.P	2016-19	16,84,000/-	Himachal Pradesh
22	Supplementary livelihood options through utilization of wild apricot fruit pulp and oil and conservation	2016-19	14,55,000/-	Uttarakhand

S No	No of research projects related to Himalayas	Duration	Total fund outlay (Rs.)	Location
	of Apricot through mass propagation at and around Uttarkashi by Dr. Arun K. Agrawal , Govt. P.G. College, Uttarkashi, Uttarakhand			
23	Conservation and management of biodiversity for the Darjeeling Himalaya by Dr. Gambir Singh Yonzon , Darjeeling Society of Education, Research and Development, 3B Kutcheri Road, Darjeeling, West Bengal	2016-19	11,20,000/-	West Bengal
24	Temperate mushrooms cultivation for livelihood development and natural resources conservation in the selected Panchayats of Mandi district in Himachal Pradesh by Dr. Maninder Jeet Kaur , Himalayan Research Group (HRG) Shimla, Umesh Bhavan, Chotta Shimla, H.P.	2016-19	14,59,500/-	Himachal Pradesh
25	Selection and genetic improvement of Wild Pomegranate (<i>Punica granatum</i>) – a commercially and ecologically important species of mid-hill regions of Himachal Pradesh by Dr. (Mrs.) Tara Gupta , Department of Tree Improvement & Genetic Resources, College of Forestry, Dr. Y.S. Parmar University of Horticulture & Forestry, Nauni, Solan, H.P.	2016-19	11,60,500/-	Himachal Pradesh
26	Education on water conservation, water quality and health hygiene by Dr. Bhavtosh Sharma , Uttarakhand Science Education & Research Centre (USERC), 33 Vasant Vihar, Phase -2, Dehradun, Uttarakhand	2016-19	5,96,000/-	Uttarakhand
27	Cultivation of organic agriculture and vegetable for livelihood improvement in the Himalayan region by Mr. B.C. Pandey , Parvatiya Vikas Evam Shodh Samiti (PVSS), Bageshwar, Uttarakhand	2016-19	6,64,650/-	Uttarakhand
28	Ecological, taxonomical and ethnobotanical study of wild edible plants of Nainital district in Uttarakhand, India by Dr. Lalit M. Tewari , Department of Botany, DSB Campus, Kumaun University, Nainital, Uttarakhand.	2016-19	13,65,000/-	Uttarakhand

S No	No of research projects related to Himalayas	Duration	Total fund outlay (Rs.)	Location
29	Plant traits, soil microbial properties and ecosystem services in agroforestry systems in Garhwal Himalaya by Prof. Kusum Arunachalam , Department of Environment & Natural Resource, Doon University, Kedarpur, Dehradun, Uttarakhand	2016-19	19,68,560/-	Uttarakhand
30	Income generation programme (IGP) for rural women through high valued medicinal plants cultivation in higher altitude villages particularly in flood affected areas of Uttarakhand by Dr. S.S. Koranga , Human India, Srikot, Sringar, Pauri Garhwal, Uttarakhand.	2016-19	14,09,100/-	Uttarakhand
31	Survey and validation studies on local food and medicinal bioresources of Kameng and Tawang districts of Arunachal Pradesh for supplementary rural livelihood security by Dr. Pallabi Kalita Hui , Department of Biotechnology and Chemical Engineering, National Institute of Technology (NIT), Yupia, Papum Pare, Arunachal Pradesh	2016-19	16,06,000/-	Arunachal Pradesh
32	Impact of hypolimnetic aeration on ecology of Naukuchiyatal lake, Kumaun Himalaya by Dr. P.K. Gupta , Deptt of Zoology, DSB Campus, Kumaun University, Nainital, Uttarakhand	2016-19	14,71,250/-	Uttarakhand
33	कौशल विकास व तकनीकी हस्तांतरण द्वारा ग्रामीणों को पशुधन के लिए प्रोत्साहित कर स्वरोजगार को बढ़ावा देना द्वारा श्री आर. एस कनवालए परवरिस सामाजिक कल्याण समिति, एन, टी, डी, अल्मोडा, उत्तराखण्ड	2016-19	7,98,000/-	Uttarakhand
34	Physicochemical and micro-biological assessment of some selected water springs of central Himalayan region by Dr. Gopal Krishna Joshi , Deptt. of Zoology and Biotechnology, HNB Garhwal University, Srinagar, Uttarakhand	2016-19	14,63,000/-	Uttarakhand

S No	No of research projects related to Himalayas	Duration	Total fund outlay (Rs.)	Location
35	Soil nutrient pool and microbial studies under different forest types in Uttarakhand Himalayas for sustainable management by Dr. Brij Mohan Dimri , Scientist 'D', Department of Forest Soil and Land Reclamation Division, New Forest Research Institute, Dehradun, Uttarakhand.	2017-20	13,42,000/-	Uttarakhand
36	A sustainable approach for cleanup of metal polluted soils using basil species with respect to their genetic diversity by Dr. Chitra Pande , Professor, department of Chemistry, DSB Campus, Kumaun University, Nainital, Uttarakhand.	2017-20	9,95,500/-	Uttarakhand
37	Documentation, nutrient analysis and cultivation of wild edible mushrooms of Nagaland by Dr. Talijungla , Associate Professor & Head, Department of Botany. Nagaland University	2017-20	10,40,600/-	Nagaland
38	Impact of changing climatic pattern in a part of Uttarakhand with specific reference to landslides in Garhwal region by Dr. Kishor Kumar , Chief Scientist, Geotechnical Engineering Division, CSIR-Central Road Research Institute, Delhi-Mathura Road, New Delhi - 110025.	2017-20	19,66,800/-	Uttarakhand
39	Fire adaptational features of important tree species of Himalayas and strengthening community participation in preventing forest fire by Dr. Pankaj Tewari , CHEA, Waldrof Compound, Mallital, Nainital.	2017-20	12,59,500/-	Uttarakhand
40	Building capacities of farmers for soil health management against changing climate conditions at rawain region of district Uttarkashi by Mr. Mahendra Singh Kunwar , HARC, Indira Nagar, Dehradun.	2017-20	14,30,000/-	Uttarakhand
41	बिनसार अभयारण्य में जैव विविधता संरक्षण के लिए सहभागिता एवं समीपवर्ती गांवों में सतत ग्रामीण विकास हेतु प्रौद्योगिकी प्रदर्शन एवं प्रसार परियोजना द्वारा श्री ईश्वर दत्त जोशी, लोक प्रबंध विकास संस्था, ग्राम एवं पोस्ट- सुनोली, अल्मोडा, उत्तराखण्ड	2017-20	8,00,000/-	Uttarakhand

S No	No of research projects related to Himalayas	Duration	Total fund outlay (Rs.)	Location
42	Exploring documenting and conserving the secondary fungal diversity associated with unexplored niche (i.e. Lichens) in Uttarakhand with special reference to Kumaun Himalaya by Dr. Yogesh Joshi , Assistant Professor, Department of Botany, SSJ Campus, Almora, Uttarakhand.	2017-20	12,48,500/-	Uttarakhand
43	Uttarakhand Sustainable community-based management of minor forest products (MFP) to enhance local livelihoods in western Arunachal Pradesh. India by Dr. Pijush Kumar Dutta , WWF-India, Game village, Vasistha, Guwahati, Assam.	2017-20	14,57,500/-	Assam
44	Livelihood enhancement through integration of mushroom cultivation and dairy farming in Jaunpur block, Tehri district, Uttarakhand by Ms. Upasana Joshi , Center for business and entrepreneurial development, 195/1, Vasant vihar, Phase-2, Dehradun, Uttarakhand.	2017-20	9,55,500/-	Uttarakhand
45	Seed dispersal and seed persistence potential of alpine plants – A case study of Tungnath Timberline by Dr. Shyam Singh Phartyal , Assistant Professor, Department of forestry & NR, HNBGU, Chauras Campus, Kilkileshwar, Tehri Garhwal, Uttarakhand.	2017-20	14,00,000/-	Uttarakhand

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#### Annexure-III

#### **Details of projects under National Mission on Himalyan Studies (NMHS)**

| <b>S No</b> | <b>Particulars of the NMHS projects</b>                                                                                                                    | <b>Fund allocated/ Sanctioned</b> | <b>Location</b>                                                       |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------------|
| 1.          | “Biodiversity Assessment through Long-term Monitoring Plots in Indian Himalayan Landscape”<br>Dr. Paramjit Singh,<br>Botanical Survey of India, Kolkata(WB | 3.43                              | Uttarakhand,<br>Himachal Pradesh,<br>Sikkim<br>,Arunachal Pradesh and |

| S No | Particulars of the NMHS projects                                                                                                                                                                                                                                                                                                                                                                        | Fund allocated/ Sanctioned | Location                                                                     |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------------------------------------------------------|
|      |                                                                                                                                                                                                                                                                                                                                                                                                         |                            | West Bengal                                                                  |
| 2.   | “Rejuvenation of springs and Spring-fed Streams in Mid-Himalayan Basins using Spring Sanctuary Concept”<br>Er. S. Tarafdar,<br>GBPNIHESD, Garhwal Unit, Srinagar (UK).                                                                                                                                                                                                                                  | 3.77                       | Uttarakhand and Himachal Pradesh and Arunachal Pradesh                       |
| 3.   | “Management and Long-Term Monitoring of Shifting Cultivation and Coal Mining in North-Eastern India”<br>Prof. S. K. Barik,<br>North-Eastern Hill University, Shillong, Meghalaya.                                                                                                                                                                                                                       | 2.86                       | Meghalaya                                                                    |
| 4.   | “Timberline and Altitudinal Gradient Ecology of Himalayas, and Human Use Sustenance in a Warming Climate”<br>Prof. S. P. Singh,<br>Central Himalayan Environment Association (CHEA),<br>Nainital (UK).                                                                                                                                                                                                  | 6.41                       | Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh |
| 5.   | “Human- Wildlife Conflict Resolution Mechanism in Indian Himalayan Region: Risk Assessment, Prediction, and Management through Research and Community Engagement”<br>Dr. G. S. Rawat,<br>Wildlife Institute of India, Dehradun (UK)                                                                                                                                                                     | 4.45                       | Himachal Pradesh, Uttarakhand and Sikkim                                     |
| 6.   | “Dynamics of Himalayan Ecosystem and its Impact under Changing Climate Scenario”<br>Prof. A. P. Dimri,<br>Jawaharlal Nehru University, New Delhi.                                                                                                                                                                                                                                                       | 2.10                       | Himachal Pradesh and Uttarakhand                                             |
| 7.   | “Coping with Uncertainty: Building Community Resilience and Ecosystem Based Adaptation to Climate Change in the Indian Himalayan Region”<br>Prof. J. S. Rawat,<br>International Union for Conservation of Nature (IUCN),<br>New Delhi                                                                                                                                                                   | 5.36                       | Uttarakhand and Sikkim                                                       |
| 8.   | “Environmentally Sustainable Smart Synthesis of Carbon Nano material along with the production of High Value Added Fuel and Additives for the Concrete Mixture from Waste Plastic, Hazardous Waste Around the Himalayan Region”.<br>Dr. Nanda Gopal Sahoo,<br>Nanoscience and Nanotechnology center, Department of Chemistry, Kumaun University, Nainital                                               | 1.97                       | Uttarakhand,                                                                 |
| 9.   | “Establishment of Gene Pool, Propagation and Ex-Situ Conservation of selected sensitive high altitude Medicinal and Aromatic plant species and Nature Interpretation Site (NIS) for creating Awareness among the various stakeholders”<br>Dr. P. Prasad,<br>High Altitude Plant Physiology Research Centre (HAPPRC) Hemwati Nandan Bahuguna Garhwal University (A Central University Srinagar (Garhwal) | 2.08                       | Uttarakhand,                                                                 |

| S No | Particulars of the NMHS projects                                                                                                                                                                                                                                                                                                                                                                                                                       | Fund allocated/ Sanctioned | Location                                          |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------------------------------------------------|
| 10.  | “Sustainable use of Sikkim Himalayan Biodiversity for socioeconomic development of mountain villages with special reference to <i>Ophiocordyceps sinensis</i> , <i>Hippophae salicifolia</i> , <i>Docynia indica</i> and <i>Rhus chinensis</i> : Technology development, alternative livelihood and conservation”<br>Dr. Dhani Raj Chhetri,<br>Associate Professor, Dept. of Botany, Sikkim University, 6th Mile, Samdur, P.O. Tadong, Gangtok, Sikkim | 0.94                       | Sikkim.                                           |
| 11.  | “Collection, evaluation and conservation of native crops germplasm from Uttarakhand hills and pre-breeding through community participation”<br>Dr. Anand Singh Jeena,<br>Professor, Directorate of Experiment Station, G.B. Pant University of Agriculture & Technology, Pantnagar, U.S. Nagar, Uttarakhand                                                                                                                                            | 0.51                       | Uttarakhand.                                      |
| 12.  | “Multidisciplinary studies in Floristic assessment, ecological analysis, ecosystem services, conservation and sustainable management of selected National Parks in Western Himalaya”<br>Dr. Paramjit Singh/BSI, Kolkata, W.B.                                                                                                                                                                                                                          | 0.71                       | Himachal Pradesh and Uttarakhand                  |
| 13.  | “A Sustainable Approach for livelihood improvement by Integrated Natural Resource Management in the central Himalaya”<br>Dr. D.S. Rawat,<br>Scientist 'F', GBPIHED, Kosi-Katarmal, Almora, Uttarakhand.                                                                                                                                                                                                                                                | 2.42                       | Uttarakhand                                       |
| 14.  | “Enhancing livelihood of Himalayan communities through action research and transforming wild produces into high value products”<br>Dr. Rajendra Dobhal,<br>Uttarakhand State Council For Science & Technology (U-COST), Department of Science & Technology, Govt. of Uttarakhand, Dehradun.                                                                                                                                                            | 2.50                       | Uttarakhand                                       |
| 15.  | “Understanding Mountain Peoples' approach and practices to combating Climate Change in the Indian Himalayan Region: Research to Renewal and Reforms”<br>PI: Dr. Sushil Ramola, IMI, New Delhi                                                                                                                                                                                                                                                          | 0.94                       | Uttarakhand                                       |
| 16.  | “Creating Communities of Practice and resilient village ecosystems in the mountain region of Uttarakhand”<br>PI: Dr. Lalit Pandey, Seva Nidhi, Almora                                                                                                                                                                                                                                                                                                  | 0.95                       | Uttarakhand                                       |
| 17.  | “Anthropogenic impacts and their management options in different ecosystems of the Indian Himalayan Region”<br>PI: Dr. J.C. Kuniyal, GBPNIHESD, HP Unit, Kullu                                                                                                                                                                                                                                                                                         | 2.68                       | Jammu & Kashmir, Himachal Pradesh and Uttarakhand |
| 18.  | “Capacity Building Strategies for Managing Complex Disasters in the face of Climate Change”<br>PI: Dr. Shyamli Singh, IIPA, New Delhi.                                                                                                                                                                                                                                                                                                                 | 0.82                       | Sikkim and Tripura                                |
| 19.  | “Strengthening State Training Institutions for Enhancing Capacities of Functionaries and Communities in Four Himalayan States”<br>PI: Dr. Ruchi Pant, UNDP, India, New Delhi                                                                                                                                                                                                                                                                           | 3.27                       | Himachal Pradesh, Uttarakhand, Sikkim,            |

| <b>S No</b> | <b>Particulars of the NMHS projects</b>                                                                                                                                                                                                                                         | <b>Fund allocated/ Sanctioned</b> | <b>Location</b>   |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------|
| <b>20.</b>  | “Study and Monitoring of Climate Change Impacts and Health of the Environment of the Trans Himalayan Region of Ladakh and the Designing of Effective Development Strategies and Interventions for Adaptation and Mitigation”<br>PI: Mr. Jigmet Tapka, LREDA, Leh-Ladakh, J&K    | 3.71                              | Jammu & Kashmir,  |
| <b>21.</b>  | “Developing Disaster Resilience Action plan through GIS and prioritizing actions for Natural Disaster Risk Reduction in Urban Agglomerations of Shillong & Gangtok”<br>PI: Dr. Jyoti Parikh, IRADe, New Delhi                                                                   | 1.28                              | Sikkim            |
| <b>22.</b>  | “Community-Managed Conservation of Orchid Biodiversity and Tribal Livelihood Improvement in Manipur Hill Area”<br>PI: Dr. A.N. Rao, FEEDS, Manipur                                                                                                                              | 2.23                              | Manipur           |
| <b>23.</b>  | “Innovative Technologies for Climate Change Mitigation and Biodiversity Conservation with alternate livelihood opportunities for mountain communities in North Western Himachal Himalayas”<br>PI: Lal Singh, HRG, Himachal Pradesh                                              | 0.87                              | Himanchal Pradesh |
| <b>24.</b>  | “Fish Faunal Diversity, Habitat Ecology and their Conservation strategies of the Kameng River system in Arunachal Pradesh.”<br>PI: Dr. Dandadhar Sarma,<br>Associate Professor, Department of Zoology, Gauhati University, Guwahati, Assam                                      | 0.25                              | Arunachal Pradesh |
| <b>25.</b>  | “Identification, assessment and enhancement of soil carbon and nitrogen sequestration potential of different ecosystems in the central Himalayan through a participatory approach”<br>Shri. V.S. Meena<br>Scientist (Soil Science), ICAR-VPKAS, Almora, Uttarakhand             | 0.33                              | Uttarakhand       |
| <b>26.</b>  | “Population dynamics and Biogeography of Himalayan Mouse-Hare Ochotona roylei in relation to their impact on the medicinal flora of Western Himalaya”<br>Prof. S.N. Bahuguna,<br>Department of Zoology & Biotechnology, H.N.B Garhwal University, Srinagar-Garhwal, Uttarakhand | 0.27                              | Uttarakhand       |
| <b>27.</b>  | “Conservation strategies for Taxus wallichiana and Ulmus wallichiana by DNA markers and geospatial technology”<br>Dr. Pankaj Bhardwaj,<br>Centre for Plant Sciences, Central University of Punjab, City Campus, Mansa Road, Bathinda, Punjab                                    | 0.35                              | Jammu & Kashmir   |
| <b>28.</b>  | “Survey and Mapping of Medicinal and Aromatic Plants (MAPS) and other RET/NTFPs on alpine regions of Uttarakhand and developing Uttarakhand-Alpine Information System (UK-AIS)”<br>Dr. Gajendra Singh,<br>Uttarakhand Space Application Centre, Dehradun, UK.                   | 0.37                              | Uttarakhand       |
| <b>29.</b>  | “Vegetation heterogeneity and impacts of changing climatic and land use patterns on two contrasting                                                                                                                                                                             | 0.25                              | Jammu & Kashmir   |

| S No | Particulars of the NMHS projects                                                                                                                                                                                                                                                                                                                                                            | Fund allocated/ Sanctioned | Location         |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------|
|      | timberline ecotones of Upper Chenab catchment, J&K and conservation strategies thereof<br>Prof. Anil K Raina,<br>Professor and Head, Department of Environmental Sciences, University of Jammu, Baba SahebAmbedkar Road, New University Campus Jammu (J&K)                                                                                                                                  |                            |                  |
| 30.  | "Drinking Water Security for Rural Areas in Uttarakhand Himalayas by Riverbank Filtration, Robust Disinfection Systems and Community Participation"<br>Er. P.S. Patwal,<br>Jal Bhawan, Cooperation Centre for Riverbank Filtration (CCRBF), Dehradun                                                                                                                                        | 0.50                       | Uttarakhand      |
| 31.  | "Development of psychrophilic earthworms for bio-waste conversion in Guraj and Tulail valleys of Jammu & Kashmir"<br>Dr. Tahir Ahmad Sheikh,<br>Assistant professor (Agronomy), Chief Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir, Shalimar, Srinagar, J&K                                                                                                 | 0.14                       | Jammu & Kashmir  |
| 32.  | "Geomorphic characterization of flash floods and mass wasting in upper Ganga terrain of Garhwal Himalaya: role of climate - tectonic interaction in gradation processes".<br>Dr. A.K. Pandey,<br>CSIR, National Geophysical Research Institute Uppal Road, Hyderabad                                                                                                                        | 0.50                       | Uttarakhand      |
| 33.  | "Post-Fire Management in the Pine Fortes of Indian Himalayan Region By studying, conserving and distributing cultivable microbial biota to increase ecological succession and to revive forest productivity"<br>Prof. Adesh K Saini,<br>Center of Himalayan Research on Himalayan Sustainability and Development, Shoolini University of Biotechnology and Management Sciences, Solan (HP). | 0.40                       | Himachal Pradesh |
| 34.  | "Understanding the degradation and loss of primary forest in the Teesta valley of the Sikkim Himalaya: a framework for recovery and management of biodiversity and bio-resources"<br>Dr. Robert John Chandran,<br>Indian Institute of Science Education and Research, Kolkata (WB)                                                                                                          | 0.23                       | Sikkim           |
| 35.  | "Ecological monitoring and status of fish fauna in hydropower affected Alaknanda-Bhagirathi-Ganga Rivers"<br>Dr. Prakash Nautiyal,<br>Department of Zoology& Biotechnology, HNB Garhwal University, Srinagar, Uttarakhand.                                                                                                                                                                  | 0.21                       | Uttarakhand      |
| 36.  | "Environmental monitoring and assessment of climate change of tourism affected Himalayan sub regions of Shimla and Chamba (HP)"<br>Dr. Sunil Mittal (Asth. Professor),<br>Centre for Environmental Science and Technology, Central University of Punjab, Batinda                                                                                                                            | 0.32                       | Himachal Pradesh |

| S No | Particulars of the NMHS projects                                                                                                                                                                                                                             | Fund allocated/ Sanctioned | Location        |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------|
| 37.  | "Restoration of Ecosystem Services by Community Involvement in Rudrasagar Lake of Tripura"<br>PI: Dr. Sourabh Deb, Tripura University                                                                                                                        | 0.24                       | Tripura         |
| 38.  | "Capacity building on bamboo treatment techniques for promotion of Earthquake Resilient Housings and Structures in Hill regions of Tripura"<br>PI: Pawan K. Kausik, Centre for Forest, Tripura                                                               | 0.30                       | Tripura         |
| 39.  | "Promotion of High Value-Low volume crops based enterprises in Higher Himalayas of Uttarakhand"<br>PI: Mr. B.M. Kandpal, SIMAR, Dewal, UK                                                                                                                    | 0.28                       | Uttarakhand     |
| 40.  | "Conservation of local ecology, and degraded or wasteland management through "Rambans" (Agave) plantation and generation of availability of resources in villages for providing base to livelihood activities "<br>PI: Mr. Satish Kandwal, GAURAS, Pauri, UK | 0.34                       | Uttarakhand     |
| 41.  | "Bamboo bricks/laminates from BMFs (Bamboo Micron Fibres) for low cost housing structures for North Eastern Himalayan region"<br>PI: Dr. S. Halder, NIT, Silcher, Assam                                                                                      | 0.45                       | Assam           |
| 42.  | Livelihood improvement and empowerment of rural poor through quality bulb production in cut flowers under temperate conditions of Kashmir Valley PI: Dr. Z.A. Bhat, SKUAST, J&K                                                                              | 0.44                       | Jammu & Kashmir |

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Annexure-IV

Details of research projects sponsored by the various foreign funding agencies in GBPNHESD

S No.	Name of the Project	Duration	Funding Agency	Total project outlay	Location
1.	PDF-B-GEF- Pollinator (LoA-III) project:- Conservation and Management of pollinators for sustainable agriculture, through ecosystem approach.	2014-2016	F.A.O of the United Nations, Rome, Italy	61,22,928.00	G.B.P.N.I.E. S.D Kosi Katarmal - Almora, Uttarakhand
2.	ICIMOD-Kailash Main (RSR) Project: Kailash Sacred Landscape Conservation and Development Initiative (Programme Implementation)	2012-2016	ICIMOD, Nepal	45,22,000.00	G.B.P.N.I.E. S.D Kosi Katarmal - Almora, Uttarakhand

3.	ICIMOD-KLCDI-HKB Project (Addendum phase):- Khangchendzonga Landscape Conservation & Development Initiative (KLCDI) India.	2015 (April-December)	ICIMOD, Nepal	66,85,512.2	G.B.P.N.I.E. S.D Sikkim Unit, Tadong, Sikkim
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