

National Mission on Himalayan Studies (NMHS)

HIMALAYAN RESEARCH FELLOWSHIP

(FORMAT FOR THE HALF YEARLY PROGRESS REPORT)

[Reporting Period: from 1st Jan 2018 to 30th June 2018]

Name of the Institution/ University:	Doon University
No. of Himalayan Research/Project Associate:	3
No. of Himalayan Junior Research/Project Fellows:	10

Himalayan Research/Associate

H-RAs Profile Description:

S. No.	Name of RA	Date of Joining	Name of the PI	Qualification
HRA-001	Dr. Tripti Mishra	2 nd September 2016	Dr. Ujjwal Kumar Dr. Vijay Shridhar	Ph.D.
HRA-002	Dr. Vivek Joshi	2 nd August 2016	Prof. Kusum Arunachalam	Ph.D.
HRA-003	Dr. Niyati Naudiyal	4 th July 2017	Prof. Harsh Dobhal Dr. Ujjwal Kumar	Ph.D.

Progress Report: H-RAs

RA No.	Research Objectives	Achievements	Addressed Deliverables	Location of Field Site with Details, if any
HRA-001	<ul style="list-style-type: none">Energy efficiency study in 13 districts of stateExtent of application of new policies and best practices	<ul style="list-style-type: none">Input oriented Data Envelopment Analysis (DEA) to estimate the overall, technical, and scale efficiency of 35 Electricity distribution division (EDD) in 13 districts of Uttarakhand. The results show that hill division are less efficient and have scope for improvement.Slack analysis to formulate improvement directions for relatively inefficient divisions.The results will support policy makers to increase the operational efficiency of EDDs leading to higher working efficiency and profitability of the state electricity board.	<ul style="list-style-type: none">Support Non-conventional energy sector (In Progress)Promote intervention of state-of-the-art technology (In Progress)Existing institutions and regulatory mechanisms strengthened (In Progress)	35 Electricity distribution division in 13 districts of Uttarakhand
HRA-002	<ul style="list-style-type: none">Survey, Inventory and Assessment of	<ul style="list-style-type: none">Field survey of 72 villages in 5 districts of Uttarakhand for assessment of fuel wood, fodder requirements and	<ul style="list-style-type: none">Participatory conservation framework	Seven Districts: Almora,

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	<p>traditional natural resources.</p> <ul style="list-style-type: none"> ● Management practices in the context of Climate change. ● Development of adaptation strategies. 	<p>annual carbon emission values has been collected.</p> <ul style="list-style-type: none"> ● Data from 98 villages in 6 districts was recorded for assessing extent of anthropogenic disturbances on community forest. ● Tree, shrub and grass species being used for fodder, fuel wood and agricultural tools has been recorded. ● Data of status of springs inside Van-Panchayat forest from 98 villages has been collected. ● Data on regeneration status of seedling of 32 species from Van Panchayat and soyam forest collected. Data on major causes effecting seedling recruitment identified. ● Data on medicinal plant collection, non timber forest resources have been collected. 	<p>developed (In progress)</p> <ul style="list-style-type: none"> ● Sustainable harvesting protocols for diverse natural resources developed (In progress) ● Local natural resource management institutions strengthened (In progress) ● Good practices documented and up-scaled. (In progress) 	<p>Pithoragarh, Bageshwar, Champawat, Dehradun, Uttarkashi, and Nainital</p>
HRA-003	<ul style="list-style-type: none"> ● Study of outmigration pattern in Uttarakhand Himalaya ● Study the factors responsible and solutions 	<ul style="list-style-type: none"> ● Field data collection in Tehri Garhwal, Uttarkashi, and Dehradun hills. Key Person interviews (n=30) and household surveys (n= 480) ● Compilation and preliminary analysis of field data collected so far which includes data from Pithoragarh, Almora, Bageshwar, Pauri, Tehri, Dehradun, and Uttarkashi. ● An ordinal regression analysis was to know the influence of developmental variables (e.g. education, healthcare, water, electricity, market, banking, communication, and transport facilities etc.) on the tendency of the rural population to migrate from their native villages ● Binomial logistic regression analysis to assess the influence of outmigration and livelihood diversification on farm-exit tendency ● Research publications communicated: <ol style="list-style-type: none"> 1. Rural out-migration as a response to developmental inadequacies: A study of causative factors influencing human migration in the Central Himalayan mountain villages of India (Communicated to: Asian and Pacific Journal of Migration) 2. The future of mountain agriculture amidst continual farm-exit, livelihood diversification, and out-migration in the Central Himalayan villages of India (Communicated to: Journal of Mountain Science) 	<ul style="list-style-type: none"> ● Recommendations of policy changes for reducing outmigration (In Progress) ● Alternate livelihood options (In Progress) 	<p>Out of the total 13 districts of Uttarakhand, the study focuses on 11 hill districts (Pithoragarh, Almora, Bageshwar, Pauri, Tehri, Dehradun, Nainital, Champawat, Uttarkashi, Chamoli, Rudraprayag).</p> <p>Out of the selected districts Pithoragarh, Almora, Bageshwar, Pauri have been surveyed by Dec 2017.</p> <p>During the assessment period Jan-June 2018 Tehri Garhwal, Uttarkashi, and Dehradun hills have been covered.</p>

Himalayan Junior Research/Project Fellows

H-JRFs Profile Description:

S. No.	Name of JRF	Date of Joining	Name of the PI	Qualification
HJRF-1	Mr. Parmendar Singh	1 st Dec 2016	Dr Vijay Shridhar Dr Archana Sharma	M. Tech. (Environment technology)
HJRF-2	Ms. Rashi Srivastava	1 st Dec 2016	Dr Achlesh Daverey Dr Archana Sharma	M. Tech. (Environmental Technology)
HJRF-3	Ms. Priyanka Kumari	1 st Dec 2016	Prof. Kusum Arunachalam Dr. Vijay Shridhar Dr. Archana Sharma	M.Sc. (Environment Management)
HJRF-4	Ms. Ina Bahuguna	1 st Aug 2016	Prof. Harsh Dobhal Prof. Kusum Arunachalam	Masters in Economics
HJRF-5	Mr. Kailash Chandra	1 st Dec 2016	Dr. Vijay Sridhar Prof. Kusum Arunachalam	M.Sc. Zoology
HJRF-6	Ms. Shikha Arora	1 st Aug 2016	Dr. Achlesh Daverey	M.Sc. (Forestry)
HJRF-7	Mr. Yudhistter Dutt	1 st Dec 2016	Dr. Ujjwal Kumar Dr. Vijay Shridhar Dr. Archana Sharma	M.Sc. (Environment Management)
HJRF-8	Mr. Vivek Kumar Kushwah	1 st Aug 2016	Prof. Harsh Dobhal Prof. H. c. Purohit Prof. Kusum Arunachalam	M.Sc. (Forestry, wildlife & environmental science)
HJRF-9	Ms. Priyanka Sharma	1st Dec 2016	Dr. Ujjwal Kumar Prof. Kusum Arunachalam Dr. Achlesh Daverey	M.Sc. (Environmental Science)
HJRF-10	Ms. Devanshi Singh	5th Dec 2016	Dr. Ujjwal Kumar Prof. Kusum Arunachalam Dr. Achlesh Daverey	M.Sc. (Biotechnology)

Progress Report: JRFs

JRF No.	Research Objectives	Achievements	Addressed Deliverable	Location of Demonstration/ Study Site with Details
HJRF-1	<ul style="list-style-type: none"> Issues for sustainable tourism including ecotourism Changing patterns of tourism 	<ul style="list-style-type: none"> Database on total number of jungle safaris, and unregulated flow of tourist safaris Existing solid waste management status of Dhikuli region identified Data collected and compiled on changing patterns of revenue generated/tourists in Rajaji Tiger Reserve from 2012 to 2016 	<ul style="list-style-type: none"> Ecologically compatible equitable tourism promoted/implemented leading to stoppage of unregulated tourism (in progress) Changing patterns of tourism is recorded from selected study area and is under process for analysis. (In progress) 	Chilla and Motichur (Rajaji Tiger Reserve) range and Jhirna/ Bijrani/ Sitabani (Corbett Tiger Reserve) were selected for the study site because these are the most attractive regions for Jungle safaris with higher tourist impact.

HJRF-2	<ul style="list-style-type: none"> Waste management, including management of hazardous substances Innovative approaches developed and implemented/ Quantity of waste treated/ managed 	<ul style="list-style-type: none"> The details on the type and number of major polluting industries that are linked with Common Effluent Treatment Plant (CETP) have been identified. The technology adopted to manage primary sludge and bio-sludge from CETP has been identified. Survey on the details about the innovative technologies used at CETP done and it would be available, once commissioned and made operational. 	<ul style="list-style-type: none"> Up scaling of best practices supported (in progress) Existing institutions and regulatory mechanism strengthened (in progress) 	<p>For the purpose of hazardous waste management system, Haridwar was selected as the sample site area because of the presence of large number of industries. The member industries of CETP are textile, cosmetic, food products, plastic/rubber moulders, pharmaceutical (formulation), metal/auto parts, electrical and electrical devices which constitute for about total 100 industries. The amount of solid waste generated at CETP is approximately 25 tonnes/month.</p>
HJRF-3	<ul style="list-style-type: none"> The issues concerning development in sensitive areas 	<ul style="list-style-type: none"> The satellite data (Bhuvan and USGS portal) and the data from tourism department, Uttarkashi forest division, NHIDCL and others related to the research objective were collected Thematic layers for vulnerability indicators (slope, drainage, and road network etc.) have been developed using satellite data as well as data from other sources. 	<ul style="list-style-type: none"> Scientific evidences and database developed /augmented/ disseminated (in progress) GIS analysis of different factors for evaluating the sensitivity of the study area (In progress) 	<p>Dunda and Bhatwari Block of Uttarkashi District</p>
HJRF-4	<ul style="list-style-type: none"> Testing options for human capacity building including promotion of micro-enterprises and green technologies 	<ul style="list-style-type: none"> Data was collected from six districts (3 districts during Jan-June 2018). The compilation and analysis of these data have been completed. Primary database of human capacity building indicators have been prepared for 6 districts of Uttarakhand. The detailed study of different government data and reports highlighting the problem and recommendations for micro enterprises. The manuscript titled "Status of natural resource based microenterprises in central Himalaya: Identifying and evaluating indicators of capacity building" is prepared. 	<ul style="list-style-type: none"> Identify key sectors and capacity building needs of those having an immediate bearing on conservation and livelihoods. (Completed) Natural resource based and community oriented microenterprises developed/ promoted.(in progress) 	<p>The study is focussed on 11 hill districts of Uttarakhand, out of which six has been completed (three during Jan-Jun 2018).</p> <p>Uttarkashi district coverage in hamlets/villages/towns : (Bharamkhal, Jaspur, Uttarkashi city, Joshiyara, Dunda, Harsil, Bagori)</p> <p>Tehri Garhwal district coverage in hamlets/villages/towns : (Ghansali, Chamiyala, Budha kedar, Binakhal, Tingadh, Chopriyal,</p>

		<ul style="list-style-type: none"> ● Three best practices case studies in hill region (Almora, Uttarkashi, Tehri) were documented in detail. 		<p>Suakholi, Raushnikhal, Chamba, Ranichori)</p> <p>Dehradun district coverage in hamlets/villages/towns : (Kalsi, Chakrata, Tuini, Dehradun city, Rishikesh, Mussorie)</p>
HJRF-5	<ul style="list-style-type: none"> ● Conservation of genetic resources of rare, endemic, threatened and globally significant flora and fauna including agro-biodiversity 	<ul style="list-style-type: none"> ● Data on anthropogenic pressures and habitat preference of select mammal species is being collected and is under analysis ● Data on agro biodiversity of the adjacent villages have been collected. ● Encounter rate of Himalayan Grey Ghoral, Himalayan Serow, Asiatic Black Bear and Musk Deer have been assessed. 	<ul style="list-style-type: none"> ● Conservation of endemic/threatened/significant species augmented through ex situ/ in situ mechanisms. (in progress) 	Askot Wildlife Sanctuary, District Pithoragarh
HJRF-6	<ul style="list-style-type: none"> ● Development of database of alien plant species occurring in Uttarakhand Himalayas. ● Isolation of alien plants extracts and their screening for bio preservation of wood. 	<ul style="list-style-type: none"> ● The database has been upgraded. Initially 265 alien plant species were reported but now the list comprises a total of 420 species with respect to their family, nativity, life form and altitudinal range. ● <i>Lantana camara</i> has also been selected for studying its bio-preservative potential. ● Authenticated and essential oil extracted from its aerial parts and yield determined. ● Oil obtained was analysed using GCMS and chemical constituents of leaves and flowers of <i>Lantana camara</i> identified by comparing their Kovats Retention Index (KRIs) ● The extracts of <i>Eupatorium adenophorum</i> were characterized qualitatively as well as quantitatively. ● Ph.D. synopsis submitted and approved 	<ul style="list-style-type: none"> ● Database of alien plants species (completed) ● Development of bio-preservatives (in progress) 	Uttarakhand Himalayas
HJRF-7	<ul style="list-style-type: none"> ● Appraisal to plant diversity and restoration of degraded lands in Pithoragarh district 	<ul style="list-style-type: none"> ● Plant Diversity data of temperate, sub alpine and alpine meadows is collected. ● Land use change pattern of Pithoragarh district completed using Landsat imageries. ● GIS mapping of Pithoragarh 	<ul style="list-style-type: none"> ● Database of plant resources will be available (in progress) ● Database of indigenous technologies of plant use generated (in progress) 	Pithoragarh town fringe area. Didihat forest area. Dharchula forest area. Munsiyari (Khaliya bugyal)

		forest cover has been completed using sentinel imagery.		
HJRF-8	<ul style="list-style-type: none"> ● Supplementary livelihood options for rural population and other population ● Study the market linkages. 	<ul style="list-style-type: none"> ● Community meetings in the study area to suggest alternate livelihood options which include: MAP cultivation, backyard poultry farming, Bee keeping and mushroom cultivation ● Market linkages have been identified on the basis of responses from farmers/shopkeepers/middleman. The volunteering farmers from the study area have been linked to the local NGOs that provide training on value addition of agriculture and forest produces ● Assessment of tourism potential in the rural and urban area of Dehradun district is completed ● Study of traditional knowledge of handicrafts and handlooms workers is completed in the study area. 	<ul style="list-style-type: none"> ● Recommendations on livelihood (completed) ● Development of market linkage options (in progress) 	<p>Study area comprises of six Tehsil of Dehradun district of Uttarakhand. Study area divided into hilly and plain region and 10 villages in each Tehsil have been surveyed.</p> <p>To study the potential of tourism in the study area 8 sites have been surveyed during Jan-Jun 2018 which include: Sahastradhara, Tapkeshwar, Mussoorie, Chakrata, Hanol, Lakhamandal, Koti-kanasar and Kathiyan.</p>
HJRF-9	<ul style="list-style-type: none"> ● Effect of forest fires on nutrient dynamics in the soil. 	<ul style="list-style-type: none"> ● Soil sampling has been done to study the post fire impact on nutrient dynamics ● Soil nutrients analysis has been completed. ● Soil nutrients were found to be significantly changed after forest fire. However, these changes were different for different forest type. ● Further sampling was carried out during June-2018 as well. 	<ul style="list-style-type: none"> ● Database on impact of forest fire (in progress) ● Policy recommendations (in progress) 	<p>soil samples were collected at two different depths (0-15 and 15-30 cm), in three different forest types Sal forest, Oak forest and Pine forest for the four sites (Thano, Khirsu, Bubakhal and Tehri) from three different districts namely Dehradun, Pauri Garhwal, Tehri Garhwal</p>
HJRF-10	<ul style="list-style-type: none"> ● Effect of forest fires on microbial biomass and diversity 	<ul style="list-style-type: none"> ● Sampling has been done to analyze the impact of forest fire ● Significant changes in enzymatic activities of three enzymes Dehydrogenase, acid phosphatase and alkaline phosphatase has been found ● Changes in microbial biomass after forest fire were found to be significant. ● Study area has been decided to study the impact on microbial and enzymatic properties after forest fire on the basis of the previous result ● Further sampling was carried out during June-2018 as well. 	<ul style="list-style-type: none"> ● Database on impact of forest fire (in progress) ● Policy recommendations (in progress) 	<p>Dehradun, Pauri Garhwal, Tehri Garhwal</p>

(Signature of Registrar/ Head of Department)

Report (hard copy) should be submitted to:

The Nodal Officer, NMHS-PMU
G.B. Pant National Institute of Himalayan Environment and Sustainable Development (GBPNIHESD)
Kosi-Katarmal 263 643, Almora, Uttarakhand

Report (soft copy) should be submitted to:

E-mail: nmhspmu2016@gmail.com