

**Half yearly progress report
(April to December 2016)**

On

**HIMALAYAN RESEARCH FELLOWSHIP
[NATIONAL MISSION ON HIMALAYAN STUDIES (NMHS)]**

**submitted
to**

**GOBIND BALLABH PANT NATIONAL INSTITUTE OF HIMALAYAN ENVIRONMENT AND
DEVELOPMENT, ALMORA (UTTARAKHAND)**

by



**CSIR-INSTITUTE OF HIMALAYAN BIORESOURCE TECHNOLOGY
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National Mission on Himalayan Studies (NMHS)

HIMALAYAN RESEARCH FELLOWSHIP

(FORMAT FOR THE HALF YEARLY PROGRESS REPORT)

[Reporting Period: from April 2016 to 31 December 2016]

Name of the Institution/ University:	CSIR- Institute of Himalayan Bioresource Technology, Palampur -176061, Himachal Pradesh
No. of Himalayan Research/Project Associate:	01
No. of Himalayan Junior Research/Project Fellows:	05

Himalayan Research/Associate

H-RAs Profile Description:

S. No.	Name of RA	Date of Joining	Name of the PI	Qualification
1.	Dr. Rachit Raghava Kashyap (HRA001)	26/May/2016	Dr. Sanjay Kr. Uniyal	Ph.D. Environmental Science

Progress Report: To be filled for each HRA in a separate row.

RA No.	Research Objectives	Achievements	Addressed Deliverables	Location of Field Site with Details, if any
1.	<p>Identification of bio-indicators for documenting environmental health</p> <p>-To assess air pollution tolerance index (APTI) of plants for identifying bio-indicator plant species.</p> <p>-To document species richness.</p> <p>-To study dust accumulation patterns on the foliage of plant species.</p>	<p>HRA 001 inducted.</p> <p>Three field surveys conducted.</p> <p>Work plan developed.</p> <p>Methodology standardized.</p> <p>Twenty-nine sites along an altitudinal gradient from 500 to 3500 m identified.</p> <p>522 soil and plant samples collected (29 sites × 6 pollution transects × 3 replications × 1 season = 522) for physicochemical analyses.</p>	<p>Bio-indicators of environmental health for western Himalaya. A Monitoring protocol.</p>	<p>Kullu district (HP) from 31°24'40.85" 71°51'38.81" to 32°21'8.34" 77°13'32.63"</p>

Note: Data, table and figures may be attached as separate source file (.docx, .xls, .jpg, .jpeg, .png, .shp, etc.).

H-JRFs/JPFs Profile Description:

S. No.	Name of JRF/JPF	Date of Joining	Name of the PI	Qualification
1	Mr. Mustaqeem Ahmad (H-JPF 001)	14/June/2016	Dr Sanjay Kr. Uniyal	M.Sc. Environmental Science
2	Miss. Alpy (H-JPF 002)	27/May/2016	Dr Sanjay Kr. Uniyal	M.Sc. Environmental Science
3	Mr. Rohit (H-JRF 003)	27/May/2016	Dr Sanjay Kr. Uniyal	M.Sc. Botany
4	Miss. Nikita Rathore (H-JRF 004)	01/September 2016	Dr Sanjay Kr. Uniyal	M.Sc. Botany
5	Miss. Deepika Devi (H-JRF 005)	26/May/2016	Dr Sanjay Kr. Uniyal	M.Sc. Environmental Science

Progress Report: To be filled for each JRF/JPF in separate row.

JRF/JPF No.	Research Objectives	Achievements	Addressed Deliverable	Location of Demonstration/ Study Site with Details
1	<p>LTEM sites established/investigated/ robust data-sets generated. Extent of scientific evidences generated across key sectors.</p> <p>-To establish LTEM along altitudinal gradient in Western Himalaya</p> <p>-To study floral diversity and composition along altitudinal gradient</p> <p>-To study physico-chemical properties of soil along altitudinal gradient.</p>	<p>H-JPF 001 inducted.</p> <p>Four field surveys conducted.</p> <p>Work plan developed.</p> <p>Methodology standardized.</p> <p>Ten permanent plots established.</p> <p>30 soil samples collected for physico-chemical analyses.</p> <p>Blossom area documented for five alpine species.</p>	<p>Long term ecological monitoring sites. Building scientific evidence base for implications of climate change.</p>	<p>Permanent sites representing high altitude ecosystem of Himalaya have been marked in the Dhauladhar mountain range, Kangra (HP). These sites primarily represent temperate and alpine ecosystems and lie on the south facing slopes. Location of the marked sites is provided below:</p> <p>32°11'33.975" 76°35'55.237"</p> <p>32°11'15.832" 76°36'02.123"</p> <p>32°11'15.833" 76°36'01.858"</p> <p>32°11'13.072" 76°36'03.873"</p> <p>"</p> <p>32°11'02.819" 76°36'02.918"</p> <p>32°10'10.644" 76°35'18.308"</p> <p>32°10'10.249" 76°35'10.022"</p> <p>32°10' 05.82" 76°34'55.069"</p> <p>32°09'59.579" 76°34'45.323"</p> <p>32°09'53.099" 76°34'39.021"</p> <p>32°09'43.025" 76°34'39.361"</p>

2	<p>Extent of IKP documentation and strengthened through scientific evidence base.</p> <p>-To document folk knowledge of tribal communities residing in interior areas of HP.</p> <p>-To document resource use patterns of the identified communities.</p> <p>-To compare spatio-temporal variation in folk knowledge</p>	<p>H-JPF 002 inducted</p> <p>Study sites and tribal communities for IKP documentation identified.</p> <p>Work plan developed.</p> <p>Questionnaires developed and field tested.</p> <p>Surveys for resource use documentation carried out amongst <i>Bhangalis</i>.</p> <p>More than 100 informants interviewed.</p> <p>Preliminary information on plant use recorded.</p>	<p>Database on Indigenous Knowledge and Practices (IKP) of tribal communities linked to scientific evidence base.</p>	<p>The study is being carried out amongst the <i>Bhangalis</i> of Chhota Bhangal (Kangra), <i>Lahulas</i> of Lahul and Spiti, and <i>Kinners</i> of Kinnaur district of HP. To account for spatial coverage and cross-cultural comparisons. Locations of <i>Bhangalis</i> surveyed-</p> <p>32°06'03.73" 76 ° 51'14.88"</p> <p>32 ° 04'42.06" 76 ° 50'50.001"</p> <p>32 ° 05'35.753" 76 ° 51'20.954"</p> <p>32 ° 04'38.556" 76 ° 51'38.703"</p> <p>32 ° 04'24.762" 76 ° 52'01.67"</p>
3	<p>Study the Invasive Alien Species (IAS): Effectiveness of approaches developed for reduction of IAS/ innovative use of biomass/ extent of areas/ landscapes restored.</p> <p>-Categorization of alien species occurring in the timber line</p> <p>-Documentation of status of invasive alien species in timberline ecosystem.</p> <p>-Community composition of timberline in HP</p> <p>-Documenting phenological patterns of tree line community.</p>	<p>H-JRF 003 inducted</p> <p>Three field surveys conducted.</p> <p>Work plan developed.</p> <p>Methodology standardized.</p> <p>Timberline sites have been identified.</p> <p>Preliminary vegetation recordings carried out at two sites.</p> <p>Phenological documentation has been set-up.</p>	<p>Status of invasive alien species with reference to threats of proliferation in timberline ecosystem.</p> <p>Identification of vulnerable ecosystems for management and restoration.</p>	<p>The study sites are located in the alpine regions of Kinnaur/Shimla, Kullu and Chamba, districts. The locations of the sites are provided below:</p> <p>76°27'22.17" 33°05'14.85" (Pangi)</p> <p>76°14'47.84" 32°22'17.91" (Kullu)</p> <p>78°26'26.53" 31°20'26.69" (Kinnaur)/ OR 31° 13' 11.50" 77° 58' 51.07" (Shimla)</p>
4	<p>Assessment of level and diversity of engagement of traditional institutions facilitated. Analyze the extent of capacity built of the traditional institutions.</p>	<p>H-JRF004 inducted.</p> <p>Work plan developed.</p> <p>Traditional practices pertaining to soil, water and forests identified.</p> <p>Traditional Institutions</p>	<p>Key traditional institutions of IHR states identified. Their role, norms and practices concerning environment protection & socio-economic development documented. Identify their capacity</p>	<p>Kullu district of Himachal Pradesh.</p>

	-To identify traditional institutions in HP. -To document traditional conservation practices in HP.	working in the field documented.	building needs in present day context.	
5	<p>Capacity building on biodiversity conservation through field based trainings/ awareness programs</p> <p>-To organize popular lectures for school children on biodiversity conservation.</p> <p>To generate awareness amongst village folk and rural communities.</p>	<p>H-JRF 005 inducted.</p> <p>Work plan developed.</p> <p>Low and high altitude villages for awareness programme and group interaction identified.</p> <p>Interacted with 7 villages communities in high altitude regions.</p> <p>Popular lecture delivered in Government school, Khalet.</p>	<p>Scientific evidences and databases developed/ augmented/disseminated.</p> <p>All traditional Information and Communications Technologies (ICT) and innovative methods effectively used, etc.</p>	<p>Following sites in HP covered for awareness creation.</p> <p>Low altitude: 31°52'04.428" 76°32'42.580"</p> <p>31°51'23.91" 76°32'05.21"</p> <p>31°51'37.64" 76°32'27.97"</p> <p>31°51'39.69" 76°32'01.128"</p> <p>31°50'59.270" 76°32'50.475"</p> <p>High altitude: 32°03'29.632" 76°51'22.792"</p> <p>32°04'28.606" 76°51'19.858"</p> <p>32°03'41.648" 76°51'29.650"</p> <p>32°03'58.608" 76°51'41.750"</p> <p>32°05'09.307" 76°50'58.927"</p> <p>32°05'16.893" 76°51'12.871"</p>

Note: Data, table and figures may be attached as separate source file (.docx, .xls, .jpg, .jpeg, .png, .shp, etc.).


Signature of Principal Investigator


(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 (G.B. Pant Institute of Himalayan Environment and Sustainable Development)
Kosi-Katarmal 263 643, Almora, Uttarakhand

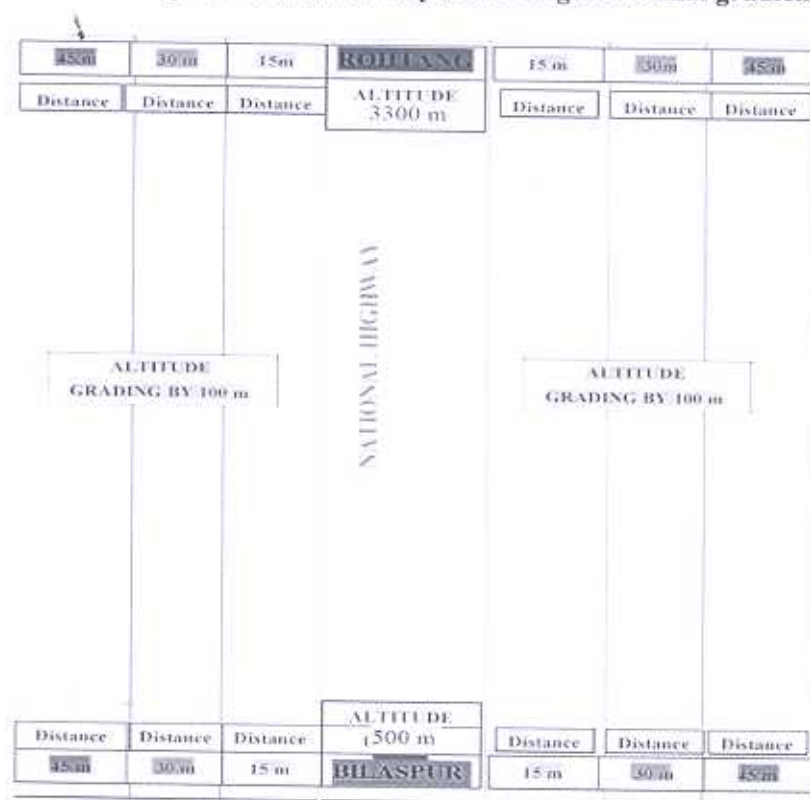
Director
CSIR-Institute of Himalayan Bioresource Technology
Palampur-176 061 (H.P.)

Report (soft copy) should be submitted to: E-mail: nmhspmu2016@gmail.com

National Mission on Himalayan Studies (NMHS)

HIMALAYAN RESEARCH FELLOWSHIP

Schematic representation of study sites along altitudinal gradient for identification of bio-indicators



Location of sites for bio-indicators studies

Site Code	Latitude	Longitude	Elevation/Altitude
S1	31°24'40.85"	71°51'38.81"	500
S2	31°27'3.99"	76°51'17.45"	600
S3	31°28'38.21"	76°52'4.26"	700
S4	31°41'47.45"	77°2'17.99"	800
S5	31°41'42.64"	77°8'38.29"	900
S6	31°45'21.44"	77°12'20.66"	1000
S7	31°52'0.28"	77°9'21.52"	1100
S8	31°59'7.88"	77°7'35.63"	1200
S9	32°0'48.39"	77°7'34.54"	1300
S10	32°4'24.21"	77°7'44.55"	1400
S11	32°8'13.11"	77°9'16.21"	1500
S12	32°9'20.17"	77°10'15.32"	1600
S13	32°19'60.1"	77°10'8.35"	1700
S14	32°13'10.82"	77°11'35.13"	1800
S15	32°14'57.98"	77°11'28.7"	1900

S16	32°15'53.68"	77°11'6.31"	2000
S17	32°16'50.11"	77°10'51.87"	2100
S18	32°17'27.71"	77°10'47.67"	2200
S19	32°18'28.61"	77°10'36.44"	2300
S20	32°18'45.04"	77°10'42.17"	2400
S21	32°18'58.39"	77°11'18.14"	2500
S22	32°19'26.97"	77°11'35.32"	2600
S23	32°19'40.51"	77°11'51.00"	2700
S24	32°19'53.46"	77°12'5.27"	2800
S25	32°19'35.17"	77°12'10.89"	2900
S26	32°19'16.29"	77°12'14.59"	3000
S27	32°20'21.9"	77°13'1.73"	3100
S28	32°20'14.33"	77°13'10.8"	3200
S29	32°21'8.34"	77°13'32.63"	3300

Locations of LTEM marked

Altitude	Latitude(N)	Longitude(E)
4000	32°11'33.975"	76°35'55.237"
3900	32°11'15.832"	76°36'02.123"
3800	32°11'15.833"	76°36'01.858"
3700	32°11'13.072"	76°36'03.873"
3600	32°11'02.819"	76°36'02.918"
3500	32°10'10.644"	76°35'18.308"
3400	32°10'10.249"	76°35'10.022"
3300	32°10'05.82"	76°34'55.069"
3200	32°09'59.579"	76°34'45.323"
3100	32°09'53.099"	76°34'39.021"
3000	32°09'43.025"	76°34'39.361"

Physico-chemical characteristics of soils collected from some of the LTEMs

Altitude	pH	total potassium %	total nitrogen %	total phosphorus %
3000	4.62±0.01	1.10±0.03	0.58±0.03	0.09±0.00
3100	5.28±0.0	1.60±0.06	0.63±0.03	0.13±0.00
3200	4.57±0.0	1.68±0.01	0.63±0.03	0.11±0.00
3300	4.52±0.01	0.97±0.01	0.60±0.03	0.15±0.01
3400	4.49±0.0	1.02±0.02	0.82±0.05	0.18±0.00

3500	4.36±0.0	0.94±0.01	0.68±0.05	0.07±0.00
3600	4.92±0.0	0.27±0.0	0.42±0.02	0.09±0.0
3700	4.95±0.0	0.24±0.0	0.19±0.0	0.08±0.0
4000	5.50±0.0	0.25±0.0	0.20±0.0	0.08±0.0

Interactions for Indigenous knowledge documentation



Sacred grove- a traditional conservation practice



A Betula tree line- marked for alien species documentation

