

## PERFORMA FOR THE HALF YEARLY PROGRESS REPORT

(Reporting Period from April 2017 to September 2017)

### 1. Project Information

Project ID	NMHS/SG-2016/009	Sanction Date	31-03-2016
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Project Title	<b>Survey and Mapping of Medicinal and Aromatic Plants (MAPs) and other RET/NTFPs from alpine regions of Uttarakhand and Developing Uttarakhand- Alpine Information System (UK-AIS)</b>
BTGs	

PI and Affiliation (Institution)	Dr. Gajendra Singh Uttarakhand Space Application Centre, Dehradun
Name & Address of the Co-PI, if any:	Mr. Shashank Lingwal Uttarakhand Space Application Centre, Dehradun
Institution	Uttarakhand Space Application Centre, Dehradun

Structured Abstract - detailing the current year progress [Word Limit 250 words]	<p>During April to September 2017 various activities were undertaken in the project are as follows:</p> <p><b>(i)</b> After completing the first year field work, 1st Project Steering Committee (PSC) meeting was conducted and the suggestions provided by the committee are being implemented. <b>(ii)</b> 100 Medicinal and Aromatic (MAPs) plant species are prioritized for conducting detailed study in the alpine region of the State, of which 35 are RET, 6 are banned in the state and about 35 are highly exploited in the region. <b>(iii)</b> These MAPs are being estimated across six major alpine vegetation types (habitats) namely Tall forbs, Mixed herbaceous formations, <i>Danthonia</i> grassland, <i>Kobresia</i> grassland, Shrubberies and Cushionoid <b>(iv)</b> The data of 30 alpine meadows of Pithoragarh district is analysed and shows that alpine grassland (<i>Danthonia</i> and <i>Kobresia</i>) represent the maximum (1063 km<sup>2</sup>) area followed by Shrubberies (312 km<sup>2</sup>) (<i>Krummholz</i> and alpine scrub) area. <b>(iv)</b> In these meadows maximum MAPs are recorded in <i>Danthonia</i> grassland (50) followed by Herbaceous meadows (45) and Shrubberies (35). <b>(v)</b> Overall MAPs density (individuals/m<sup>2</sup>) in <i>Danthonia</i> grassland was maximum (102 individuals/m<sup>2</sup>) followed by <i>Kobresia</i> grassland (78 individuals/m<sup>2</sup>) and Herbaceous meadows (75.64 individuals/m<sup>2</sup>). <b>(vi)</b> Napalchu nala, Kuti and Ralam areas are found having high RET species availability in the surveyed &gt; 30 meadows of the district <b>(vii)</b> The web based information system is being prepared. <b>(viii)</b> More than 10 Alpine meadows in Madhmaheshwar, Tungnath, Har-Ki-Doon and Kedarkantha area were surveyed.</p>
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Project Partner Name	Affiliations	Role & Responsibilities
Partner 1	Uttarakhand State Biodiversity Board, Dehradun	Development of BMCs in the identified villages and Training for Access and Benefit Sharing (ABS) mechanism
Partner 2		
Partner 3		
[Add]		

## 2. Project site details:

Project Site	Alpine Meadows of Uttarakhand
IHR States Covered	Uttarakhand
Long. & Lat.	
Site Maps	
Site Photographs	

## 3. Project Activities Chart w.r.t. Timeframe [Gantt or PERT]

PROJECT ACTIVITIES	Work undertake				OUTPUT
	Year 2017-18				
	Qtr 1	Qtr 2	Qtr 3	Qtr 4	
Project Activity 1	Data collected in more than 30 meadows were analyzed,  1 <sup>st</sup> PSC meeting was conducted to assess the progress made under the project				100 MAPs are prioritized for conducting detailed study. In the 30 alpine meadows of Pithoragarh District Danthonia grassland (50) followed by Herbaceous meadows (45) and Shrubberies (35)
Project Activity 2		Data collection (Vegetation sampling) across various alpine meadows of the Uttarkashi District	Data collection (Vegetation sampling) across various alpine meadows of Rudrapraya g Districts		More than 120 sampling plots were laid in about 12 alpine meadows covering various elevation, grazing gradients. Field Based information collected, which will be further used for preparing the distribution maps
Project Activity 3		Field based training for the parataxonomist and VPs			A field based training was conducted in the Har Ki Doon valley for making aware about the conservation and management of MAPs
Project Activity 4			Web Based information system development is being initiated		Basic template of the website is prepared (Various information is being collected)

## 4. Project Beneficiary Groups

Beneficiary Groups [Capacity building	Target	Achieved
No. of Beneficiaries with income generation:		8 (field assistant/porter) during data collection in the field for 15 days each
No. of stakeholders trained, particularly women		
No. of capacity building Workshops/ trainings:	1	Field based Para taxonomist, VPs a training was conducted in the field
No. of Awareness & outreach programmes		
No. of Research/ Manpower developed	3	2 (Research scholars)

## 5. Project Progress Summary (as applicable to the project)

Description	Total (No.)	Description (attach separate Annexure, if reqd.)
<i>IHR States Covered</i>		Uttarakhand
<i>Project Site/ Field Stations developed</i>		Alpine meadows of Uttarakhand
<i>No. of Patents filed (Description):</i>	NA	
<i>Article/ Review/ Research Paper/ Publication:</i>		
<i>New Methods/ Modellings Developed description in 250 words</i>		
<i>No. of Trainings (No. of Beneficiaries)</i>	1 (10)	Field based training for VPs and parataxonomist
<i>Workshop:</i>		
<i>Demonstration Models (Site):</i>		
<i>Livelihood Options</i>		
<i>Training Manuals:</i>		
<i>Processing Units:</i>		
<i>Species Collection:</i>		
<i>Species identified:</i>		
<i>Database/ Images/ GIS Maps:</i>		Photographs of about 100 MAPs have been collected

## 6. Project Concluding Remark (For the report period only)

Objectives#	Outputs / Outcomes against Objective	Monitoring indicators (as specified in Sanction Letter	Measurable Deliverables (as specified in Sanction Letter)
<b>Objective1</b> To assess the distribution and abundance of commercially important MAPs, RET (rare, endangered and threatened) and NTFPs	1. More than 30 alpine meadows of Uttarakhand have been surveyed and the data collected is being analysed.	Distribution and density maps (low, mid and high densities) (Nos.).	Distribution and density maps (low, mid and high densities) of MAPs.

from alpine regions of Uttarakhand	100 MAPs have been prioritized for the detailed assessment (spatial distribution, density and abundance estimation)		
<b>Objective2</b> To generate a spatial distribution and abundance database and ecological characteristics of MAPs for alpine region,	The major vegetation types map with distribution of key species for surveyed meadows have been developed.		
<b>Objective3</b> To develop web-based Uttarakhand Alpine Information System (UK-AIS),	Web based information system development have been initiated. Domain name with SSL services have been secured	Web-based Online Information System of Distribution and Abundance Patterns of Commercially important MAPs, RETs and NTFPs from the Alpine regions of Uttarakhand (UK-AIS) (Data Nos).	Web-based information system comprising of current and past data sets.
<b>Objective 4</b> To evolve strategies for sustainable harvest, future monitoring and conservation of medicinal and aromatic plants.	Development of CDH plan for Kumaun region is in progress. The data has been collected and is being analysed.	CDH (conservation, development and harvest) plans along with comparative analyses (Nos.). Manual on Sustainable Harvest Strategies along with Conservation and Long-term Assessment of MAP species (Nos /species).	Minimum of two CDH (conservation, develop and harvest) plans, each for Kumaon and Garhwal region will be developed.

<b>Methodology (in brief):</b>	<p>1. Extensive field surveys are being done in various alpine meadows of the state. Two sampling techniques are being used for estimation of MAPs i) <b>Rapid Sampling across various habitat types:</b> The MAPs are being estimated by using random sampling technique (10 plots of 1x1) plots across various habitats in the alpine region. ii) <b>Rapid Mapping Exercise (RME):</b> at places transects (10 plots at every 50m interval) are also being laid for rapid assessment of MAPs in scrub/forested area by using Rapid Mapping Exercise (RME) Technique. All the medicinal trees, shrubs, climbers and herbs are being recorded.</p> <p>2. <b>Satellite imageries (Landsat series/LISS-IV)</b> are being used for preparing the distribution map of various MAPs across the alpine region of Uttarakhand.</p>
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	<p><b>3. Web based information system is being developed:</b> All the information (through literature review) and during present study is being collected in such a way that the information can be uploaded in the web portal for wider dissemination. All the compiled information will be hosted in the, upgradable Uttarakhand Alpine Information System (UK-AIS).</p>
<b>Major Research Achievements:</b>	
<b>Brief Conclusion - the current progress – for the reporting period ONLY (pointwise):</b>	<p>1. Hundred MAPs are prioritize for detailed study (spatial distribution, density, abundance estimation) of which 35 species are under RET category, 6 are banned and 35 are commercially exploited from the region.</p> <p>2. The data of 30 alpine meadows of Pithoragarh district is analysed and shows that alpine grassland (<i>Danthonia</i> and <i>Kobresia</i>) represent the maximum (1063 km<sup>2</sup>) area followed by Shrubberies (312 km<sup>2</sup>) (<i>Krummholz</i> and alpine scrub) area.</p> <p>3. In the surveyed 30 meadows of alpine region, maximum MAPs are reported in the <i>Danthonia</i> grassland (50 species) followed by Herbaceous meadows (45) and shrubberies (35).</p> <p>4. The web based information is system is being prepared.</p>
<b>Progress Achieved (%):</b>	<b>50</b>
<b>Remaining work to be done:</b>	Assessment of MAPs in alpine meadows of Bageshwar, Chamoli and part of Uttarkashi Districts

## 7. Next Reporting Period Plan and Projections (month-wise)

## 8. Additional Information (If any)

Submitted to:

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Submitted by:

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Institution (Seal):  
Dated (20/01/2018):

Please fill the NMHS Progress Report proforma as applicable with respect to time and other requirements and return *via* post/ e-mail. In case of any query, please contact at: [nmhspmu2016@gmail.com](mailto:nmhspmu2016@gmail.com)

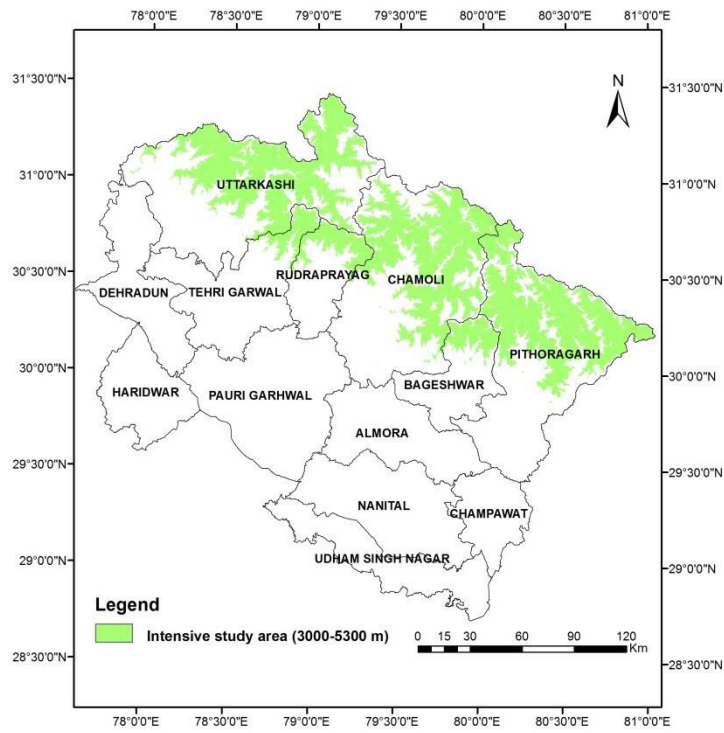
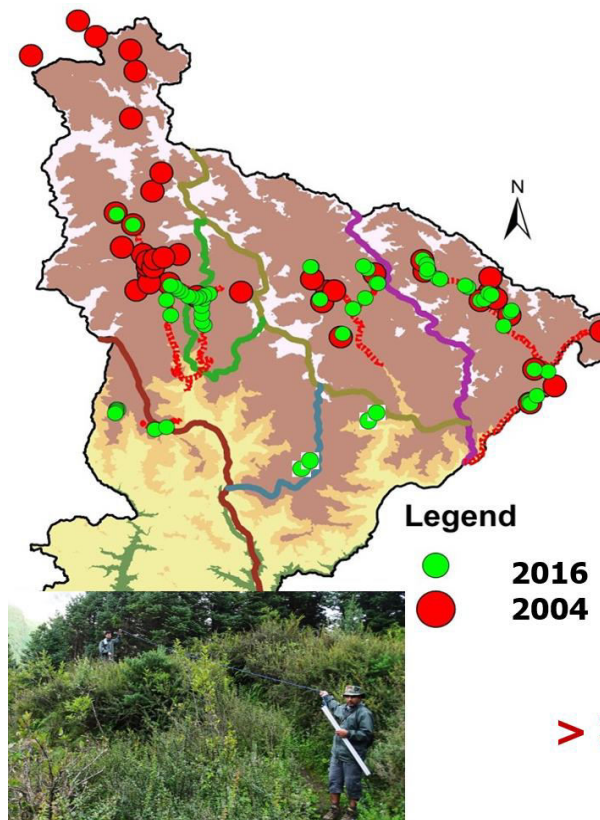
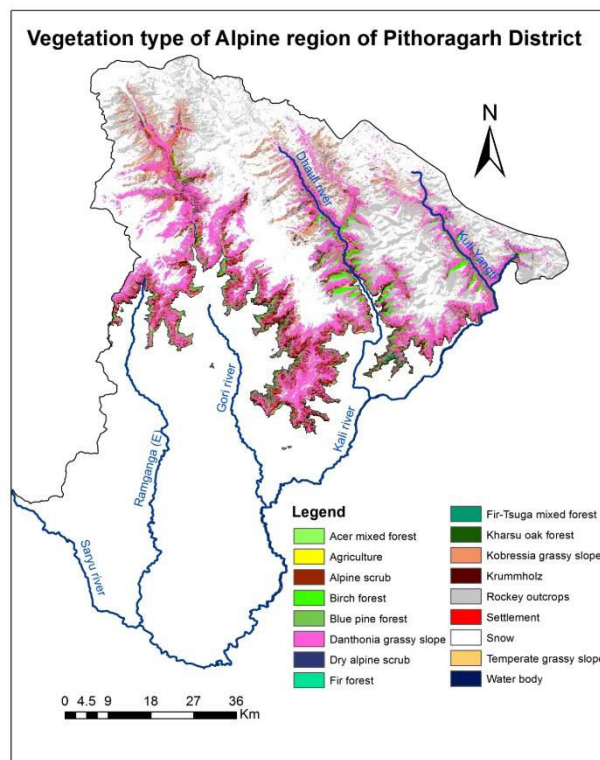


Figure: Study area: alpine region (> 3000m) of Uttarakhand State



**Figure: Field sampling plots across various meadows in the alpine region of Uttarakhand**



**Figure: Alpine vegetation map of Pithoragarh District**

**Table: Area statistics across various alpine meadows of Pithoragarh District**

Name	Area (km <sup>2</sup> )	
Blue pine forest	1.56	
Fir-Tsuga mixed forest	5.44	
Fir forest	6.14	
Acer mixed forest	10.78	
Temperate grassy slope	23.32	
Kharsu oak forest	36.48	
Birch forest	89.23	<b>172.96</b>
Krummholz	84.81	
Alpine scrub	146.83	
Dry alpine scrub	80.47	<b>312.1</b>
Kobressia grassland	208.4	
Danthonia grassland	855.12	<b>1063.52</b>
Agriculture	1.196	
Settlement	0.27	
Water body	0.91	

Rocky outcrops	550.28	
Snow	1728.6	
<b>Total</b>	<b>3829.83</b>	

**Table: Richness, Density (individuals/m<sup>2</sup>), Evenness and Five Dominant MAPs across various alpine meadows in the Pithoragarh District**

Types	# Richness	# Density	Diversity	Evenness	Five Dominant species Density/m <sup>2</sup> (frequency)	RET (individuals)
Tall forbs	17	59.33	2.14	0.76	Viola biflora 22.9 (100), Origanum vulgare 7 (70), Taraxacum officinale 6 (26), Berberis jaeschkeana 4.2 (70), Trigonella emodi 3.5 (40)	
Herbaceous meadow	45	75.64	2.77	0.73	Thalictrum alpinum 13.3 (34), Taraxacum officinale 9.8 (67), Plantago ovalta 9.6 (35), Trigonella emodi 7.1 (33), Bistorta vivipara 6 (33)	Allium stracheyi (110)
<i>Danthonia</i> grassy slope	50	102.58	2.96	0.76	Thalictrum alpinum 22.6 (70), Viola biflora 7.5 (67), Taraxacum officinale 7.2 (68), Thalictrum cultratum 6.4 (22), Geranium wallichinum 5.9 (41)	<b>A. heterophyllum (10)</b>
Kobresia grassy slope	33	78.95	2.67	0.76	Thalictrum alpinum 17.5 (69), Bistorta vivipara 14.9 (60), Taraxacum officinale 5.7 (49), Oxytropis lapponica 4.6 (23), Tymus linearis 4.3 (26)	A. violaceum (3),
Matted shrub	35	43.74	2.64	0.74	Thymus linearis 11.6 (56), Hippophae tibetana 5 (28), Artemisia gmelini.6 (32), Astragalus candoleanus 2.8 (44), Berberis jaeschkeana 2.6 (26)	Ephedra gerardiana (90), Fritillaria roylei (3)
Camping sites	17	27.49	2.15	0.76	Taraxacum officinale 7.9 (67), Geranium wallichianum 6.5 (45), Plantago ovata 2.9 (20), Bupleurum longicaule 2.1 (30), Anemone rivularis 1.5 (37)	
Agriculture old fallow	22	76.98	2.56	0.83	Plantago ovata 13.6 (25), Taraxacum officinale 11.5 (35), Thymus linearis 6.9 (42), Euphrasia officinalis 5.2 (60)	<b>A. heterophyllum (23)</b>





**Figure: Field Sampling of MAPs in the Byans Valley, Uttarakhand**



**Figure: 1st Project Steering Committee (PSC) Meeting at USAC, Dehradun, Uttarakhand**