

National Mission on Himalayan Studies

PROFORMA FOR THE HALF YEARLY PROGRESS REPORT
(Period from 01-04-2016 to 31-09-2016)

Project Title: Multidisciplinary Studies in Floristic Assessment, Ecological Analysis, Ecosystem Services, Conservation and Sustainable Management of Selected National Parks in W. Himalaya

Sanction No. and date -: Ref. No. NMHS/MG-2016/006/8504-7 Dt. 31-3-2016

Institution Name-: Botanical Survey of India, Kolkata & BSI, NRC, Dehradun

Personal Details -:

Name and Address of the PI-: Dr. Paramjit Singh, Director, Botanical Survey of India, CGO Complex, Salt Lake City, Kolkata-700064
Name and Address of the Co PI-: 1. Dr. B.K. Sinha, Scientist-F, BSI, Kolkata 2. Dr. S.K. Srivastava, Scientist-E, BSI, NRC, Dehradun 3. Dr. Kumar Ambrish, Scientist-D, BSI, NRC, Dehradun

Partner Details-:

Sl. No.	Name/Address	Work assigned to partners	Fund allocated to partners during the period
1.	Dr. Paramjit Singh Director Botanical Survey of India, Kolkata	Floristic Assessment Preparation of Database, Documentation of comprehensive flora	30,07,400
2.	Dr. Chandrasekar, Scientist-D G.B. Pant Institute of Himalayan & Development, Kosi Katarmal, Almora-263643, Uttarakhand	Ecological Studies, Analysis of ecosystem services, Impact of Climate Change on flora and vegetation.	7,96,200

Project Objectives -:

Objective(s) of the Project that will be achieved by the project

- Exploration and inventorisation of floristic diversity
- Estimation of endemism, categorization and reassessment of rare and threatened species of VoF and GHNP based on revised IUCN guidelines.

- Identification and documentation of economic/ socioeconomic uses of plants occurring within the park area along with future potentials of medicinal plants in the socioeconomy of local peoples.
- Ecological assessment (species richness, community structure, population structure, seasonal changes in plant community structure) of different groups of plants within the park and their role on the ecosystem along with functional dynamics and phenology.
- Impact of Anthropogenic and other factors on the plants.
- To identify the change in vegetation and species population due to climatic change and natural hazards including the assessment and impact of invasive species on indigenous flora.
- Detailed report on floristic and ecological studies along with conservation measures of RET species both *in-situ* and *ex-situ* in the proposed study area.
- To analyse the ecosystem services emanating from the National Park
- To establish the relationships between the structural and functional parameters of the flora in context with recent natural calamity in Uttarakhand and Himachal Pradesh states and to suggest measures for conservation of the plant diversity in the area.
- Create awareness programme for local community towards the biological conservation and sustainable use of biodiversity.

Completion in the last six months in % (According to each Deliverables):-

Sl. No.	Quantifiable Deliverables (as per sanction letter)	Output/ achievements	Performance in terms of Monitoring indicators	Remarks
1.	Preparation of plant database (Valley of Flowers National Park and Great Himalayan National Park)	40% complete Herbarium exsiccata of Valley of Flowers and Great Himalayan National Park	40% completed	Documented the plant diversity in Valley of Flowers national park (Angiosperms: 520 taxa; Gymnosperms: 02; Pteridophytes: 29 taxa) based on herbarium and published literature. Further, a total of 104 taxa of bryoflora are also documented from Great Himalayan National Park, Himachal Pradesh
2.	Survey & Exploration of Floristic Diversity of	Tour to Valley of Flowers National Park undertaken w.e.f. 19 – 25 th Sep., 2016 and	10% achieved	Sapling of <i>Pinus wallichiana</i> recorded first time from the Valley of Flowers National Park.

	Valley of Flowers and Great Himalayan National Park	collected 78 specimens of angiosperms (c.29 families), 2 specimens of gymnosperms (2 families) and 42 specimens of lichens (c. 15 families) were collected. The preservation and identification of specimens are in progress Tour to be undertaken from 25 th Nov.,2016 for GHNP, HP		Data of different seasons are required to analyze the entire plant diversity patterns.
3.	Ecological Assessment (Valley of Flowers National Park)	One assessment tour was conducted w.e.f. 19 – 25 th Sep., 2016 and assessed five threatened species and compared with the earlier records (Fig. 1)	25% achieved	Analysis of data collected from Valley of Flowers in progress.
4.	Identification of RET Species (Valley of Flowers National Park)	Five species identified in Valley of Flowers National Park.	10% achieved	

Summary of progress:

i. Botanical Survey of India

Prepared baseline data on plant diversity of Valley of Flowers National Park and Great Himalayan National Park, as detailed below:

Valley of Flowers National Park: Angiosperms: Wadhwa *et al.* (1987) reported 600 species under 308 genera and 95 families of Angiosperms and 29 Pteridophytes from the valley of flowers and its environs. Kala (1993) carried out study on the floristic, ecology and conservation of plants in the valley for a decade and he made an inventory of 520 alpine plants exclusively growing in the Park; Gymnosperms: There is report of only two gymnosperms *Abies pindrow* and *Taxus wallichiana* in the National Park area; Pteridophytes: Wadhwa *et al.* (1987) reported only 29 taxa of ferns from valley of flowers.

b. Great Himalayan National Park: Based on literature, 104 taxa of Bryoflora recorded from Great Himalayan National Park.

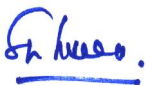
ii. G.B. Pant National Institute of Himalayan Environment & Sustainable Development

A field survey was conducted during 19 – 25th Sep., 2016 at Valley of Flowers National Park for the fulfillment of the objectives of the project assigned to GBPNIHESD, viz. ecological assessment of floristic diversity, status assessment of threatened, endemic and medicinal plants, analysis of floristic changes and analysis of possible loss of plants in relation to climate and anthropogenic aspects.

A total of 78 specimens of angiosperms (c.29 families), 2 specimens of gymnosperms (2 families) and 42 specimens of lichens (c. 15 families) were collected. The preservation and identification of specimens are in progress.

Five threatened species namely *Polygonatum verticillatum* (L.) Alloni (1.71 ± 0.41 ind/m²), *Dactylorhiza hatagirea* (D. Don) Soo. (1.76 ± 0.38 ind/m²), *Fritillaria roylei* Hook. (0.42 ± 0.8 ind/m²), *Podophyllum hexandrum* Royle (0.78 ± 0.02 ind/m²) and *Malaxis muscifera* (Lindl.) Kuntze (1.00 ± 0.02 ind/m²) were analyzed for status assessment and data was compared with earlier records (Kala, 2005) to define the floristic changes (Fig. 1.). There was found massive decrease in the density of *Dactylorhiza hatagirea*, *Fritillaria roylei*, *Polygonatum verticillatum*, *Podophyllum hexandrum*, while the density of *Malaxis muscifera* was increased when compared to earlier recorded density.

The diversity of *Polygonum polystachyum* Wallich ex Meissn. (2.49 ± 0.62 ind/m²) was found in higher density and may be a major invasive plant in the valley. One sapling of *Pinus wallichiana* A.B. Jackson was also recorded during exploration and considered as a new addition to Valley of Flowers National Park. It was found at an altitude of 3527 m asl. in latitude 30° 43' 40.4'' N, longitude 79° 36' 07.7'' E (Photo. 1).



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