COMPLETED EXTERNALLY AIDED PROJECTS

Project 1: Ecological assessment of forest areas falling under Kol Dam Hydroelectric Project in Bilaspur district of Himachal Pradesh [FT48-88/86(FCA) CATP Kol Dam–HPSFD Funded Project].

Findings: Carried out phytosociological studies in different catchment areas falling in the Forest Divisions of Bilaspur, Suket, Kunihar, Shimla, Theog and Karsog. Study in Bayali catchment of Suket forest division showed that the total number of plant species was 140 belonging to 66 families and 127 genera. In Hadaboi catchment of Suket forest division total number of plant species was 192 belonging to 72 families and 164 genera. While studying the composition of vegetation in Jattu catchment of Suket forest division, the total number of palnt species was 43 belonging to 24 families and 36 genera. In Kasol catchment of Bilaspur forest division total number of plant species was 133 belonging to 60 families and 113 genera. Kandhar catchment of Kunihar forest division revealed that the total number of plant species was 166 belonging to 56 families and 135 genera. In Tattapani catchment of Karsog forest division total number of plant species was 167 belonging to 66 families and 150 genera. Studied the composition of vegetation in Kotlu catchment of Karsog forest division and found that total number of plant species was 219 belonging to 83 families and 188 genera. In Sunni catchment of Shimla forest division total number of plant species was 227 belonging to 77 families and 194 genera. Matiana catchment of Theog forest division revealed that total number of plant species was 155 belonging to 70 families and 140 genera. The dominant families were Asteraceae, Fabaceae, Lamiaceae, Euphorbiaceae, Rubiaceae and Rosaceae. The distribution pattern of most of the plant species was contiguous in all the catchments. Out of 128 medicinal plant species recorded from the various catchments, 6 species i.e. *Dioscorea deltoidea, Taxus wallichiana, Zanthoxylum armatum, Gloriosa superba, Roylea cinearea, Valeriana jatamansi* fall in the category of threatened plants.

Gloriosa superba

Cassia fistula

Punica granatum

Adhatoda zeylanica

Project 2: Study on plant diversity in Rakchham, Chitkul Wildlife Sanctuary of district Kinnaur Himachal Pradesh [GBPI/IERP/04-05/15/862-GBPI Funded Project]

Findings: Phyto-sociological studies were carried out at various altitudes in Doje forest, Kanasa area and Shone Khad area of Rakchham beat; Hitch Pawang, Murti Panag, Rani kanda to Jarra and Tumer area of Chitkul beat; Rasrang, Hurba and Shingan area of Batseri beat of the sanctuary. In Doje Forest, number of trees, shrubs and herb species were 15, 31 & 117 with dominance of *Betula utilis, Hippophae salicifolia and Polygonatum verticillatum* respectively. In Kanasa Nala, number of trees, shrubs and herbs species were 9, 23 & 122 with dominance of *Acer acuminatum, Rhododendron campanulatum* and *Polygonum polystachya* respectively. In Shone Khad, number of trees, shrubs and herbs species were 11, 23 & 115 with dominance of *Hippophae salicifolia, Juniperus indica* and *Rumex nepalensis* respectively. In Hitch Pawang, number of trees, shrubs and herbs species were 3, 29 & 103 with dominance of *Pinus wallichiana, Lonicera parvifolia* and *Polygonum polystachya* respectively. In Murti Panag, total number of tree, shrub and herb species were 7, 18 & 97 with the dominance of *Betula utilis, Berberis jaeschkeana* and *Potentilla atrosanguinea* respectively.

Betula utilis Forest

Hippophae Rhododendronlepidotum tibetana

In Rani Kanda to Tumer Nala, the number of trees, shrubs and herbs species were 1, 11 & 74 with dominance of *Betula utilis, Rhododendron anthopogon* and *Polygonum polyatachya* respectively. In Rani Kanda to Jarrya top**,** the number of trees, shrubs and herbs species were 1, 8 & 98 with dominance of *Betula utilis, Juniperus indica* and *Thymus linearis* respectively. In Rasrang area, the number of trees, shrubs and herbs species were 13, 25 & 70 with dominance of *Cedrus deodara, Abelia triflora* and *Rumex nepalensis* respectively. Whereas, in Hurba area**,** the number of trees, shrubs and herbs species were 9, 25 & 73 with dominance of *Betula utilis, Juniperus communis* and *Caltha palustris* respectively. In Shingan area**,** the number of trees, shrubs and herbs species were 13, 26 & 95 with the dominance of *Betula utilis, Rhododendron anthopogon* and *Thymus linearis* respectively. Three species of Rhododendron viz., *Rhododendron companulatum, R. anthopogon*, and *R. lepidotum* were also recorded from the sanctuary. The distribution pattern of plant species was mostly contiguous in all the studied areas. The population structure of various tree species occurring in different areas of the sanctuary was estimated and recognized three patterns of population structure. Out of 105 medicinal plant species recorded from the various areas, 27 plant species fall in the category of threatened plants. Conducted ethno-botanical studies in Rakchham, Chitkul, Batseri, Themgarang, Boningsaring villages and documented 50 plant species used for various purposes.

Project 3: Inventorization, documentation and to evolve site specific management strategies for the conservation of sacred groves of Kullu Valley in Himachal Pradesh. (GBPI/IERP/04-05/18/865).

Findings: A total of 33 sacred groves were inventorized in the Kullu valley and these sacred groves were found rich in plant biodiversity. A total of 224 plant species were recorded. The sacred groves serve as storehouse of medicinal plants. During the study, ethnobotanical information on 69 plant species were also documented. Deodar (*Cedrus deodara*) was recorded as the dominant tree species in most of the sacred groves. However, the number of deodar trees varied among the sacred groves. A pamphlet on "*Dev van Ek Prachin Dhrohar*" was prepared for creating awareness among the local community for conservation and rejuvenation of sacred groves. Reasons for degradation of individual sacred groves were identified and site-specific management strategies for rejuvenation and conservation of the sacred groves were evolved with the participation of people.

Project 4: Studies on population status and berberine content in different provenances of *Berberis aristata* DC. in Himachal Pradesh and standardization of its propagation techniques (BT/PR4695/PBD/17/300/2004 dated 13th May 2005).

Findings: Seven provenances of *Berberis aristata* were identified in Himachal Pradesh. After identification of different *Berberis aristata* provenance/populations, root samples were collected,

cut into small pieces, dried in shade and sent to the Forest Research Institute, Dehradun for estimation of berberine content. The chemical analysis showed maximum berberine content of 2.81 % in sample no.30 followed by 2.70% in sample no. 5. The high berberine yielding plants identified in this study were mass propagated through stem cuttings, but the rooting percentage and survival of the rooted cuttings were very less. Although, the vegetative propagation of the species is very difficult, the species can be easily propagated through seeds.