HIMALAYAN FOREST RESEARCH INSTITUTE SHIMLA

The Great Himalayas is one of the youngest mountain regions of the world and the land-mass here has yet to acquire its final form. The landscapes of the Himalaya, in fact, are characterised by lofty mountains, innumerable snow-clad peaks, glaciers, deep gorges and glens, roaring water falls, wild and narrow valleys and mountain plateaus thereby, presenting a breath-taking panoramic views. As already pointed out that the Himalayan mountain system is vast, diverse and youngest in the world and these mountains and people living in their ranges deserve considerable attention so that the local knowledge available is recognized, synthesized into modern research and used for the overall benefit of the humankind. The existence of the valuable flora, fauna and minerals exclusive to the region is unique, which, therefore, needs proper documentation for their preservation and conservation as well.

Himalayan Forest Research Institute (HFRI), Shimla, Himachal Pradesh was earlier, established as High Level Conifer Regeneration Research Centre during May, 1977 for carrying out research on the problems associated with natural regeneration of Silver fir and Spruce. The centre developed the technology for the same and transferred it to the State Forest Departments. During reorganization of forestry research and coming up of Indian Council of Forestry Research and Education (ICFRE), Dehradun in 1987, the mandate of this centre was enlarged from Regeneration of Silver fir and Spruce to Eco-Rehabilitation of Cold Deserts, Mined Areas Rehabilitation, Insect-Pests and Disease Management, besides studies on agroforestry practices in hills and Regeneration of Coniferous and Broadleaved Forests. This centre was redesignated as Himalayan Forest Research Institute, Shimla in 1998.

An abstract of projects run by the Institute is as follows:

	No. of projects completed in 2007-08	No. of ongoing projects in 2007-08	No. of projects initiated in 2007-08
Plan Projects	3	10	3
Externally Aided Projects	7	6	0
Total	**10**	**16**	**3**

PROJECTS COMPLETED DURING THE YEAR 2007–2008

PLAN PROJECTS

Project 1: Introduction and performance trial of *Paulownia* species for agroforestry in different agro-climatic zones of Himachal Pradesh [HFRI-026/08 (AGF-02) PLAN 2003-08]

Findings: As a result of various combinations tried with *Paulownia* in different agroforestry trials, the species showed that, *Paulownia fortunei* exhibit, better growth performance in lower and in

mid-hill zones whereas, *Paulownia tomentosa* performed well in the high hills in the State of Himachal Pradesh. Accordingly, the species can be recommended for its integration in various agroforestry systems. Also organized three trainings and published technical manual on *Paulownia* for the ultimate benefit of different stakeholders.

Project 2: Diagnostic survey and appraisal of existing agroforestry systems in mid and high hills of Himachal Pradesh [HFRI-028/08 (AGF-03) PLAN/2003-08]

Findings: On the basis of structure and functions of components, five types of the existing agroforestry systems were identified viz. Agri-silviculture, Horti-agriculture, Horti-agri-silviculture, pastoral-silviculture and Horti-pastoral both in mid and high hill temperate regions of Kullu district, Himachal Pradesh. Data for biological yield and economic returns of different existing agroforestry systems have been collected for evaluating the technological gaps, if any.

Project 3: Natural enemy complex of key and potential pests of five *Quercus* species of Himachal Pradesh [HFRI-027/06(FPT-05) PLAN/2003-08]

Findings: The entomo-pathogenic fungus which was collected from IGM larval cadaver, were cultured in PDA media for extraction. The culture was maintained and when sporophores were grown, fungus was identified on the basis of spore characteristics as *Beauveria bassiana*. Bioassay experiment to evaluate the pathogenic efficacy of *Lymantria obfuscata* Nuclear Polyhedrosis Virus (LONPV) was also carried out and 92% mortality was recorded from 3rd instar larvae to 6th instar larvae, whereas 1st and 2nd instar larvae were found more resistant to the virus. One egg parasitoid was got identified from FRI, Dehradun, as *Anastatus kashmirensis* Mathur (Eupelmidae: Chalcidoidea: Hymenoptera). Laboratory culture of about 1000 individual of IGM is being maintained for future experiments. As per the extension activity, a one day villagers training on the control of Indian Gypsy Moth was organized at Sarhan, Sirmour district, in Himachal Pradesh.

EXTERNALLY AIDED PROJECTS

Project 1: Development of suitable model for inter-cropping of commercially important medicinal plants with horticultural plantations in temperate region of Himachal Pradesh [BT/PR-4372/PBD/17/285/03]

Findings: Developed the package of cultural practices for intercropping of temperate medicinal plants viz. *Aconitum heterophyllum, Angelica glauca, Polganatum verticilatum, Picrorhiza kurrooa* and *Valeriana jatamansi* with horticultural crops i.e. Apple and Cherry in high hill temperate region of Himachal Pradesh. All the five selected medicinal plants were found suitable for inter cropping with horticultural plantation. It has been observed that active ingredient contents in intercropping samples was lower than the samples from natural habitat, however is not that significantly lower, that cannot be saleable. The net economic return from intercropping of medicinal plants was found to be in the order *Aconitum heterophyllum*> *Angelica glauca*> *Valeriana jatamansi*> *Polganatum verticilatum*> and *Picrorhiza kurrooa.* The finding gives an opportunity to the farming communities to go for diversification and generate extra income in a sustainable manner.

Project 2: Ecological and management studies in certain, dry temperate and alpine pastures of Lahaul and Spiti, Himachal Pradesh

Findings: Alpine pastures in the entire Himalayan region constitute approximately 1.7 million ha and over 2/3 of this area lie in Himachal Pradesh. The state is predominantly mountainous and more than 92 % of the population is mainly rural and is directly engaged in animal husbandry. However, indiscriminate use of the grazing areas has resulted in critically low biomass availability and accordingly, adversely affected the livestock production. The utility and usefulness of various species of livestock can not exploited fully unless and until the feed and fodder resources are fully developed and properly utilized. Hence, the importance of alpine pastures – which is not only a group of grasses but is an ecosystem in itself can not be underestimated.

Keeping all the above points in views, sites supporting alpine pastures in each part of the district of Lahaul and Spiti i.e. Miyad Nallah, Triloknath, Dalang and Kwaring in Lahaul valley and Gue, Tabo and Kunjam in Spiti valley were selected for detailed structural and functional aspects like floristics, phyto-sociological and biomass studies/ estimations. Management aspects were also worked out at length. The studies have revealed that these alpine pastures certainly require proper attention. A booklet on Flora of Miyad valley – The lesser known Lahaul was also brought out under the project.

Project 3: Development of ecologically viable and socio-economically acceptable integrated model for arresting Willow (*Salix* sp.) mortality in Lahaul valley of Himachal Pradesh

Findings: Benchmark surveys for assessing the causes behind large scale mortality in *Salix* were conducted in different areas of Lahaul valley of Himachal Pradesh. The planting stock of *Salix* both local and International clones was raised and maintained at Field Research Station Tabo for establishment of demonstration plantations. *Salix fragilis, S. vitellina, S. matsudhana, S. babylonica, S. alba* and *S. corrulea* were the collections from the state of Jammu and Kashmir whereas International clones (given by code names) viz. UWA-1; UWA-2; UWE-1; UWM-1; UWM-2; UWM-3; UWU-1; UWU-2; UWK; UWHY-1; UWHY-2; and WO2-4 were procured from UHF, Solan. Beside this, planting stock from 8 different locations of district Kinnaur and Spiti falling within the state of Himachal Pradesh were also collected, raised and maintained at Tabo. As per the objectives of the project, demonstration plantations were established following different models in both farmers and in Govt. lands. Life cycle of the willow aphids were also investigated. Villagers meetings were also organized for generating awareness amongst the local population.

Project 4: Screening of potential germplasm of *Hippophae rhamnoides* (Seabuckthorn) for raising quality planting stock in the nursery and establishment of demonstration plantations in cold desert areas of Spiti valley, Himachal Pradesh [DDP/Spiti/SBT/ 2006-11/2006-09]

Findings: *Hippophae rhamnoides* commonly known as Seabuckthorn is a multipurpose plant species which can conserve the water and soil of fragile cold desert ecosystem. It also enriches the soil fertility through fixing atmospheric nitrogen. Its natural habitat includes river banks, valley and shady slopes and those sites where plenty of moisture is available. To exploit the species on a large scale, especially, in a cold desert areas of Himachal Pradesh, efforts to screen the potential germplasm

of the species for raising quality planting stock were carried out. Under the project, population from different areas of Spiti valley were screened and finally planting stock from Shego, Tabo and Susna were collected for establishment of demonstration plantation. Demonstration plantation in an area of half ha was raised and maintained. Data recording were carried out. Different monitoring teams under Desert Development Programmes visited the demonstration plantation and appreciated the efforts of the institute.

Project 5: Inventorization, documentation and plant diversity and to evolve site specific management strategies for conservation of various sacred groves in Kullu valley of Himachal Pradesh

Findings: Plant samples were collected from all the 33 sacred groves as recorded in Kullu Valley and a total of 215 plant species belonging 68 families have been identified so far. Data on GBH and height of trees in seven sacred groves have also been collected. Ethno-botanical information on 62 species belonging to 28 families was documented and information on 9 venerated plants had also been collected during the survey. About 150 Deodar seedlings were planted in the degraded sacred groves of Nashala and Jana. A pamphlet on "Dev van Ek Prachin Dhrohar" was prepared for creating awareness amongst the local community for conservation and rejuvenation of the sacred groves. Villager's meeting/discussion on conservation and rejuvenation of sacred groves was organized at Jana and Rujak Villages in Kullu district. To create site-specific management strategies for the conservation and rejuvenation of sacred groves, data on existing management practices, threats affecting each sacred groves and type of rejuvenation required were collected from all the sacred groves.

Project 6: Quality planting material of *Picrorhiza kurrooa* Royle ex. Benth and *Valeriana jatamansi* Jones and extension of their cultivation technology to local communities [GO/HP-2/2004-07: NMPB]

Findings: Under this project the Institute raised 4.6 lacs of quality planting material of *Picrorhiza kurrooa* (Kutki) and *Valeriana jatamansi* (Mushakbala) in different nurseries of the Institute against 4.0 lakhs target given by National Medicinal Plant Board (NMPB), New Delhi. Also distributed 4.08 lakh nursery stock of Kutki and Mushakbala to various end users during the entire project period. Under extension activities of the project, Institute organized four two days training and demonstration programmes at Jagatsukh, Manali for 23 numbers of farmers of Kullu valley. Such training and demonstration programmes were also organized at Shillaru and Model Nursery, Shimla for 34 numbers of farmers of Shillaru, Narkanda region of Shimla district. In the process trainings on commercial cultivation of Kutki and Mushakbala were organized at Jhungi and at Chail Chowk, for the farmers of Mandi district. Also organized one camp workshop-cum-training programmes on 'Commercial cultivation of temperate medicinal plants' for various stake holders at Totu near Shimla, which was attended by 50 farmers and field staff of Shimla Forest Division. Besides these, two open meetings were conducted at villages Sajla and Karjan near Manali and another open meeting at Nasogi for the farmers of Kullu valley so as to discuss about the prospects of commercial cultivation of medicinal plants in temperate region to diversify existing horticulture practices. These open meetings were attended by 125 farmers. The farmers, infact, were got sensitized

through these open meetings and training programmes for adopting commercial cultivation of Kutki and Mushakbala in temperate areas. Published two booklets and two pamphlets in Hindi on cultivation of Kutki and Mushakbala in Himachal Pradesh for the benefit of various end users.

Project 7: Development of elite planting material, establishment of model plantations and extension of nursery and plantation techniques of Wild Apricot to local communities in Himachal Pradesh [27-114/NOVOD/2006-07: NOVOD]

Findings: Under this project the Institute has raised 11,000 no. of quality planting material of *Prunus armeniaca* (Wild Apricot) in different nurseries of the Institute. Demonstration plantations on 10 ha area in Mandi and Kullu districts of Himachal Pradesh were carried out during 2006-07 and maintained during 2007-08. Two no. training and demonstration programmes on 'Wild Apricot-Nursery, Plantation, Oil Production and Its Uses' were organized under this project for local communities (70 no.) at Jari village in Kullu district of Himachal Pradesh on 12th and 13th March 2007 and for field functionaries of Himachal Pradesh Forest Department (50 no.) at Forest Training Centre, Sunder Nagar, district Mandi of Himachal Pradesh on 27th and 28th December 2006. Published one booklet and one pamphlet in simple Hindi on Wild Apricot (Chuli) for the benefit of various end users.

PROJECTS ONGOING DURING THE YEAR 2007–2008

PLAN PROJECTS

Project 1: Evaluation of soil fertility status and nutrient return from the important indigenous agroforestry systems in Himachal Pradesh [HFRI-034/08(AGF-04)/PLAN/ 2006-11]

Status: Experiments for recording and collection of litter were laid down. Samples were collected which are being processed and analysed for various constituents so as to know the status of nutrient return from important agroforestry species. Soil fertility status is also being analyzed.

Project 2: Standardization of nursery techniques of five prominant indigenous species (*Capparis spinosa, Colutea nepalensis, Caragana gerardiana, Ribes orientale* and *Cratagus songarica*) besides *Eleaegnus angustifolia, Hippophae rhamnoides* and *Rosa webbiana* of cold deserts [HFRI-019/03(EBC-08)PLAN/ 2002-10]

Status: Trials to understand various aspects pertaining to standardization of nursery techniques of the prominent species of cold deserts those at large, have got ecological and socio-economic relevance to the local society are being undertaken.

Till date, experiments have revealed that hot water treatment for 24 hours in case of the seeds of *Hippophae rhamnoides* gave maximum (75%) germination percent. Five thousand and 6000 ppm concentration of IBA using quick dip method were found to be the best for *Eleaegnus angustifolia* in soil and in sand medium whereas 7000 ppm concentration of this harmone using the same method was found to be the best in open nursery conditions. Germination percent in case of *Ribes orientale* showed an enhancement (upto 31%) using hot water treatment and *Rosa webbiana*

in pure sand medium gave germination of 68.80% after hot water treatments. Germination as high as 60% was recorded in *Caragana gerardiana* when tried in poly house conditions.

Ribes orientale showed excellent performance in shade house whereas no germination in this case was recorded in open nursery conditions.

Mulching have shown pronounced effect during germination of *Capparis spinosa*. *Cratagus songarica* - species found in Lahaul Valley alone – is showing good response towards root hormones and its root cuttings are performing well. Scope of the project was enlarged during Research Advisory Group Meeting of October 2007 by including few other parameters and trials were initiated accordingly.

Project 3: Studies on plant diversity in cold deserts of district Kinnaur, Himachal Pradesh [HFRI-029/ 02(EBC-11)PLAN/2004-09]

Status: Phyto-sociological studies were carried out at an altitude varying from 3000 m – 5000 m in Ropa-Giavung valley and from 2750 m – 5000 m above msl in Lipa- Asrang valley of Pooh Sub-division of Kinnaur district of Himachal Pradesh. Data when analysed altitude wise, revealed 12 number of tree species. In Ropa-Giavung valley with the dominance of *Pinus gerardiana* at 3000-3500m elevation. The number of shrub species was 20 and 15 with the dominance of *Rosa webbiana* and *Juniperus indica* at the elevation of 3000-3500 m and 3500-4000m respectively. The number of herb species was 85, 46, 44 and 30 with the dominance of *Ephedra gerardiana*, *Artemisia brevifolia, Bistorta affinis* and *Potentilla argyrophylla* at 3000-3500 m, 3500-4000 m, 4000-4500 m and 4500-5000 m elevation ranges respectively. The diversity index for herb species varied from 2.98 to 3.97m.

In Lipa- Asrang valley, the number of tree species was 10 with dominance of *Cedrus deodara* and 8 with the dominance of *Pinus wallichiana* at 2750-3200 m and 3200-3650 m elevation respectively. The number of shrub species was 19, 17, 7 and 3 at the elevation of 2750-3200 m, 3200-3650 m, 3650-4100 m and 4100-4550 m respectively. *Juniperus communis* was the dominant shrub at 2750-3200m, 3200-3650m and 3650-4100m elevation rages. Whereas, *Rhododendron anthopogon* was the dominant species at 4100–4550 m elevation range. The number of herb species was 76, 73, 66, 39 and 33 with the dominance of *Artemisia brevifolia, Heracleum candicanse, Thymus linearis, Bergenia stracheyi* and *Bistorta affinis* at 2750-3200 m, 3200-3650 m, 3650-4100 m, 4100-4550 m and 4550-5000 m elevation ranges respectively. The distribution pattern of plant species was mostly contiguous in all the altitude ranges in both the sites. Documented the plants of medicinal value and threatened categories of these areas.

Project 4: An ecological assessment of floristic diversity in hemis high altitude National Park, Ladakh, Jammu & Kashmir [HFRI– 031/02 (EBC–12) PLAN/2006–11]

Status: Conducted ecological assessment studies in the Rumbak valley of the Hemis High Altitude National Park. Surveyed it in-depth and camped within the valley at various high altitude camp sites; viz, Umrutse (4200 m), Ganda La (5100 m), Stok La (5000 m), Manskarmoh (4800 m), Changma (4300 m) and Stok (3900 m) etc. Besides floral collections were taken from the Spituk, Martselang, Mathod and Hemis region of the park too.

Laid quadrants along the representative slopes within the valleys following the altitudinal gradient, from 3800 m to the upper benchmark of 5000 m. Ethno-botanical records were initiated, along with the information obtained from local *Amchis* (Traditional Healer) and the Research Officer of Sowa-Rigpa (Amchi) Research Centre, Leh. Documented the vegetation types in the river valleys and also the general flora near habitations. The specimens were taken to the DD and BSI Herbaria at Dehradun for authentication. Besides, the soil samples collected during the last field trip were analysed.

Project 5: Management of insect borer complex in Chir Pine forests [HFRI-035/ 06 (FPT-08) 2006-11]

Status: Three plots of size 1000 sq m were laid at D- 113 Sairighat Forest (Solan Forest Division) and P-8 Santana Forest (Hamirpur Forest Division) and insect fauna of Chir Pine and their natural enemies were recorded from randomly selected trees. To evaluate the effectiveness of tree traps, billets of two sizes (80 cm L x 70 cm GBH and 100 cm L x 90 cm GBH) were used and the data on insect activity and population abundance of *Polygraphus longifolia, Cryptorhynchus rufescens* and *Sphaenoptera aterrima* were recorded along with moisture content of the logs. Trees falling within the girth range 90-180cm were found to be highly susceptible towards infestation in comparison to the young (below 90 cm) and mature (above 180 cm) stands. *P. longifolia* Stebbing was identified as one of the most destructive pest of Chir Pine trees as this beetle was found boring directly into the bark for oviposition and make the tree vulnerable for other insect borers to infest subsequently. It has been graded as the formidable pest of Chir Pine, since, it infests trees of all ages from the seedling and sapling to the oldest tree and even the green trees. Fire incidence and excessive resin tapping increased the susceptibility of the trees to the beetle incidence. Grownim and endosulphan 35 EC at various concentrations ranged from 1.0 % to 5.0 % for containing the insect pest population was evaluated in the field. Data on population abundance of insect on randomly selected trees during pre and post treatment were recorded.

Project 6: Survey, biology and control of insect-pests of important medicinal plants in Himachal Pradesh and Jammu & Kashmir [HFRI-033/06(FPT-07) PLAN/2005-10]

Status: In all, 37 insect species belonging to five insect orders viz. Lepidoptera, Coleoptera, Hemiptera, Orthoptera, Hymenoptera and 24 families was recorded from 13 selected medicinal plants, being cultivated in this region. Studies on the biology of *Plusia orichalcea* Fab. infesting *Saussurea costus, Picrorhiza kurrooa* Royle ex Benth., *Acrtium lappa* Linn., *Heraclium candicans* Wall. ex DC, *Angelica glauca* Edgew., *Saussurea costus* Falc. and *Valieriana jatamansi* Jones revealed as below:

P. Orichalcea Fab. (Lepidoptera: Noctuidae) was found to be in the most active phase from second week of April to last week of June. Four overlapping generations were studied from March to June. Freshly laid eggs were spherical in shape (0.63 x 0.59 mm) with pale greenish or yellowish in colour. First instar larva was dull white with cylindrical body whereas, the second instar larva was light greenish dorsally with blackish warts. The third instar larva was greenish with transparent median line on dorsal side whereas the fourth instar larva was green with prominent dorsal and

lateral bands. The pre-pupa was light green initially and changed to deep brown finally. It was enclosed in dull white silken cocoon. The moth was reddish brown with conspicuous triangular golden patch on each forewing toward the outer margin. The incubation period varied from 2.5 to 3.5 days. The egg hatchability was 87.7 to 92.7% during April to June. The overall larval period was 11.0 to 15.5 days and the larval survival varied from 39.9 to 74.4 % in different months. The pupal period lasted for 7.0 to 11.0 days and pupation occurred in the leaf-fold. Pre-oviposition, oviposition and post-oviposition periods varied from 24.0 to 60.0, 72.0 to 144.0 and 36.0 to 96.0 hours, respectively. The fecundity of a female varied from 113 to 228 eggs and the total life cycle was completed in 27 to 38 days during different months. While studying the biological control of *P. orichalcea* two species of larval parastoids viz., *Apanteles glomeratus* and *Apanteles ruficrus* (Haliday) were reported and the extent of parasitisation by these species was 13.3, 21.2 and 25.0 % in April, May and June, respectively. Entomopathogen, which resulted in large scale mortality of larval and pupal population in field as well as in laboratory, was identified as *Bacillus cereus* Var. Mycoides (Flugge) Smith, Gorden and Clark. The study indicated that these biological control agents can play an important role in eco-friendly management of this pest.

Project 7: Diagnostic study of indigenous and institutionalized participatory forest management in Himachal Pradesh [HFRI-025/08 (PFM-01) PLAN/ 2005-09]

Status: The main objectives of the project are to analyze the various modes of Participatory Forest Management in the state of Himachal Pradesh along with women involvement, suitable species, attitudinal changes, institutionalization of the process. During the year PFM data and survey was conducted in Chamba, Bilaspur, Mandi and Shimla Forest Circles. Survey of various Village Forest Development committees and Panchyats were carried out and villagers meetings were held at Panngna, Jhungi, Urla in Mandi Forest Circle. The species preferred by villagers were enlisted. Staff interviews were also carried out at Forest Training School Sundernagar and Chail. Data analysis is in progress.

Project 8: Planting stock improvement programme in *Cedrus deodara* [HFRI-028/05(SFG-08) PLAN-03/2003-09]

Status: Sample plot studies as carried out to supplement ocular selections of seed stands for their conversion into Seed Production Areas (SPAs) resulted in final selection of two seed stands i.e., Cheog Forest (20 ha) of Theog Forest Division and Nankhari Forest (15 ha) of Rampur Forest Division in the state of Himachal Pradesh and Neeru Forest (9 ha) of Bhadrwah Forest Division in Jammu & Kashmir. The matter to obtain culling permission from the competent authority was pursued regularly with PCCF of Himachal Pradesh and Director, SFRI, Jammu and also discussed during RAG meetings. However the culling permission is yet to be obtained. The progeny trial using seeds from 52 plus trees raised during December 2006 is being maintained and first pricking was done during July-August 2007. Data on germination and survival of seedlings is being recorded periodically.

Project 9: Allozyme variation in natural populations of Deodar (*Cedrus deodara*) [HFRI-030/05(SFG-10) PLAN-03/2005-09]

Status: Six populations were assayed for the six enzyme systems this year. The enzyme systems 6 PGDH and MDH which were standardized last year were studied for all the populations. These populations showed polymorphism of varying degrees for the five enzyme systems except for GDH which was monomorphic in all except for the population Mashobra. More samples of this population are being assayed before drawing logical inferences. All these enzyme systems assayed for the populations would be studied for genetic diversity and differentiation in the species.

Project 10: Standardization of methodology for seed collection, seed handling, storage and breaking seed dormancy in *Juniperus polycarpos* C. Koch and *Fraxinus xanthoxyloides* (Wall. ex G. Don) DC. [HFRI-036/03 (SFG-11)PLAN-2006-11]

Status: The causes of seed dormancy and delayed germination in *Fraxinus xanthoxyloides* were studied and it was observed that seed dormancy and delayed germination are mainly due to the presence of some inhibiting substances and restrictions upon the embryo by the enveloping layers. The removal of pericarp resulted in earlier onset of germination. The trials to overcome seed dormancy and to find the optimum time of seed collection in *Fraxinus xanthoxyloides* and *Juniperus polycarpos* were maintained, continuously monitored and germination data recorded periodically. The seed storage trials in *Fraxinus xanthoxyloides* and *Juniperus polycarpos* by using different type of storage containers/storage environment was maintained and seed viability test carried out periodically. *Juniperus polycarpos* cones were screened in the laboratory for studying insect-pest and after analysis of the samples; it has been observed that about 65% of cones of were found to be infected on tree itself. Three different species of cone borer moths of family GELECHIDAE (Lepidoptera) were reared in the laboratory.

Two species of *Phytophagous hymenopterus* parasites were also found to be borer viz. *Megastigmatus dorsalis* and *Torymus* sp. (Hymenoptera: Chalcidoidea). One natural enemy, *Stetoda* sp. (Spider Family; Theridiidae) found as a predator in the tree.

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]

Status: The study sites were selected and phyto-sociological studies carried out in Kotlu and Bayali catchments of Karsog and Suket forest division of Himachal Pradesh. The vegetation data was analysed altitude wise. In Kotlu catchment, at 800-1200 m altitude, the number of tree, shrub and herb species was 33, 56 and 76 respectively. *Pinus roxburghii*, *Dendrocalamus strictus* and *Urtica dioica* was dominant tree, shrub and herb species respectively. The diversity index for tree, shrub and herb was 3.13, 3.63 and 3.84 respectively. At the elevation of 1200-1600m, the number of tree,

shrub and herb species was 23, 42 and 54 respectively. *Pinus roxburghii, Dendrocalamus strictus* and *Artemisia parviflora* was dominant tree, shrub and herb species respectively. The diversity index for tree, shrub and herb was 2.80, 3.41 and 3.94 respectively. The number of tree, shrub and herb species at 1600-2000 m altitude was 14, 33 and 65 respectively. *Pinus wallichiana, Rosa moschata* and *Gerardiana diversifolia* was dominant tree, shrub and herb species respectively. The diversity index for tree, shrub and herb was 2.25, 3.25 and 3.94 respectively.

While carrying out phyto-sociological studies in Bayali catchment, at 600-1100m elevation, total number of tree, shrub and herb species was 28, 38 and 49 respectively. *Toona ciliata, Dodonaea viscosa* and *Desmodium triflorum* was the dominant tree, shrub and herb species respectively. The diversity index for tree, shrub and herb was 3.10, 3.44 and 3.59 respectively. At the elevation of 1100-1600 m, the number of tree, shrub and herb species was 23, 38 and 44 respectively. *Pinus roxburghii, Lantana camara* and *Bidens pilosa* was the dominant tree, shrub and herb species respectively. The diversity index for tree, shrub and herb was 2.78, 3.24 and 3.63 respectively. The distribution pattern of plant species was mostly contiguous in all the altitudinal ranges. The plants of medicinal value and ethno-botanical importance were documented from these catchments. The chemical properties of soil was also estimated for these areas.

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]

Status: The study sites were selected and phyto-sociological studies carried out at an altitude varying from 2700-3600 m above msl at Rasrang and Hurba area, 2700-4200 m above msl in Shingan area of Batseri beat and 3700-4500 m above msl in Rani Kanda to Tumer Nala and 3600-4500 m above msl in Rani Kanda to Jarrya top area of Chitkul beat of the sanctuary. In Rasrang, at 2700-3600 m elevation, the number of trees, shrubs and herbs species were 13, 25 and 70 with dominance of *Cedrus deodara, Abelia triflora* and *Rumex nepalensis* respectively. The values of diversity index for tree, shrub and herb were 2.18, 2.69 and 4.02 respectively. The regeneration of *Abies pindrow, Picea smithiana, Betula utilis, Cedrus deodara, Pinus wallichiana* and *Acer accuminatum* were recorded from the area. Whereas, in Hurba area, at 2700-3600 m elevation, the number of trees, shrubs and herbs species were 9, 25 and 73 with dominance of *Betula utilis, Juniperus communis* and *Caltha palustris* respectively. The values of diversity index for tree, shrub and herb were 1.85, 2.89 and 3.94 respectively. The regeneration of *Cedrus deodara, Pinus wallichiana, Taxus wallichiana, Betula utilis, Abies pindrow* and *Picea smithiana* were recorded.

In Shingan area, at 2700-4200 m elevation, the number of trees, shrubs and herbs species were 13, 26 and 95 with dominance of *Betula utilis, Rhododendron anthopogon* and *Thymus linearis* respectively. The values of diversity index for tree, shrub and herb were 2.09, 2.91 and 4.41 respectively. The regeneration of *Picea smithiana, Cedrus deodara, Abies pindrow, Pinus wallichiana, Betula utilis* and *Acer caesium* were recorded from the studied area. In Rani Kanda to Tumer Nala, at 3700-4500 m elevation, the number of trees, shrubs and herbs species were 1, 11 and 74 with dominance of *Betula utilis, Rhododendron anthopogon* and *Polygonum polyatachya* respectively. The values of diversity index for shrub and herb were 2.11 and 3.82 respectively. In Rani Kanda to

Jarrya top, at 3600-4500 m elevation, the number of trees, shrubs and herbs species were 1, 8 and 98 with dominance of *Betula utilis, Juniperus indica* and *Thymus linearis* respectively. The values of diversity index for shrubs and herbs were 1.54 and 3.95 respectively.

The population structure of various tree species occurring in different areas i. e. Rasarng, Hurba, Shingan and Chitkul area of the sanctuary was estimated and recognized three patterns of population structure. In all 170 and 182 plant species were recorded from studied areas of Batseri and Chitkul beat of sanctuary respectively. Out of these, 65 and 70 plant species of medicinal importance were recorded from the studied areas of Batseri and Chitkul beat of sanctuary respectively. Twenty seven plant species of threatened categories were recorded from Batseri and Chitkul beat of the sanctuary. The ethnobotanical study was also undertaken in Batseri, Themgarang and Boningsaring villages and documented about 32 plant species used for different purposes.

Project 3: Studies on population status and berberine content in different provenances of *Berberis aristata* DC. in Himachal Pradesh and standardization of its propagation techniques [BT/PR/4695/ PBD/17/300/2004-07]

Status: The project aimed to identify high berberine yielding *B. aristata* provenances in Himachal Pradesh and to develop nursery techniques for mass propagation of identified elite clones/provenances of *B. aristata*. During this year, as per the instructions of the Task Force on biotechnology for medicinal and aromatic plants, root samples of 35 *Berberis aristata* plants were collected from all the seven populations identified previously and their berberine content was estimated at Forest Research Institute, Dehradun. Data on Location, Height, No. of shoots, diameter etc were collected from all the 35 *B.aristata* bushes. Vegetative propagation experiments were repeated in April 2007 and the results showed poor rooting (10%). To improve the rooting in the stem cuttings, nursery experiments were repeated using different concentrations of IAA and Thiamine during February 2008. Data on rooting and sprouting is being recorded from the above experiments.

Project 4: Suitability of *Jatropha curcas* L. seed sources in lower and mid Himalayan regions of Himachal Pradesh [BT/PR/5094/AGR/16/429/2005-08]

Status: During this year (2007-08), 15,000 quality planting stock of *Jatropha curcas* of various seed sources collected from various sites of Himachal Pradesh were produced, out of which, 2000 plants were produced through cuttings.

Experimental-cum-demonstration plantations were established during July-August, 2007 on 5 ha. area at Nalagarh (Solan), Johrji (Solan) and Devidhar (Shimla) in H.P. by planting about 12,500 saplings of *Jatropha curcas* and maintained 18 ha of plantations raised earlier. About 23 fresh seed samples amounting approximately 40 kg collected from different seed sources of Himachal Pradesh during November 2007 are being analysed for oil estimation. Growth and survival data pertaining to experimental-cum-demonstration plantations are being recorded regularly. The project has completed its period of 3 years on 31st March 2008. However, 2 years extension is under consideration with the funding agency.

Project 5: Setting up 100 hectare demonstration plot in Himachal Pradesh and production of elite planting material of *Dendrocalamus hamiltonii* (DBT Funded Project) [BT/PR/5243/ AGR/ 16/456/04]

Status: As per the action plan of the project, a total of 20 ha was to be raised during the year. But due to non-availability of plants from IHBT, Palampur only 8.75 ha was raised during July-August 2007 and the remaining target was rescheduled for winter planting. During February-March 2008, IHBT could provide only 1100 plants for winter planting, hence, 2.75 ha demonstration plot was raised. A total of 32.22 ha raised till date is being managed and maintained properly. The data recorded both in experimental and demonstration plots showed 84 % overall survival for Tissue Culture and cutting raised plants. The mortality has been caused by monkeys, porcupines and landslides during August 2007.

Project 6: Production of quality planting material of *Aconitum heterophyllum* Wall. Ex Royle and *Angelica glauca* Edgew and extension of their cultivation technology to local communities [GO/HP-07/2006-09: NMPB]

Status: About 1.00 lakhs nursery stock of *Aconitum heterophyllum* Wall. *ex* Royle (Atish) and 0.30 lakhs nursery stock of *Angelica glauca* Edgew (Chora) at two nurseries of the Institute viz., Shillaru nursery (Shimla) and Brundhar medicinal plants nursery (Manali) raised during 2006-07 were maintained. The nursery activities mainly included preparation of land for nursery beds, sowing of seeds, shading, irrigation and other maintenance activities. Overall, upto March 2008, the Institute raised 3.00 lacs of quality planting material of Atish and Chora under this project in different nurseries. Under extension activities of the project, Institute has successfully organized an workshop-cum-training programmes on 'Commercial cultivation of temperate medicinal plants' at village Bagian near Haripurdhar in Shri Renukaji Forest Division of H.P. on 17th August 2007. Fifty farmers took active participation. Besides these, 0.33 lakhs QPM of Atish and Chora were distributed to various end users during the year.

NEW PROJECTS INITIATED DURING THE YEAR 2007–2008

PLAN PROJECTS

Project 1: Introduction and performance trails of *Gmelina arborea* for agroforestry in lower hills of Himachal Pradesh and Jammu & Kashmir [HFRI-039/08(AGF-05)PLAN/2007-12]

Status: Nurseries of *Gmelina arborea* have been raised at Bir Plasi (Nalagarh) and Johron (Paonta Sahib) for taking up field plantations subsequently. Growth data of the seedlings at nursery stage were also recorded. It was observed that the heavy fog during winter season affected seedlings of this species in the nursery stage.

Project 2: Productivity enhancement through selection of superior clones of *Dalbergia sissoo* [Planting Stock Improvement Programme]

Status: Selection of superior clones of *Dalbergia sissoo* carried out in already established seed orchard of the species based on its growth data and their flowering/fruiting behaviour. Hence clones were

evaluated for their degree of infestation in the field. Preliminary observations were recorded on stress resistance of different clones in the field. The site to raise advance generation seed orchard was surveyed in the State of Jammu & Kashmir and also in Himachal Pradesh. The protocol to study the selected clones using isozyme techniques was standardized for three enzyme systems. The experiment for insect-pest resistance of clones is in progress.

Project 3: Determination of morphological and physiological quality parameters of nursery stock of Deodar (*Cedrus deodara*) and Ban Oak (*Quercus leucotrichophora*) [HFRI-037/05(SFG-12)PLAN/2007-12]

Status: Around 12,000 plants of Deodar and Ban Oak were maintained in the nurseries and carried out fresh seed collection and sowing of these species was carried out for raising nursery stock of various sizes for planting under the project. Questionnaire was prepared for subsequent interviews of the field functionaries of State Forest Department so as to finalize Interim Quality Parameters (IQP) for Deodar and Ban Oak nursery stock. Sixteen nurseries at Shimla, Solan, Theog, Chopal, Karsog, Nachan and Kullu Forest Divisions of Himachal Pradesh were visited. Field functionaries of the State Forest Department were interviewed and the relevant information on nursery raising and quality parameters adopted in Deodar and Ban Oak nursery stock was collected in the field. Compiled the information pertaining to Deodar and Ban Oak stock quality. It was found that height of the stock (>9") is the only morphological parameter considered for judging the quality Deodar and Ban Oak nursery stock in the field.

EDUCATION AND TRAINING

Education

1. Research Advisory Committee (RAC) of HFRI, Shimla met on 18th May 2007 and on 24th August 2007 to review the Six Monthly Progress Reports and also for assessing/recommending the work of various researchers registered with FRI-University Dehradun for the award of Ph.D. Degree. Shri Mohindar Pal, IFS, Director of the Institute was the Chairman whereas Prof. M.K. Seth, Deptt. of Bio-Sciences, Himachal Pradesh University, Shimla and Dr. V.D. Verma, Principal Scientist and Head, NBPGR, Phagli, Shimla were invited as the Expert Members of the committee from out side the institute.
2. Ms. Asha Devi Negi; Ms. Neha Thakur; Ms. Neha Ahuja and Ms. Deepika Kumari, Students of B.Sc. (Hons.) Biotechnology, from the Institute of Life Sciences and Business Management, Solan Himachal Pradesh, successfully underwent one month's training on "Biotechnology (Allozyme Variation Techniques)" from 3rd January 2008 to 4th February 2008 under the supervision of Dr. Rajesh Sharma, Scientist-E.
3. A group of B.Sc. (Forestry) students from the College of Horticulture and Forestry, Jhalawar (Rajasthan) along with their faculty visited the Institute on 25th January 2008. Similar group of 16 newly recruited Scientists of ICFRE, Dehradun also visited HFRI, Shimla from 10th to 12th March 2008. During these visits, detailed presentations on the research activities of HFRI was made before these groups besides apprising them about modern trends in forestry research. The students also visited the laboratories and herbarium of the Institute.

4. Dr. Nagin Nanda, Research Scholars registered with FRI University, Dehradun through this Institute was awarded Ph.D. Degree in Forestry (Ecology and Environment) for his work titled "To test the efficacy of total catchment management mechanism for attending to the ecological and environmental problems of Baddi-Barotiwala-Nalagarh industrial area for sustainable development".

5. Dr. Jatender Kumar Sharma registered with FRI University, Dehradun through this institute was awarded Ph.D. Degree in Forestry (Ecology and Environment) for his work titled "Studies on litter production, its decomposition and nutrients release in Chir Pine stands of Siwaliks and mid hill of Himachal Pradesh".

6. Dr. S.P. Subramani, Research Scholar registered with FRI University, Dehradun through this institute was awarded Ph.D. Degree in Forestry (Botany) for his work titled "Systematic studies on the Flora of Churdhar Wildlife Sanctuary, Himachal Pradesh".

Trainings

1. To encourage farmers towards Commercial Cultivation of Medicinal Plants, two open meetings were organized in Janna and Sajala villages of Kullu valley on 10th and 11th July 2007. These trainings were conducted by the Institute under one of the project, which was funded by National Medicinal Plant Board, New Delhi.

2. To analyze issues pertaining to Participatory Forest Management and Existing Agroforestry System in the Mid Himalayan region, meetings with the local farmers were organized at village Faujal, (Patlikuhal range) and at Bhutti, (Kullu range) on 12th and 13th July 2007, respectively.

3. To sensitize the village communities and farmers towards cultivation practices of medicinal plants, the Institute organized a one day camp workshop on 17th August 2007 on "Medicinal Plants Cultivation" at village Baigain, near Haripurdhar, district Sirmour, of Renuka Forest Division, Himachal Pradesh. The workshop was funded by the National Medicinal Plants Board, Government of India, New Delhi.

4. As a part of project activity on "Inventorization, Documentation of Plant Diversity and to Evolve Site Specific Management Strategies for Conservation of Various Sacred Groves in Kullu valley of Himachal Pradesh" funded by G.B. Pant Institute of Himalayan Environment and Development, Almora, about 150 seedlings of Deodar were planted in degraded sacred groves of Nashala and Janna in Kullu Valley during August 2007.

5. A training on "Insect Pests of Ban Oak and Management of Defoliators" was organized on 12th September 2007, at Sarahan, district Sirmaur, Himachal Pradesh.

6. A one day training on "Nursery and Plantation Technique on Paulownia" was organized on 13th November 2007 at Dharamshala, Himachal Pradesh.

7. A one day training programme on "Commercial Cultivation of Medicinal Plants" was organized at Hamirpur on 24th November 2007.

8. A training programme on "Insect-pests of Chir Pine and their Control Strategy" was organized for the frontline staff and farmers of the area at Subathu Forest Range under Solan Forest Division on 10th December 2007.

9. A two days training programme on 15th and 16th February 2008 for "Skill Upgradation of Range Officers and Deputy Rangers" of Himachal Pradesh Forest Department was conducted at the Institute.

10. A two days training programme on "Eco-restoration of Degraded Forests" on 18th and 19th February 2008 at Forest Training Centre, Sundernagar.

11. One day training-cum-camp workshop on "Commercial Cultivation of Medicinal Plants" was organized at Shimla for the farmers and officials of Shimla Forest Division at Totu on 15th March 2008 under National Medicinal Plant Board funded project.

12. A training programme on "Insect Pest and Diseases Management of Forest Trees" was organized for the frontline staff of the Jammu region at State Forest Research Institute, Jammu on 18th March 2008.

13. A one day training programme on "Conservation and Rejuvenation of Sacred Grove in Kullu valley" was organized on 26th March 2008 at Jana and Rujak villages in district Kullu where the local communities were apprised of the importance of sacred groves to the mankind.

LINKAGES AND COLLABORATION

1. Linkages were developed with IHBT, Palampur; IIM, Jammu; HAPPRC, Garhwal; UHF, Solan; J.P. University Vaknaghat and GBPIHED Himachal Unit, Kullu for preparing network project on medicinal plants.

2. Linkages and collaboration were developed with NGO,s and SFD,s for organizing the various training programmes to different end users.

3. Collaboration initiated with Dr Y. S. Parmar, University of Horticulture and Forestry, Nauni, Solan for pathological components in various research project. In addition to it, the Institutes/ Universities in this region are contacted for exchange of ideas/ informations.

PUBLICATIONS

1. Aushdhiya Paudhon Ki Krishikaran Taknik (HFRI/Br/16)

2. Paulownia – Ek Bahuudashya Podha (HFRI/Bull/17)

3. HFRI brochure containing information on past achievements and ongoing activities of HFRI, Shimla.

4. Flora of Miyad valley –Lesser known Lahaul (HFRI/Br/29).

Following Pamphlets were published in Hindi for ultimate benefit of end users:

Harad (*Terminalia chebula*); Bahera (*Terminalia valerica*); Kachnar (*Bauhinia ariegate*); Karroo (*Gentiana kurroo*); Chuli (*Prunis armenica);* Khirak (*Celtis australis);* Shahtoot (*Morus alba*); Ban Oak (*Quercus leuchotrichophora*); Moru Oak (*Quercus dilatata*); Pushkarmool (*Inula racemosa*); Paulownia; Shukpa (*Juniperous macropoda*); *Salix* sp.; Safed Poplar (*Populus alba*); Kuth (*Saussurea lappa*); Kala zira (*Bunium persicum*); Dev van Ek Dhrohar and Pushkar Mool (*Inula racemosa).*

CONSULTANCIES

1. A consultancy for "Production of Quality Planting stock of Wild Fruits" was awarded to the Institute by Wildlife Wing of Himachal Pradesh Forest Department, Shimla vide their no. WL (misc.) 83/2004/472 dated 5th May 2007 at a total cost of Rs.2 lakhs.

2. A consultancy for "Environment Impact Assessment (EIA) Studies and Formation of Environment Management Plan (EMP) for Integrated Kashang Hydro-electric Project (243 MW) in District Kinnaur, Himachal Pradesh" was awarded to the Institute by KINNAUR KAILASH POWER CORPORATION LIMITED (A Corporation promoted by Himachal Pradesh State Electricity Board). A Memorandum of Agreement (MoA) was signed between HFRI and KKPCL on 28th February 2008 at KKPCL, Construction Unit, Jeori, Tehsil Rampur, District Shimla. The total amount of the consultancy is Rs.28 lakhs.

3. Director, HFRI, Shimla on 29th March 2008 signed a Memorandum of Agreement (MoA) with Additional PCCF (Wildlife), State Forest Department, Himachal Pradesh for establishment of Temperate Arboratum Botanical Garden (TABG) at Potter's Hill, Summer Hill, Shimla. HFRI as per the agreement will provide Technical Assistants and over all work of this consultancy will be coordinated through an advisory committee to be set up by Government of Himachal Pradesh. Funds to the tune of Rs. 75 lakhs have already been released for the consultancy in question.

PATENTS

Patent applications for the following techniques and equipments were submitted to the Patent Information Centre, State Council of Science Technology and Environment, Shimla for taking up the matter with Technology Information Forecasting and Assessment Council (TIFAC).

1. Macro-proliferation technique for Mushakbala multiplication.
2. Macro-proliferation technique for Kutki multiplication.
3. Multiple Nursery Planting Bar.
4. Nursery Bed Marker.

CONFERENCE/MEETINGS/WORKSHOPS/SYMPOSIA/EXHIBITIONS

1. A one day consultative workshop on "Sustainable Land Use Planning through Geographical Information Systems (GIS) Application" was organized on 7th September 2007 at HFRI, Shimla in which about 35 participants from the State Forest Department of Himachal Pradesh, Research Organization dealing in Forestry, Universities, representative from Non-Governmental Organizations and

Shri Devendra Pandey, IFS, Director General, Forest Survey of India, Dehradun addressing the workshop

Progressive Farmers participated. Shri Devendra Pandey, IFS, Director General, Forest Survey of India, Dehradun delivered a key note address and said that the establishment of GIS for management of forests on scientific lines would be one of the priorities in the 11th Five Year Plan. Shri Ashok Thakur, IAS Principal Secretary (Forests), Government of Himachal Pradesh was the Chief Guest of this workshop.

2. To systematize the statistical data pertaining to forestry at ICFRE level, a one day workshop on "Forestry Statistics India" was organized by HFRI, Shimla on 6th November 2007 in which about 35 participants from the State Forest Departments of Himachal Pradesh and Jammu & Kashmir, Research Institutions including Universities of the region participated in the workshop. Dr. Rabindra Kumar, IFS, Deputy Director General (Extension) and Dr. Raman Nautiyal, Scientist represented ICFRE in the workshop.

DDG (Extension), Director, HFRI and other participants during workshop

3. Himalayan Forest Research Institute, Shimla organized two days symposium on "Forest Insect Pest and Disease Management in Himalaya" on 10th and 11th January 2008. This symposium primarily focused on the insect-pest and disease incidences in the forests of Himalayan eco-system thereby enabling the Institute to draw a road map for further planning towards management of forest insect-pest. The symposium was attended by Forest Managers, renowned Scientists from various Universities/ research institutions of the Himalayan Region. Shri Ashok Thakur, IAS, Principal Secretary (Forests), Govt. of Himachal Pradesh Inaugurated this two day's symposium.


Symposium on Insect-Pest and Disease Management in Himalaya

Meetings Organized

1. Research Advisory Group (RAG) of HFRI, Shimla met on 23rd and 24th October 2007 to review the ongoing research activities of the institute and also to examine and recommend the new research proposals formulated by the researchers for their implementation after approval by Research Policy Committee (RPC). The meeting was attended by the ADG (RP) from ICFRE, Officers of the State Forest Departments of Himachal Pradesh, Professors/ Dean of Universities, Retired Scientists and Forest Officers, representatives of NGOs, Wood and Forest based industries besides researchers and officers of this Institute.

2. Shri Mohinder Pal, IFS, Director, HFRI, Shimla convened the meeting of the Committee as constituted by Director General, ICFRE for reviewing the ACR forms of the Scientists working in ICFRE on 17th December 2007 at ICFRE, Dehradun. Representatives of the Scientists from various institutes of the council were also present and their views were heard during the meeting.

3. A village meeting to analyze PFM activities was conducted on 25th January 2008 at Village Gheech, Kachobeg Panchayat falling under Shimla Forest Division.

DISTINGUISHED VISITORS

1. Shri Ashok Thakur, IAS, Principal Secretary (Forests), Govt. of Himachal Pradesh and Dr. Pankaj Khullar, IFS, Principal Chief Conservator of Forests, Himachal Pradesh visited the Institute on 4th May 2007 in connection with the 1st Meeting of State Level Bamboo Steering Committee (SLBSC) on 4th May 2007 held at HFRI, Shimla.
2. Shri Ashok Thakur, IAS, Principal Secretary (Forests) to the Government of Himachal Pradesh and Dr. Pankaj Khullar, IFS, PCCF, Himachal Pradesh visited the Institute to inaugurate the workshop on "Sustainable Land Use Planning through GIS Applications" organized by HFRI, Shimla on 7th September 2007.
3. Thiru S. Regupathy, Union Minister of State for Environment and Forests, Ministry of Environment and Forests, Government of India, New Delhi visited HFRI, Shimla on 18th September 2007.

Welcome of Hon'ble Minister by staff of HFRI, Shimla

4. Dr. Pankaj Khullar, IFS, PCCF, Himachal Pradesh visited the Institute to inaugurate and attend the Research Advisory Group (RAG) meeting held on 23rd and 24th October 2007.
5. Shri Ashok Thakur, IAS, Principal Secretary (Forests) to the Government of Himachal Pradesh and Shri Vinay Tandon, IFS, Principal Chief Conservator of Forests (Wildlife) visited the Institute on 10th January 2008 to inaugurate and attend the symposium on "Forest Insect Pest and Disease Management in Himalaya.

MISCELLANEOUS

Facilities

1. Keeping in view the importance and modern trends in forestry research, Geographical Information System (GIS) has been installed in the newly established GIS Lab of the institute.

2. The issue of climate change is a matter of concern in these days. Therefore, HFRI has procured and installed Automatic Weather Station at HFRI, Shimla and at Field Research Station, Tabo (district Lahaul and Spiti) to record the weather data on regular basis, which is urgently required for monitoring climate change related studies.

- To propagate the idea of Green Building Concept, Himalayan Forest Research Institute, Shimla constructed office and residential staff quarters at Field Research Station, Tabo, district Lahaul-Spiti, Himachal Pradesh. It may specifically be added that during construction of these solar passive structures, ecological and social aspects, of-course, conforming to the requirements of the region, were kept into consideration thereby adding towards efforts of the Institute for mitigating the effects of climate change in the region having special ecological significance. This can be a model for such types of works in the cold desert areas of Himachal Pradesh and Jammu & Kashmir.

Field Research Station, Tabo, district Lahaul-Spiti, Himachal Pradesh

A master plan is being developed by HFRI for upgrading the research facilities at Field Research Station, Tabo as the Institute has already been declared as Advanced Centre for Cold Desert Afforestation and Pasture Established by the ICFRE Headquarters.

Upgradation of Research Facilities at Field Research Station, Tabo

A village meeting to analyze PFM activities was conducted on 25th January 2008 at village Gheech, Kachobeg Panchayat falling under Shimla Forest Division.

3. Van Vigyan Kendra (VVK) was inaugurated by Shri Mohinder Pal, IFS, Director, HFRI on 27th February 2008 at Forest Training Centre, Sunder Nagar. About 150 participants consisting of Forest Officials, Farmers, members of local Mahila Mandals including Divisional Forest Officer, Suket Forest Division, Sunder Nagar, Principal, Forest Training Centre, Sunder Nagar were present on the occasion. The accommodation for VVK had been provided by the Himachal Pradesh Forest Department and the related peripherals have been arranged by HFRI.