

CHAPTER-X

HIMALAYAN FOREST RESEARCH INSTITUTE SHIMLA

Himalayan Forest Research Institute, Shimla addresses specific research issues of Western Himalayan states of Himachal Pradesh and Jammu & Kashmir. Major fields of research at this institute include regeneration of natural temperate forests, eco-restoration of cold deserts, rehabilitation of degraded areas and development and popularisation of agroforestry along with research on planting stock improvement.

This Institute has made significant contribution to artificial regeneration of Silver fir (*Abies pindrow*) and Spruce (*Picea smithiana*) by carrying out research on seeds, nursery practices and planting technology. Other notable achievements include development of nursery and planting techniques of broad-leaved associates of conifers like, Birdcherry, Horsechestnut, Oaks, Maples and Poplars, and species endemic to the cold desert areas. Models for rehabilitation of mine damaged areas were also developed.

PROJECTS COMPLETED DURING 1998-99

NIL.

OLD PROJECTS CONTINUED DURING 1998-99

Project 1: Cold desert afforestation and pasture establishment.

Sub-Project (1): Select suitable species for planting including trees shrubs and grasses and to develop effective establishment techniques.

Objectives: (a) To conduct ecological survey in the cold desert areas. (b) To select suitable species for afforestation.

Achievements

Preliminary analysis of phytosociological data from various sites showed great variations in the frequency of occurrence of various species, their density and dominance, etc. with clear indication of the effect of altitude and aspect. Draft report was updated by incorporating suggestions of various experts.

Five dominant indigenous shrub species have been short-listed for afforestation.

Objectives: Survey to determine the ecological status of *Juniperus macropoda* stands in cold desert areas of Himachal Pradesh.

Achievements

Distribution maps of *Juniperus macropoda* stands has been prepared. Soil samples from various locations analysed for pH electrical conductivity and available nutrients (P, K, Ca, Na, & N₂). Organic carbon in samples was also assessed.

Objectives: Species composition, plant biomass and net primary production in certain alpine pastures of Western Himalayas.

Achievements

Data on phytosociological and phenological characteristics was analyzed. Biomass potential showed variation with treatments/sites. Physico-chemical analysis of the soil samples was taken up. Good correlations amongst bulk density, particle density and sticky point etc. has been observed. The report is in the process of finalization.

Objectives: Development of nursery and planting techniques of *Fraxinus xanthoxyloides*.

Achievements

Nursery techniques related to seed sowing depth and sowing spacing have been standardized. The results show that seeds sown at a depth of about 2 cm (in lines spaced 20 cm apart with 50 seeds per line and in the beds of the size 2 m X 2 m) give the best results. The studies have also shown that the seeds collected during the month of September gives the best germination percentage.

Objectives: Development of nursery and planting techniques of *Quercus ilex*.

Achievements

Nursery techniques were standardised. Seeds sown during winters (late September to mid October) to gave the highest germination percentage. Additional studies to understand the effect of root clipping and assess the effect of irrigation schedules on growth and development in pricked out seedlings have been laid out.

Objectives: Development of nursery and planting techniques for *Hippophae rhamnoides*.

Achievements

Data show that winter sowing of the seeds of the species gives the highest germination percentage in nurseries. Trials to assess the growth performance of shoot cuttings of various diameter classes and irrigation regime are in progress.

Sub-Project (2): Improve establishment of clonal wood species.

Objectives: Studies on different soil working techniques for afforestation of slopes and low lying areas in the cold desert regions of the Western Himalayas.

Achievements

The sites for proposed experiment were selected and all the developmental activities carried out. This experiment will be taken up during the next year.

Objectives: Performance testing of different provenances of *Populus ciliata* and other Poplars in Nursery and in field conditions.

Achievements

Nursery trials on various provenances of *P. ciliata* and *P. alba* have been completed. The 'Pinder' provenance of *P. ciliata* has shown the best potential for planting. Field trials of *P. ciliata* with 15 different provenances of this species are under trial. The data on the related growth attributes have been recorded. Casualty replacements were also taken up during the year.



Survey of Juniperus macropoda



Floristic survey of the cold desert under FREEP



Cold desert afforestation

Project 2: Regeneration of coniferous and broad leaved forests.

Sub-Project 2(1): To Examine the effect of introduction of *Populus ciliata* into degraded coniferous forests.

Objectives: Improvement of Silver fir and Spruce regeneration through introduction of *Populus ciliata* as the nurse crop.

Achievements

Site for laying out trial for shade treatment was developed and planting of Poplars carried out. Replacement of casualties of both the Poplars and the conifers was done.

Sub-Project 2(2): Develop and Improve Propagation, Nursery and Planting Techniques.

Objectives: Determination of seedling grade for field planting of Silver fir.

Achievements

The data generated was statistically analysed. It has been found that the seedlings of the size range 15-20 cm. showed the highest mortality percent, whereas seedlings above 20 cms. height performed well in the field.

Objectives: To assess the size of root trainers for raising standard sized Silver Fir and Spruce seedlings.

Achievements

Seed sowing of Silver fir & Spruce in the different sized root trainers has been initiated and the related parameters are being observed.

Objectives: Studies on grafting techniques of *Pinus gerardiana*.

Achievements

The seeds collected from different provenances have been raised in the nursery for initiating grafting. The nursery stock raised during the past years from various seed sources is being maintained. Experiments to assess the performance of various grafts have been laid out.

Objectives: Improve growth and establishment of *Pinus gerardiana* plants in field conditions.

Achievements

Application of nitrogen fertilizers was found to considerably improve the establishment of *Pinus gerardiana* seedlings in the initial stages in the field. The experimental plots were maintained and additional doses of fertilizers applied. Data analysis showed a marked impact on the survival and growth of the species with the application of fertilizers.

Objectives: Studies to evaluate the performance of different seed sources in *Pinus gerardiana* (a) in nursery conditions and (b) in field conditions.

Achievements

The nursery trials showed that seeds collected from 'Jungi' area of district Kinnaur gave the highest germination percent and most vigorous seedlings. Experiment to assess the field performance of various provenances of *Pinus gerardiana*, rescheduled for 1998-99 was laid out following specific statistical designing.

Project 3: Agroforestry and silvipasture in lower hills.

Objectives: (a) Selection of species most suited for agroforestry/silvipasture in the lower hills. (b) To develop appropriate models with people's participation.

Achievements

Approach paper giving status of research in agroforestry in the region and setting future agenda for agroforestry research in lower hills of Himachal Pradesh was prepared.

Project 4: Planting stock improvement programme.

Sub-Project 4(1): Identification and Location of Seed Stands.

Objectives: Identification and location of seed stands of *Pinus roxburghii* and their development into Seed Production Areas (SPAs).

Achievements

Marking of inferior trees in the potential Chir-pine SPAs (50 ha.) for culling in Himachal Pradesh was completed. MoU signed with SFD of Jammu & Kashmir for establishing SPA over an area of 15 ha. of Chir-pine. Culling operations in SPA at 'Kopra' (10.52 ha.) in Nurpur Forest Division were completed.

Sub-Project 4(2): Establishment of Seedling Seed Orchards (SSOs)/Seedling Seed Production Areas (SSPAs).

Objectives: Establishment of CSO of *Dalbergia sissoo* (8 ha).

Achievements

CSO of Shisham at Gondpur, Paonta Sahib over an area of 2.27 ha was extended to 3 ha. Another 5 ha area was fenced at Laliyal In J&K and CSO raised over 3 ha. Nursery of planting material obtained for Shisham CPTs was raised at Johron, Paonta.

Site for raising SSO of Chir Pine was selected in Shun forest of Kuthar range falling in Kunihar Forest Division. Site developmental activities were completed. The seed from 26 CPTs of Chir-pine selected was used for raising stock for establishment of SSPA.

2 ha of SSPA of Shisham was raised with seedlings obtained from 28 CPTs. Shisham SSO over 5 ha. area in Bir-Plasi in Nalagarh Forest Division was established with seedlings raised from 25 different CPTs during the year.

Sub-Project 4(3): Establishment of Vegetative Multiplication Gardens (VMGs).

Objectives: Establishment of VMG of *Dalbergia sissoo* (2 ha).

Achievements

Site for raising VMG of Shisham was selected in Bir-Plasi forest falling in the Nalagarh Forest Division. Developmental activities on the proposed site have been taken up. Stock for establishing the VMG was raised and maintained.

Project 5: Strengthening and developing ICFRE and its institutes (UNDP Project).

Objectives: Increasing Forest Productivity through production of genetically superior planting material.

Achievements

This being basically an extension activity, efforts were made to educate the farmers about utility of taking up agroforestry by raising field demonstration plantations in their field. More than 1,50,000 seedlings ETPs of different species namely, *Acacia catechu*, *Eucalyptus* hybrid, *Ulmus laevigata*, *Pinus roxburghii* and *Populus deltoides* were raised and maintained on the lands of 1226 farmers. 40,000 ETPs of *Populus deltoides* were raised and maintained at Iyktion Research Nursery during the year. Plants of horticultural importance were procured from Regional Station of University of Horticulture & Forestry and distributed to the farmers. A farmer's workshop was also arranged in which officers from the State Forest Department also participated.

A final report of the activities was prepared and presented to the Terminal Evaluation Mission of the Programme at IFGTB, Coimbatore.

Project 6: Himalayan eco-rehabilitation project (IDRC Project).

Sub-Project 6(1): Rehabilitation of mined and other degraded areas.

Objectives: Rehabilitation of mine damaged areas with specific micro-interventions.

Achievements

Plant growth data of the earlier trials were collected. Preparation of maps of Sirmour district (Western Himalayas) on SOI topo-sheets, 53-F/10 showing forests, non-forests, agricultural lands, drainage and habitation was completed. Silvi-horticultural practices in the adjoining villages were taken up and plants of horticultural importance distributed. Physico-chemical analysis of the soil was carried out and soil classification of mined areas in the district of Sirmour was completed.

The trials carried out till date reveal that the mined areas can be ecologically rehabilitated and biologically rejuvenated for sustained economic production of produce within a period of 8 to 9 years.

Training programmes were organized for the local population and door to door contact with the target groups was also established.

Project 7: Increasing productivity of man-made forests.

Sub-Project 7 (1): Introduction and performance trials on some broadleaved tree species for afforestation and agroforestry.

Objectives: (a) To screening the different provenances of *Populus ciliata* and *Populus alba* by evaluating their performance in nurseries with special reference to Himachal Pradesh and maintenance of their germplasm. (b) To screen different clones of *Populus deltoides* in different edapho-climatic conditions of Himachal Pradesh and maintenance/multiplication of their germplasm. (c) To initiate trials on multiplication of *Paulownia*.

Achievements

The results are in the stage of compilation.

NEW PROJECT TAKEN UP IN HAND DURING 1998-99

Project 8: Nursery evaluation of different provenances of *Cedrus deodara*.

Sub-Project 8(1): Identification of provenances and collection of half sib seed.

Sub-Project 8(2): Nursery evaluation of different provenances of *Cedrus deodara*.

Progress made

19 provenances of deodar were identified and seeds collected from these provenances were tested for growth, and survival in the nursery.

Project 9: Assessing the impact of diseases and insect-pest attacks both in nursery and in field conditions and working out control measures thereof.

Sub-Project 9(1): Studies on the growth and pathogenicity of *Phytophthora cinnamomi*, on deodar and standardization of control measures thereof.

Objectives: (a) To study mode of infection and growth rate of fungi in diseased Deodar Forests. (b) To assess impact of edaphic and climatic factors on the growth and development of causal organism. (c) Biological and chemical control in the laboratory and in nursery conditions. (d) Studies on the effect of mulching in containing the disease in Deodar forests and physical control of disease by way of trenching.

Progress made

Soil samples from study areas were collected. Roots of infected trees were also collected. The samples were analyzed and the cultures of the causal organism (fungi) was prepared.

EXTENSION

Field demonstrations for raising plantations and nurseries of Poplars was imparted to the farmers under UNDP Project.

Workshop /Kisan Melas were organised for the farmers of Paonta Valley. Exhibits of the Institute was exhibited at the venue.

Demonstration plantations were raised both in the farmers field and in the mine damaged areas.

Net-work was developed with State Forest Departments of Himachal Pradesh and Jammu & Kashmir for effective transfer of technology. Steps to develop working relations with NGOs and the other institutes like Field Research Laboratories, Leh (J&K) were taken up.

FINANCIAL STATEMENT

I. PLAN			
Sl.No.	SUB-HEAD		Expenditure (Rs. in lakh)
1.	A.	REVENUE EXPENDITURE	
		(a) Research	40.75
		(b) Administrative Support	20.72
		Total for Revenue Expenditure 'A'	61.47
	B.	LOAN AND ADVANCES	
		(a) Loan Advances (Conveyance)	-
		(b) House Building Advance	0.97
		Total for 'B'	0.97
	C.	CAPITAL EXPENDITURE	
		(a) Building & Roads	-
		(b) Equipments, Library Books	0.50
		(c) Vehicles	-
		Total for 'C'	0.50
		GRAND TOTAL FOR A+B+C(PLAN)	62.94
II. NON-PLAN			
1.	A.	REVENUE EXPENDITURE	
		(a) Research	-
		(b) Administrative Support (Salary)	-
		Total Non-Plan	-
		TOTAL FOR PLAN + NON-PLAN	
III. FUNDED PROJECT			
	A.	World Bank Project	39.00
	B.	UNDP Project	1.32
	C.	NABARD Project	-
	D.	FORTIP	-
		GRAND TOTAL for (A+B+C+D) FUNDED PROJECT	40.32