
DEVELOPMENT OF FORESTRY RESEARCH IN PAKISTAN

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INTRODUCTION

Before creation of Pakistan in 1947, research in forestry and forest products as well as education in these disciplines was conducted at the Forest Research Institute and Colleges, Dehra Dun, India. In fact the forestry research in the Indo-Pak subcontinent was started sometime in 1878 when research on utilization of forest products was carried out in the Forest School at Dehra Dun. In the later part of 19th century and during the early part of 20th century, consolidation of forest estates was carried out in the subcontinent for scientific management of the forests to meet growing demand of forest goods and services. The Imperial Research Institute was established in Dehra Dun in 1906 with this objectives in view. Further, expansion of forestry research was carried out in the subcontinent when the importance of conservation of forestry resources was felt during First World War. Thereafter, rapid advances were made in this regards which contributed to the management of state forests and development of forest based industries. These efforts, of course, were constrained during the period of Second World War between 1939-45. Needless to say most of the research carried out before 1947 in Forest Research Institute, Dehra Dun concerned forest management and development in the areas which presently constitute India and the forest areas now in Pakistan were rather neglected.

After the creation of Pakistan, the Government soon became aware of the importance of forestry in the country with poor forest resources, and therefore, started an institute in 1947 called Pakistan Forest College and Research Institute for forestry research and education.

Initially its activities were confined to forestry education, which were subsequently extended to research. The Pakistan Agricultural Research Council was established in the fifties with primary responsibility of agricultural research. Later on, it also initiated some research in forestry in collaboration with Pakistan Forest College and Research Institute and other local institutions under its PL-480 assistance programme.

Small research units in the form of Forest Research Divisions were also established in late forties and fifties by the forest departments of Punjab and Sindh and in 1962 in Azad Kashmir for conducting research on local forestry problems. They have worked in close association with the Pakistan Forest Institute over the years. The Punjab Forest Department has recently upgraded its research facilities and established a research institute in 1986, the Punjab Forest Research Institute at Gatwala, Faisalabad to accelerate the pace of forestry in that province. A post of Divisional Forest Officer, Research exists in NWFP, which is rarely filled. The research problems of the province are usually referred to PFI because of the close proximized Balochistan province has also a Divisional Forest Officer, research.

Forest Research Policies

In addition to creation of forestry research infrastructure in the country, the Government of Pakistan also expressed its interest in promotion of forestry research in its forest policy statements, directives, decisions and recommendations issued by it from time to time. The first forest policy announced by the Government of Pakistan in 1955

directed that forestry research and education be organized in the country. Another forest policy directive was issued by the Government in 1962 in which emphasis was placed on conduct of research and selection of quick growing tree species for various ecological zones, and on shelterbelts and windbreak; and planting of trees on saline and waterlogged areas. It also directed that studies for reducing length of rotation be undertaken to ensure prompt regeneration and improving techniques for wood utilization. The directive on soil conservation in this policy called for research to develop techniques for optimum agricultural production. Later on, a Council of common interest was formed by the Government in July, 1975 who suggested transfer of control of the Pakistan Forest Institute from the Board of Governors, Government of NWFP to the Ministry of Food and Agriculture, Government of Pakistan, thus emphasizing the rule of Federal Government in forestry research and education. The council also recommended stepping up of research of the Pakistan Forest Institute on introduction of fast growing species, problem of watershed management, and demand and supply of forest products. The National Commission on Agriculture was constituted by the Government of Pakistan in 1988 who recommended strengthening of Pakistan Forest Institute and its affiliation with NWFP Agricultural University instead of Peshawar University for the purpose of award of degrees to the trainees of the Institute. The commission also recommended that the Institute besides its current activities should also produce hybrid silk seed and train provincial sericulture units to do the same by strengthening research and training facilities in this field.

The National Agricultural Policy announced by the Government of Pakistan in May, 1991, *inter-alia* includes a chapter on National Forest Policy and stated basic objectives of the same. It has also proposed the following plan of

action for forestry research in the country:

- a. Develop and strengthen research programmes which provide technologies on the social and scientific management of forest and rangeland resources.
- b. Establish regional research stations to conduct research on specific local problems.
- c. Involve and encourage Provincial Forest Departments and industries in finance research on problems relating to forestry and forest products.
- d. Involve effective mechanism for coordination of research on forestry and forest products by Federal and Provincial Institutions and Universities.

It was stated in the introductory chapter of this report that status of forestry research in Pakistan can only be discussed in the context of its forest resources, their productivity and past and present management, etc. It is further added here that state of forestry research and for that matter any kind of research in a country depends upon social and economic milieu prevailing in it at any time as well as on its general educational and scientific literacy levels. Further, it is commonly stated that it should satisfy the objectives of the national forest policy. It is a fact that all forest policies failed to a varying extent in Pakistan because of population pressure, lack of policy initiatives and insufficient inputs. All forest policies were also silent on forest research policy. It appears from above account that importance of forestry research in forest policies framed from time to time was felt only after research had proven usefulness of its results for certain practical forestry measures and the recommendation in this regards were included in the forest policy

statements as an after thought.

Achievements of Forestry Research

In spite of absence of clear forestry research policy, impressive achievements have been made in this regards by the Pakistan Forest Institute, which is a premier and oldest national forestry research institution in Pakistan. These are listed below:

Selection and propagation of superior exotic tree species and genetically improved plant material for increasing wood production, such as poplar, Eucalyptus, Acacia and Willows. Paulownia is a recent introduction.

Production and distribution of quality tree and grass seed and tree planting material to field officers and farmers.

Selection of suitable tree species for afforestation of arid and saline and waterlogged areas. The species include both exotic *Acacias*, *Prosopis*, *Eucalyptus* etc and local *Acacia* and *Tamarix*.

Developing irrigation, fertilization, spacing, thinning, water harvesting and other management practices for improved wood production. Significant improvements in nursery techniques for a number of species Juniper, Chir pine, Blue pine, Poplar, Paulownia, Alnus and Eucalyptus have been achieved.

Surveying wildlife and wildlife habitats and developing conservation measures for endangered species. Population dynamics of Chiltan and Kashmir Markhor, Musk Deer, and Sindh Ibex and waterfowl have been studied along with other floral and faunal characteristics in different national parts.

Developing range improvement measures to enhance range and livestock productions through seeding/reseeding with improved species, enclosure, fertilization introduction of silvopastoral system, etc. and improved range management.

Developing watershed management measures, both biological and technical control measures to reduce soil erosion and landslides for different landuses in different ecological zones. It has been found that tree planting, protection from grazing and control of gully erosion reduce sediment by 63% and surface runoff by 48% in scrub forests. Studies on water harvesting and ground water recharge have also been carried.

Assessing technical properties of woods of various species to utilize their wood more efficiently and economically. *Eucalyptus camaldulensis* wood has been found useful for furniture, board products and paper making industries.

Improving logging and transportation methods, tools and machinery to increase efficiency and reduce wastage. Chainsaws are 25% more economical in irrigated plantations. Adding 7% lime to soil reduces forest road surface erosion by 32%. Interim piece rates for felling and conversion of coniferous forests have been prepared.

Developing productive, efficient and economic uses for waste wood. Economical techniques have been developed to produce standard quality board paper and paper from low quality woods of Eucalyptus, poplars, ipil ipil and bamboos.

Developing biological and chemical controls for insect pests and diseases to reduce plant mortality and losses of wood in storage. Successful chemical and biological controls have

been developed against shisham defoliator, powder post beetles, kail defoliator, chilghoza cone borer and porcupines.

Developing optimum management regimes for major forest types. Based on financial maturity/soil expectation value, the best rotation for coniferous forests in Pakistan is found to be between 50-70 years rather than the present 150-200 years. Volume and yield tables of most important species have been prepared.

Developing useful combinations of trees and agricultural crops to help farmers grow more trees on farmlands and increase crop production. Eucalyptus, poplar, simal, shisham and ipil ipil, grown in combination with wheat, cotton or sugarcane give more income even after allowing for lower crop yields. Surveys of tree growth on farmlands in NWFP and Punjab have been carried out.

Developing vegetation and ecology maps and studying interrelationship between trees, soils and other vegetation. Vegetation maps of NWFP, Punjab, Sindh and Balochistan at 1:1,000,000 and of Pakistan at 1:2,000,000 have been prepared.

Surveying medicinal plants and techniques for their artificial propagation. Special quantitative surveys of juniper, berries and Ephedra have been carried out. Cultivation techniques of *Nigella sativa*, *Mentha*, *Ocimum*, *Foeniculum* and *Plantago* have been standardized and regeneration of Dioscoren, Atropa, Digitalis, Rheum, etc. has been successfully carried out.

Survey of diseases of coniferous and hardwood species has been carried and control of mistletoe on juniper determined.

Strategies for Future Forestry Research

In spite of above achievements, there is general lack of appreciation of importance of forestry research among the field forester in the country. There is apparent indifference among them towards new knowledge and a lack of interest in application of results of research in regular forest management operations. Almost no initiative comes from outside research institutions in proposing new forestry research projects. There is no worthwhile feedback or encouragement from field foresters when research findings are published which in turn is extremely discouraging to those who are carrying out research. The situation is further complicated because of extreme financial constraints and dearth of funds for research purpose, which are presently faced by the forestry research institutions especially the Pakistan Forest Institute. For these reasons, it would be pertinent to find out how forestry research benefits society in general, research needs of those who grow and use forests and trees, and the financial and human resources required to meet these needs.

In addition to above, new directions and strategies have to be evolved for future forestry research in Pakistan. In future, research will have to be directed specifically towards needs expressed by forestry interest groups and given priority for achieving policy goals. Useful directives and guidelines in this regards, are available in National Forest Policy of 1991 and Forestry Sector Master Plan which has been finalized recently after detailed review of current situation in various subsectors of forestry in the country. For obvious reasons, large scale long-term forestry development cannot be carried out without strong support of research. The existing forestry research institutions will have to be developed and strengthened for this purpose. The Pakistan Forest Institute has a potential for becoming a centre of

excellence for forestry research, not only for Pakistan but also as a focal point in the South and Central Asian regions. It could collaborate with Centre for International Forestry Research (CIFOR) which is being established in Bogor, Indonesia under the auspices of Consultative Group on International Agricultural Research (CGIAR) as well as other regional institutions and projects.

Future forestry research would continue to be directed towards increasing local wood production, providing information and tools for scientific and sustainable forest management and protection from harmful agencies and efficient use of forest produce. In this connection, studies on testing of exotic tree species, improvement for quality seed production, improvement of nursery and plantation management techniques, range development, etc. would continue. However, more emphasis would be needed on such aspects as study of mode of propagation of trees e.g. seed versus vegetative material including that produced through tissue culture. In the case of watershed management research, a modelling approach for hydrological studies will have to be adopted. Agroforestry is expected to receive maximum attention in coming years in Pakistan in order to alleviate wood shortage situation. Therefore, research on microenvironment of tree-crop interface and allelopathy should be given a high priority. Similarly, for afforestation of problematic areas especially waterlogged and saline soils, detailed studies on soil physiology are needed. Though grazing is carried out over 60% of the total areas, still, adequate facilities for conducting range related research have not been established in the country. Future research needs in this regards include range management studies, determination of photosynthetic rates of different types of vegetation, effect of frequency of grazing on infiltration rate of soils and preparation of range utilization guides.

Although much attention is focused on general environmental problems, yet very few specific research studies have been identified so far. Some research topics in this regards are; effect of pollutants on plant and plant physiological process, problems of urban forestry, studies on plant succession under intense use, status and conservation of biodiversity, plant extinction rates, and development of biological control measures against insects and fungi. Currently, management of forests, watersheds and ranges is not assessed in terms of their effect on environment. Rather, these research areas are treated separately. Research should establish strong links between them and develop tools and information to determine environmental values of different land uses. It should develop systems of management of wildland resources that simultaneously produce commodities and maintain and improve environmental values as well as protecting their biological diversity. Again, a modelling approach will have to be adopted for managing the land and its resources at both watershed and regional scales. It would not only involve understanding the ecosystems but also the systems and practices suitable for the production and use of wildland resources.

The main reason for environmental degradation as a result of defective land use, are the constraints faced in conservation and development of wildland resources. Future research should focus on social and economic aspects of these constraints. Studies on marketing of forest and range products should also receive high priority if we are to encourage private sector's participation in management of these resources. For this purpose, standardization of products is essential, which has not been done so far. This would, in addition to facilitating their marketing, ensure economical and efficient use of scarce resources.

CONCLUSION

In spite of absence of a clear forestry research policy and general indifference to forestry research, substantial achievements have been made by the research institution especially the Pakistan Forest Institute in the past. However, forestry research scientists and managers are expected to face a difficult task in coming years. The financial support for this activity from the national and provincial governments in Pakistan would reduce because of pressure for diverting resources to other development activities. On the other hand, they would be increasingly called upon to provide

solutions to the complex problems of management of the wildland resources in the context of environmental improvement, for which ecosystem research would be given a high priority. Future forestry research would be both local and regional in nature. The regional and global aspects of forestry research at national levels are expected to receive support from CIFOR and regional projects of international organizations, such as the FAO. In order to cope with the emerging situation, some mechanism of self-financing will have to be evolved by the forestry research institution in Pakistan for which they would need autonomy in administrative and financial matters.