

M.SC FORESTRY THESIS RESEARCH AT PAKISTAN FOREST INSTITUTE, PESHAWAR 1999-2001 COURSE

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A comparative study of *Dalbergia sissoo* Roxb.: Die-back in Pakistan and Nepal by Abdul Sahim Ansari (Advisor: Dr. Mirza Hakim Khan)

The dieback in *Dalbergia sissoo* (Shisham) is a common problem in countries like Nepal, India, Bhutan, Bangladesh, and Pakistan. Being multipurpose tree, it has not only attracted the attention of the Forest Departments but also of the farming communities in the region. Sissoo trees belong to the family leguminosae, sub-family Papilionoideae. It is considered to be native to the Terai areas situated in the sub-tropical and dry temperate foothills of Nepal.

In Pakistan, it is found along the foothills of Himalayan mountains and extends up the Indus valley to Attock. It was introduced in Changa Manga during 1866 to produce coal for the locomotive engines. Plantations are existing in Khanewal, Bhagat, Bhakkar and Mianwali. It is also being grown on private lands along with agriculture crops in the districts of Peshawar, Mardan, Dera Ghazi Khan, Faisalabad, Rahim Yar Khan, Bahawalpur, Bahawalnagar, Jhelum and Gujrat. In Sindh, it is also planted along the water channels at scattered places. The species raised along the roadsides and water channels wherever sufficient water is available for irrigation.

Because of large-scale damages due to dieback, surveys were conducted in some parts of Pakistan especially in the districts of Charsadda, Peshawar, Mardan, Swabi, Rustam and Katlang areas. Heavy infestation rates ranging from 20-50% were noted in the above sites. Infestation rates were higher in Katlang and Charsadda areas. The damages were particularly due to the casual organism known as *Fusarium solani*, a root disease by fungi, *Ganoderma lucidum* and *Phellinus gilvus* in varying degree. It was mainly observed that root-injury is the main cause for the entrance of the disease.

The study recommended imposition of ban on debarking, removal of over-aged trees, collection of seed from plus trees only, site selection, deep planting sanitary precautions and avoidance of injuries for the successful growth of sissoo trees.

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Application of GIS in slope instability analysis and landslide mapping for Hilkot watershed, district Mansehra: by Muhammad Khurram Shahzad (Advisor: Asif Kamal)

The study aimed at testing a model of Geographical Information System (GIS) for natural resource management studies. It includes the field surveys of the various geological and environmental aspects of the Hilkot watershed area, in district Mansehra. The study aims at:

- i. Use of GIS for watershed surveys and studies
- ii. Emphasizing the role of land sliding hazards and
- iii. Mapping the landslide and hazardous areas in the watershed for easy decision making

During study, the existing landslides were surveyed by using GPS to mark their boundaries. To check the accuracy of the results of the GPS digital data, some manual surveying techniques such as Compass surveys were also adopted in the field. Only five landslides of the area were surveyed and the GPS digital data were feeded to the computer at PFI GIS Lab for further spatial analysis and production of different maps including:

- i. Land capability map
- ii. Contour map
- iii. Land physiography
- iv. General map of Hilkot, with streams, roads, flume-stations
- v. Slope map of Hilkot watershed

This short study concluded that inadequate drainage system, deforestation, un-control grazing character and steep slopes are the major causes of the land sliding. It was suggested that detailed surveys by using modern tools and techniques should be conducted for land-slide and hazard mapping of all the watersheds of the hilly areas. This will certainly help for future planning and decision making on national level in the country.

Comparison of plant diversity in reserved and Guzara forests: 'A case study in Murree hills': by Mahr Muhammad Asif (Advisor: Raja Ghayyas Ahmad)

Pakistan has nine major ecological zones that support a wide variety of ecosystems. Sub-tropical chir pine forest is one of the most important forest types of the country. The forests of this type growing in Murree hills are faced

with an increasing problem of degradation and species loss. Present study aimed at the assessment and comparison of plant diversity of both Reserved and Guzara forests in the chir pine zone of the Murree hill to compare the plant diversity.

To assess the status of plant diversity, a systematic sampling design was used in a selected Reserve and Guzara forests. The sample plots of 500 m² and 10 m² areas were laid out to collect the data regarding tree and shrub species respectively. The cover percentage of herbaceous vegetation was recorded through the sample plots of 1 m² size. In all, 10 sample plots were measured in each forest.

To compare the plant diversity of both types of forests, three diversity indices viz; species richness, Shannon diversity index and Shannon evenness index and Sorenson's measure of similarity were computed.

Results indicate a higher plant species richness in Reserved forest as compared to the Guzara forest. Similarly, the Shannon diversity indices suggest that the Reserved forest is more diverse in flora than the Guzara forest. To test the differences in plant diversity of the two sites, t-test was applied which revealed a highly significant difference. In other words, the forests appears to be better protected and managed in contrast to the Guzara forests. The later category suffers from many problems related to the management issues and exercise of locals rights in the forest.

Effect of community participation on the watershed management activities in Siran valley of Siran Kaghan Forest Development Project (SKFDP) district Mansehra: by Muhammad Khalid Rafiq (Advisor: Raja Muhammad Zarif)

The Siran Kaghan Forest Development Project was initiated during 1992-93 to adopt the concept of participatory management in the area. The project was technically and financially assisted by the German Government. The overall objective of the project was to integrate forest and other natural resources through sustainable production systems with the active participation of the local communities.

The present study was carried out to know the socio-economic conditions of the target community, the community involvement in the Siran Kaghan Development Project activities and the effect of participation on watershed management activities. The data for the study were collected through

a survey from 60 randomly selected respondents of five randomly selected VDCs constituted by the SKFDP. The respondents were interviewed using a comprehensive questionnaire.

The study concludes that 30% of the people were involved in farming while 25% were engaged in government/private service. About 43% of the participants were doing farming in addition to government/private service. 50% people earned upto 5000 rupees per month while 27% had income upto 7500 rupees per month. Only about one fifth of the population (23%) were having income above rupees 7500 per month.

The literacy rate in the study area was found as 59%. Of these, 20%, 22% and 16% were educated upto primary, secondary and college levels, respectively. Average family size was 7.6 member per household. Of the total cultivated land in the study area, only 45% population owned rain-fed land. Those owning irrigated land only were 20% where as 30% owned irrigated as well as rain fed lands. About 41% of the respondents were using land for raising plantation and managing as a range land. Only 2% of the population owned area supporting a natural forest cover.

Majority (70%) respondents were using wood with other non-commercial and commercial fuels. The balance (30%) was using only wood to meet their fuel needs. The average fuel-wood consumption by the household in the study area was estimated as 25 kg per day. Large number (63%) of the respondents were approached by the project staff to plan and undertake suitable soil conservation measures and adopt improved activities as per tested technologist.

Financial analysis of Chichawatni irrigated plantation and farmlands by Muhammad Shahzad Anjum (Advisor: Raja Muhammad Zarif)

Financial and economic analysis of Chichawatni Irrigated Plantation was carried out in this study. The spacing of the plantation was 10 x 6 feet with total Shisham stumps planted per acre were 724. Rotation of the plantation was fixed as 20 years for analysis period with intermediate thinnings at the age of 6 and 12 years. Clear felling at the age of 20 years with standards was the recommended management system.

Benefit Cost Ratio (B/C), Net Present Value (NPV), Soil Expectation Value (SEV), Internal Rate of Return (IRR), Pay Back Period (PBP), Equal Annual Income (EAI), were calculated at 5.61% (excluding 7.4% inflation rate) and 13% interest rate for an acre of land.

A farm land survey was also conducted in district Sahiwal Tehsil Chichawatni to find farmers' attitude and perception towards tree planting. Random sampling techniques were adopted to obtain requisite data and information from a sample of 67 respondents through semi-structured questionnaire.

The study concludes that the majority of the population owned sufficient area to grow trees. The average monthly income of the sampled population was found to be about Rs. 8,600. Highest income was earned by those who had business in addition to agriculture. However, agriculture still remains the dominant source of income in the study area.

Majority of the farmers were willing to continue tree growing as a business. Substantial saving indirectly accrued to the tree growers in the form of meeting domestic requirement by obtaining wood from their own tree resource.

The study indicates that the majority farmers hesitate to grow trees because these hinder agricultural crop production. They demanded incentives in terms of free provision of seedlings and financial assistance. The farmers also perceived development of adequate market mechanism to promote tree growth on private farmlands.

Phytosociological investigation of pharmaceutical plants in some parts of Mohmand Agency by Naveed Ahmad Khan (Advisor: Dr. Mirza Hakim Khan)

Mohmand agency is an area of rocky Mountain with barren slopes. The climate of Mohmand Agency is Dry hot in summer and dry cold in winter. The soils are generally clay and clay loam. The oldest formation or the Gandao formation which is typified by its monotonous topography, Characterised by rounded mounds throughout the exposures. Limited work on vegetation and pharmaceutical plants has been done in this valley. Khan (1998) has investigated 7 plant communities, which are mostly scrub communities.

The present work was mainly done to investigate the phytosociological aspects of the drug plants. The agency as a whole possesses great potential for pharmaceutical industry. Quadrat method was used and 57 plants belonging to different families were investigated.

The study recommends that programmes such as Education in Medicinal plants cultivation, Livestock improvement, handicraft and cottage industry, Wildlife management, Range improvement etc. can reduce poverty in the area.

Socio-economic effect of Suketar Watershed Management Project on local community in district Bhimber (AJK) by Asad Mahmood (Advisor: Dr.Sardar Muhammad Rafique)

The Suketar Watershed Management Project is located in District Bhimber (AJK). The project area comprises watershed of Suketar Nullah which is situated in two subdivisions of District Bhimber. It is a rural development project jointly funded by the UNDP and Government of AJK. The overall goal of this project was to reduce land degradation and soil erosion in the catchment area of Suketar Nullah with engineering and biological interventions and improvement of socio-economic conditions of the local people.

This study was carried out to know the changes in socio-economic conditions and perceptions of the target community. The data for the study were collected through a survey from 100 randomly selected respondents questionnaire. The data were compiled and averages as well as percentages were calculated using simple statistical techniques.

The study revealed that 45 percent of the respondents were practicing farming while 25% were involved in both farming and government/private services. Average family size was 8.22 members and 49 percent of the respondents were living in cemented houses while 44 percent had mixed (mud and cemented) houses. Majority (86%) of the respondents were living in joint family system. The average annual income was above Rs. 7,000. The literacy rate was 54%. Almost all the people in study area possessed cultivated and uncultivated land. The cultivated land was mainly rainfed. Average land holding size was 1.54 hectares. Fifty-four percent of the land was cultivated while rest was uncultivated. About 90% of the people were growing both summer and winter crops. The average livestock per household of the respondents was estimated at 8.6.

Under the project interventions conservation of natural forest and wildlife activities were carried out. Sixty percent of the respondent got their land developed under project soil conservation activities. Seventy percent of the respondent were of opinion that project brought a considerable change in socio-economic condition of local community. The productivity of fuel wood increased up to 48%, while that of timber up to 10%. Cereal crop production increased up to 30% and fruit production up to 45%. Household income increased up to 30%.

The percentage of the respondents, who got their land developed through project soil conservation activities like check damming, terracing and

dykes/wire crates was 63%, 60% and 40% respectively. Fifty three percent of the respondents were trained in five disciplines namely fish farming, nursery raising, apiculture, poultry farming and watershed rehabilitation.

Scope of extension of village landuse planning (VLUP) into joint forest management (JFM) for the management of natural resources in key area – 1 of upper Tanawal protected forests by Muhammad Waseem Ashiq (Advisor: Dr. Muhammad Noor)

The concept of Community Forestry emerged in response to the failure of forest industries development model for socio-economic development and increasing rate of deforestation and forest land degradation in the developing countries. In Pakistan, NWFP Forest Department introduced the concepts of Joint Forest Management (JFM) and Village Land Use Planning (VLUP) in public sector for better management of Natural Resources and poverty alleviation of rural communities by distributing the benefits from these resources.

As both the approaches were participation oriented, the present study was carried out to wedlock these two into one concept. Mouza Fateh Bandi (Key Area – I) was selected to study the application of JFM and VLUP.

This study revealed that although JFM approach has the potential and ability to encompass the activities of VLUP but certain severe threats are associated to its success e.g., poverty, lack of coordination, local conflicts, population growth, devolution of power etc. Unless these threats are overcome and the concepts are pilot tested in various ownership and land tenure situations, it would not be possible to fully wedlock these concepts. However, as a first step the study recommends that the decision of the government be obtained to adjust the management system with regard to the new objectives including sustainability and meeting the requirements of the community. Moreover, the present management plans be fully synchronized with the operational plans strictly in accordance with the policy objectives.

Role of NADP activities on the socioeconomic conditions of household in Diamer district by Aftab Mahmood (Advisor: Dr. Sardar Muhammad Rafique)

The Northern Areas are generally characterized by its subsistence level agro-pastoral economy because of physical isolation, limited crop lands and scarcity of natural resource. More than 90% of the population depends upon

natural resources by integrating food crops, agro-forestry, livestock husbandry, horticulture and poultry etc. The Northern Areas Development Project (NADP), established in 1998 has improved the living conditions of the rural folks of the region. During the last three years the project has brought some positive changes in agriculture through improved seeds, training and veterinary services.

The present study was conducted to determine the effects of NADP programme's, initiatives on the socio-economic conditions in district Diamer. The geographical hardships and time limitation hindered in the way of sizeable data collection for better inferences.

The analysis reveals that almost all the local inhabitants reported positive change because of programme activities. Majority of the respondents reported improvement in yield of the cash crops increased income from vegetables, higher livestock production, fodder development and changes in attitude of the target population.

Most of the sampled respondents reported that they have been provided saplings of forest as well as fruit trees. Introduction of Alphalpa for intercropping has resulted in considerable improvement in green cover. Potato seed production has increased and farmers earned some cash income. Veterinary services, especially vaccination and medication had reduced mortality rate. A large number of village specialists also got training courses.

The study proposed that the NADP, with sectoral approach limitation must integrate all the natural resource based farming activities in a well balanced fashion for sustainable management. Keeping in view the physical and socio-economic conditions of the region, NADP should continue its efforts for the development and management of natural resource in the area and ensure sustainability in their management. The study also records that the overall performance of the programme is quite satisfactory and the results are commendable.