

## M.SC. FORESTRY THESIS RESEARCH AT THE PAKISTAN FOREST INSTITUTE PESHAWAR 1989-91 COURSE

---

**Raja M. Ashfaq**, Director Forest Education Division, Pakistan Forest Institute, Peshawar

---

1. Study of vegetation in the habitat of Markhor (*Capra falconeri chiltanensis*) in Hazarganji Chiltan National Park, Quetta. Ali, M.B. (1991).

The vegetation of Hazarganji Chiltan hill is important because it constitutes one of the best abodes for the endangered Chiltan Markhor (*Capra falconeri chiltanensis*). In order to evaluate three basic requirements of Markhor i.e. shelter, food and water, a study was carried out in May, 1991 using Braun Blanquet method of vegetation analysis. Data

was collected for total number of species, cover and abundance value of vegetation.

Three plant communities were recognized at different elevation, slopes, direction and rocky sites. The communities identified were as follows:

- i) *Juniperus excelsa* - *Perovskia abrotanoides*
- ii) *Sophora griffithii* - *Artemisia maritima*



iii) *Juniperus excelsa* - *Ephedra nebrodensis*

These communities constituted the best habitat for Chiltan for its shelter and food during summer and winter season in Hazarganji. On the basis of this study, it was recommended to plant blank areas with species like, *Pistacia cabulica*, *Fraxinus xanthoxyloides*, *Prunus eburnea*, *Lonicera quinquelocularis*, *Cotoneaster nummularia*, *Rosa moschata*, *Spiraea lindleyi* and *Prunus amygdalus*. (Advisor; Dr. Mirza Hakim Khan).

2. Development of piece-rates in tree felling and conversion in Kaghan Valley. Afzal, M.K. (1991).

A study was undertaken to develop piece-rates in felling and conversion of trees of different sizes in Noori and Kamalban forests in Kaghan Valley using a four member felling crew. The data was analysed with computer and regression analysis was carried out to find out standard time for tree felling and conversion by taking the total work time as dependent and DBH of trees and slope of the terrain as independent variables. A mathematical model was developed for calculating standard time for various DBH and slope classes. The basic wages were calculated from the actual daily wage rates in similar forestry operations and corrected/adjusted for slack season.

The average volume for the three DBH classes was worked out from time study data. Standard time (min/cft) for each DBH and slope class was calculated by dividing standard time per tree by average volume of respective DBH classes. The piece-rate in Rs./cft for each DBH and slope class was formulated by multiplying standard time (min/cft) with basic wage (Rs.min.).

The piece-rate developed for the felling and

conversion for trees of DBH class-I (40-60 cm) was from Rs.77.66 to Rs.116.49 per m<sup>3</sup>, for DBH class-II(61-80 cm) was from Rs.51.19 to Rs.70.60 per m<sup>3</sup>, and for DBH class-III (81 cm and above) was Rs.48.36 to Rs.61.78 per m<sup>3</sup>. The piece-rate decreased (9-35%) from lower to higher DBH classes because the volume increased at faster rate (41-10%) than the time. The piece-rate increased at 15-22% with the increase in slope within the same DBH class. (Advisor; Dr.Muhammad Ayaz)

3. Comparison between seeded and unseeded range area at Jamrud. Azhar R.K. (1991).

A study was designed to compare forage production, cover percent and carrying capacity of both seeded and unseeded area at Jamrud located 5 km west of Pakistan Forest Institute, Peshawar. Forage production and cover percent data were collected from the seeded and unseeded areas in May, 1991. 48 quadrats were studied in each of the seeded and unseeded area. Carrying capacity for both seeded and unseeded areas was calculated. Forage production and fodder percent data were statistically analysed using *t test*. The air dried forage production (kg/ha) and carrying capacity were higher on the seeded than on the unseeded area but the cover percent did not show significant difference due to weed growth. (Advisor; Dr. M. Noor)

4. Sustainable agriculture production through forestry and watershed management. Baranyanga, V. (1991).

The objective of this study was to review as how to achieve a sustainable agriculture through forestry and watershed management in comparison to other conservation actions in the wake that the ratio of plantation establishment to deforestation in Africa is shockingly low e.g. 1:29. It was found that a



layer of 18 cm of soil in mixed deciduous forest is theoretically eroded after 575,000 and 82000 years in meadows and pastures respectively. Burning of tropical forests exposed the soil to heavy rainfall with severe losses of nutrients by leaching and by soil erosion. After only two or three seasons the crop yields declined by 25 to 70%. According to FAO estimates, current rates at which cropland is thus being destroyed is 100 million ha each year.

Different techniques of run-off harvesting have proved successful in tropical arid and semi-arid areas where under proper management and water spreading, productivity per hectare per year could be much greater than in temperate zone agriculture.

Further, successful results of wind breaks and shelterbelts in regions affected by wind erosion have proved that fruit trees and other crops increased the yield per hectare from 1.4 ton/ha to 4.8 ton/ha. Through these techniques, forest conservation can dovetail into rural development schemes, help raise agricultural productivity, provide resource protection and yield fuelwood and other essential goods for farmers in tropical countries. (Advisor; Dr. Bashir Hussain Shah)

#### 5. Study on the role of Women in Forestry in Pakistan. Jehan Ara (1991).

The primary objective of this study was to review and compile available literature on the role of women in forestry sector at global level and compare it with the present role, status, problems and special needs of women in forestry activities in Pakistan and to suggest improvement in future role of women in this sector.

The study indicated that women have generally been employed in forestry in India,

Nepal, Malaysia, Indonesia and Philippines in nursery operations. Their major activities have included fuelwood and fodder collection, establishment of court yard nurseries, sericulture, minor forest produce collection and livestock raising. Some of them were also employed in wood based industries. Women in Pakistan also are employed in similar activities but on a limited scale due to 'Purdah' system.

Tradition, cultural norms and social values have also restricted the mobility of women in the country and confined them to the household activities. Low literacy rate, lack of training facilities and shortage of trained foresters coupled with general negative attitude to female employment and division of labour are other obstacles. A number of suggestions are given to over come these constraints such as women employment in forest nurseries on priority basis, recruitment of trained female extension agents in the forest departments, involvement of women in planning and execution of social forestry programmes at provincial and federal levels, increasing job opportunities by establishing rural cottage industries, training of women in forestry operations including apiculture, silviculture, sericulture, livestock, range management and reserving special quota for women forester in forestry extension, research and education. (Advisor; Dr. K.M. Siddiqui)

#### 6. Monograph on *Juniperus excelsa* (syn. *J. macropoda* and *J. polycarpos*) Mitta K.K. (1991).

A study was conducted to compile all the scattered literature on Juniper in a consolidate form to provide the future research workers with a ready reference.

Juniper is extensively found in Afghanistan, Iran, Muscat and Syria besides Pakistan. It occurs in the inner drier ranges of



the Himalayas from Nepal westward and in western Tibet at an altitude of 1500 to 4200 meters. In Pakistan, Juniper forests occur in Chitral, Gilgit, Kurram Valley and Balochistan at an elevation of 1800 to 4200 meters. The world largest compact block of Juniper forest occurs in Ziarat, Sasnamana and Sanjavi Forests covering an area of 88,000 ha in Balochistan province.

Juniper is a medium sized, evergreen, aromatic, drought and frost resistant tree. It is an extremely slow growing tree taking about 60 years to attain the height of 1.5 meters and diameter of 2.54 cm. Investigation on germination of juniper have shown that only 1-3% of the berries contain viable seed and germination percentage is only 0-1%. Studies on artificial regeneration through seedlings and vegetative propagation did not show significant results. For achieving high germination percentage, the ripe berries must be collected in mid December. After treatment, the seed should be sown by the end of December or first week of January. Pricking should be done when plants are four weeks old. Planting out should be carried out when the plants are 2-3 years old. Tissue culture studies of this species are inconclusive. *Cupressus arizonica* has been suggested as an alternate to juniper in Balochistan on account of its drought resistance and comparatively faster growth rate.

Beside poor site quality, low germination capacity, over grazing and illicit cutting, the juniper is attacked by dwarf mistletoe (*Arceuthobium oxycedri*) and fungi (*Pyrofomes demidoffii*) also attack juniper and thus adversely affect growth of the trees. (Advisor; Raja M. Ashfaq)

7. Monograph on *Ephedra nebrodensis* Muslim, M. (1991).

*Ephedra nebrodensis* is naturally found throughout arid and semi-arid tract of the world which includes United States, Spain, Sikkim, Bhutan, Nepal, Burma, Iran, Afghanistan and Africa. It is restricted to arid regions of Waziristan, Khyber Agency, Chitral and Balochistan in Pakistan. The genus *Ephedra* has more than 50 species but only eight species are found in Pakistan. *Ephedra* plant is a small shrubs about 2 meters in height.

Main chemical constituents of *Ephedra* plant is ephedrine and pseudo-ephedrine. These alkaloids have been extensively used in the treatment of asthma, syphilis, cough, cold, urticaria, itching, renal colic and typhoid.

Seeds are collected manually in late summer or fall. Pulp of pericarp of seed is separated by rubbing into water. Air blowing method has been found suitable for separating healthy seeds from diseased and empty seeds. Seeds are sown during early spring, 5 cm apart and 1.27 cm deep with a distance between rows of plants as 76.2 cm. Irrigation and weeding is necessary in the first year of sowing. Average germination percentage of seed is 95%. The seeds start germination after 5 to 7 days of sowing.

In order to ensure healthy growth and regular supply of *Ephedra*, rotation of 5 years was suggested under protection working circle of the *Ephedra* Management Plan, closure of harvested area for 5 years, establishment of nurseries and afforestation of areas where species has potential to grow in Balochistan and other areas of NWFP and creating awareness among people about commercial importance of this plant through training and extension works thereby upgrading socio-economic conditions of peoples living in rural



area. (Advisor; Raja M. Ashfaq)

8. Correlation of forage production of *Cenchrus ciliaris* with height and number of culms. Nasrullah, J. (1991).

Field data were analysed for the determination of correlation among forage production, number of culms and height. The research work was conducted in the Target Area, Jamrud. The data was analysed by simple and step-wise multiple regression using SAS software. The study indicated that both number of culms and height contributed to the air-dried forage weight of *Cenchrus ciliaris* plant. The significance level increased when both the variables were regressed with air-dried forage. The number of culms coupled with height contributed to the vigour of the plant which in turn was expressed in the forage production. Experimental study showed that highest correlation existed between forage production and height plus number of culms. (Advisor; Dr. Muhammad Noor)

9. Monograph on *Nannorrhops ritchieana*. Mughal, M.S. (1991).

*Nannorrhops ritchieana* locally known as Mazri, is a gregarious and low growing shrub found in Peshawar Valley, Kohat, Hangu, Orakzai, Waziristan and Khyber agencies in NWFP. It also occurs along the eastern skirts of the Suleman Range ascending upto 914 m elevation, frequently upto 1524 m in Sibi and Mekran area of Balochistan except near the coastal belt and in Salt Range between 762 to 1524 m and on the mountain of Sakessar. It generally grows in low arid mountains of eastern Afghanistan and Southern Iran.

It is light demander but requires shade in the initial stages of its growth. It grows commonly on rocky grounds derived from limestones and may extend to gypsum and

sandy soils. It is propagated from seeds or rhizome. Sowing is done in the month of February and March. Seeds are pretreated by keeping it in hot water for 24 hours. Germination takes place in July-August. The leaves are harvested from mid November to mid March.

Mazri leaves are used to make matting, hand fans, sandals, baskets, hats, pouches, brushes and other articles used in daily life. Fibre is used in making ropes and pulp and paper. The seeds are pierced for making rosaries and for export to Saudi Arabia. The leaf bud and young inflorescence of fruits are eaten by local people. Young leaves with sweet astringent taste are in great use for the treatment of diarrhoea and dysentery and as purgative in veterinary practice. The dried trunk and foliage are used as fuel.

Cultivation and management of Mazri is encouraged to improve socio-economic condition of people living in rural areas. Moreover, the government is urged to establish cottage industries based on end uses of this species to create increased job opportunities for local people living in far flung rugged mountainous areas of Balochistan and N.W.F.P. (Advisor; Mr. Tanvir Ahmad)

10. Introduction of timber grading based upon wood quality in FDC timber markets. Rashid, A.A. (1991).

The study was undertaken to investigate the possibilities of introducing timber grading based upon wood quality in the Forest Development Corporation (FDC) timber markets. For this purpose, sub-lots of Kail (*Pinus wallichiana*) timber were constituted according to the FDC traditional system and proposed system of timber grading separately. Both systems were compared on the basis of financial analysis. The average sale rate



obtained was Rs. 5185.51/m<sup>3</sup> and Rs.5174.21/m<sup>3</sup> for proposed and traditional grading systems respectively. The increase was only Rs.11.30/m<sup>3</sup>. Under the proposed grading system, maximum volume was in the lowest size/quality class C5 as 36.80%, whereas under the traditional system, maximum volume was in the highest size class I as 92.42% of total timber volume. The reason was that only such defective timber was graded in the lowest grade C5 under the proposed system, while all the timber above 3.66 meters in length and 0.6

meters in girth was graded in the size class I without any consideration to the wood quality under the traditional grading system. The result showed that sorting of timber into grades on the basis of sizes together with defects (proposed grading system) was more appropriate to invite healthy competition in the market thereby resulting in higher price, reduction in waste and improved utilization of timber. (Advisor; Dr.Muhammad Ayaz)

paper. The seeds are placed for making toshas and for export to Saudi Arabia. The leaf bud and young inflorescence of trees are eaten by local people. Young leaves with sweet astringent taste are in great use for the treatment of diarrhoea and dysentery and as purgative in veterinary practice. The dried trunk and foliage are used as fuel.

Cultivation and management of *Mazus* is encouraged to improve socio-economic condition of people living in rural areas. Moreover, the government is urged to establish cottage industries based on and uses of this species to create increased job opportunities for local people living in far flung rugged mountainous areas of Balochistan and N.W.F.P. (Advisor: Mr. Tanvir Ahmad)

10. Introduction of timber grading based upon wood quality in FDC timber markets. Rashid, A.A. (1991).

The study was undertaken to investigate the possibilities of introducing timber grading based upon wood quality in the Forest Development Corporation (FDC) timber markets. For this purpose, samples of *Kail* (*Pinus wallichiana*) timber were constituted according to the FDC traditional system and proposed system of timber grading separately. Both systems were compared on the basis of financial analysis. The average sale rate

Area. Jamrud. The data was analysed by simple and step-wise multiple regression using SAS software. The study indicated that both number of columns and height contributed to the air-dried forage weight of *Conchus cilans* plant. The significance level increased when both the variables were regressed with air-dried forage. The number of columns coupled with height contributed to the vigour of the plant which in turn was expressed in the forage production. Experimental study showed that highest correlation existed between forage production and height plus number of columns. (Advisor: Dr. Muhammad Noor)

9. Monograph on *Wannothopsis nitchiana*. Maghal, M.S. (1991).

*Wannothopsis nitchiana* locally known as *Mazus* is a prostrate and low growing shrub found in Peshawar Valley, Kohat, Hangu, Orakzai, Waziristan and Khyber agencies in NWFP. It also occurs along the eastern skirts of the Sulaiman Range ascending upto 914 m elevation, frequently upto 1524 m in Sibi and Mekran area of Balochistan except near the coastal belt and in Salt Range between 762 to 1524 m and on the mountain of Sakassar. It generally grows in low and mountains of eastern Afghanistan and Southern Iran.

It is light demanding but requires shade in the initial stages of its growth. It grows commonly on rocky grounds derived from limestones and may extend to gypsum and