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ETHNOBOTANICAL SURVEY OF TREES IN PABBAR VALLEY, DISTT. SHIMLA, HIMACHAL PRADESH

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ABSTRACT:

Present study was carried out to document the ethnobotanical knowledge of local people about trees of Pabbar Valley in Himachal Pradesh. Indigenous knowledge of local inhabitants about the use of native plants was collected during field visits through semi structured questionnaire and interview method. In this paper a list of 34 plants belonging to 14 families has been presented. This paper explores the uses of trees by indigenous people for various purposes; Timber, fruit, fodder, fuel, medicine, religious and agricultural tools. The ethnobotanical studies on herbaceous plants of the area are available, but little work has been done to document the trees. The present work is compilation of information gathered through field survey, plant collected, identified and mounted on herbarium sheets. Photographs of plants were also taken.

KEY WORDS: *Ethnobotany, Trees, Pabbar Valley, Himachal Pradesh.*

INTRODUCTION:

Trees are valuable gift of nature and the silent protector of our planet. Apart from economic benefits they provide us with unmatched environmental protection- they reduce soil erosion , act as sink for atmospheric carbon dioxide, release large amount of oxygen , provide shade , absorb pollutants and slow down global climate changes such as global warming (Kohli *et.al.*,

2003) . Trees have evolved over millions of years and this process is still continuing. "*A tree is a large, long lived (i.e. Perennial) woody plant that attains a height of at least 6 meters at maturity in a given locality and usually –but not always, has a single main self-supporting stem called a "trunk" or a "bole" which gives off spreading branches, twigs and foliage to make a crown*" (Venkatesh, 1976; Panshin & de Zeeuw, 1980). Forest and tree cover of India account for about 23.4% of total geographic area of the country and stands 10th in the list of most forested nations of the world with 76.87 million hectare of forest and tree cover. Forest provide a wide range of economic and social benefits such as employment, forest products and protection of sites of cultural value to mankind (FAO, 2006). In Asia , the forests in Himalayan region are considered to be among the most depleted and this has been attributed to ever increasing population (Myers,1986) . Out of the total 55,673.30 sq. Km. area of the state, approximately 14,353 sq.km. is under forest cover. Forest cover amount to approximately 25% of the area, which is well above the national average. According to standard classification of forest Type of India , the Pabbar valley forest of Himachal Pradesh are categorised as "Himalayan Moist Temperate forests" , "Himalayan Dry Temperate forests" and "Sub alpine forests" (Champion & Seth, 1968).

In recent past ethnobotany has been recognised as a valid discipline having a strong role in the advancement of any aspects of scientific and historic studies. A number of investigators have devoted their attention to the vast knowledge of plant properties still intact in native culture in different part of the world (Morgan, 1981). Human activities have strong impact on plant communities with which they interact , the human themselves are also influenced by plants and such complying interaction are the main focus of ethnobotany (Pie,1999). Information, foresight and practice of local people play important role through applied ethnobotany to find solution to the problems of sustainable development and conservation of plant (Hamilton *et.al.*, 2003). Plants perform a vital role in the lives of rural people particularly in developing countries where plants are used for house construction, fuel, agricultural implements, food, fodder, crude drugs, religious ceremony and ornamentation. Ethnobotanical awareness among people has been found to reinforce the use of local remedies, in a sustainable member and also to devise methods of transferring knowledge from generation to generation (Martin, 1995). Of late an urgent need is being felt to document the ethnobotanical information prevalent among the diverse communities, before it is completely lost (Rao, 1996).

The literature pertaining to ethnobotanical observations in the state is scanty in comparison to neighbouring states of N.W. Himalayas. The main focuses of these studies have been on medicinal and aromatic plants (Chauhan NS, 2006, Chauhan & Negi, 2009, Samant *et.al.*, 2007, Vipin Parkash & Ashok Aggarwal, 2010 and Singh, K.N. *et.al.*, 2012). Ethnobotanical studies on timber resource of Himachal Pradesh were carried by Kharwal & Rawat(2009). The reports on ethnobotanical use of tree species from N.W. Himalaya are limited. So, present investigation was under taken to document the

diverse use of trees by local peoples and extent to their dependence on the tree species in the Pabbar valley of Shimla Hills in Himachal Pradesh.

STUDY AREA :

Pabbar valley gets its name from the river Pabbar which flows in the middle of valley. The river originates from Gangadari Dhar(Chander Nahan) ranges of Himalaya at an altitude of 5100m in Shimla distract of Himachal Pradesh. The total catchment Pabbar river in Himachal Pradesh is 1200 sq.km. is an important tributary of Tons which in turn joins the river Yamuna. The valley lies in eastern part of Shimla district and is bounded by Kinnaur in the north and Uttarakhand State in the east. The scenic valley known for its ethnic identity is guarded from both sides by mountains, having natural, long and open pastures in high area.

The area is mountainous or semi –mountainous from 1200m to 5200m. The area is located between 77^0 -29'-40" to 78^0 -18'-42" and 30^0 -57'-0" to 31^0 -25'-20" North in Rohru Sub division.

The climate of region ranges from Sub -temperate to Alpine. The highest temperature is recorded during summer time which may reach up 36^o C in lower elevation. During winters the most of area remains snow covered and temperature falls to -2^0C to -6^0C. The economy is dominated by fruit crops (Apple, Pear), agriculture, cattle and sheep rearing is still practised in the valley.

METHODOLOGY:

The present study was conducted during 2012-2013. Information was gathered from knowledgeable informants from villages through semi-structured questionnaire and interview schedule and observations. The indigenous knowledge of local people about the uses of tree was documented. The plants specimens were photographed, collected, pressed dried using blotting papers and were mounted on standard herbarium sheets. The plants were identified with the help of existing standard literature available on the flora of the region (Flora Simlensis; Collett,1902),(Flora of Bashahr Himalayas; Nair, N.C.1977), (Flora of Himachal Pradesh; Chowdhery & Wadhwa,1984).

RESULTS:

During the present investigation ethnobotanical uses for 34 tree species (7 gymnosperms, 27 angiosperms) were documented. The information gathered indicates that the trees of Pabbar valley have multipurpose use. The plants have been arranged and described according to their botanical name, family, local name, flowering season and local use. Such enumeration is important for evaluating human plant relationship and also help in better understanding of the regional human ecology(Alcorn, 1981) . Most of the trees described are Endemic and Near Endemic to the region (Samant and Dhar, 1997).

1. ***Abies pindrow* Royle**

Family: Pinaceae

Vernacular Names: Himalayan fir, silver fir (E), Tosh (H).

Local Name: Tosh

Flowering season: April-May.

Local uses: The wood being light is used for interior repair works, boxes and as fuel by local people.

2. **Abies spectabilis (D.Don) Spach**

Family: Pinaceae

Vernacular Names: Himalayan High level silver fir (E), Tosh (H).

Local Name: Tosh

Flowering season: April-May.

Local uses: Wood is used for making boxes; used as fuel and timber by local people of the valley.

3. ***Acer caesium Wall***

Family: Aceraceae

Vernacular Names: Himalayan Maple (E), *Pharjanj* (H).

Local name: *Karanchla*.

Flowering season: April-June.

Local Uses: Fodder species **.**Wood is used in making farming implements. Trees are commercially used for making Gun Butts.

4. ***Aesculus indica* (Colebr. Ex. Camb.) Hook**

Family: Hippocastanaceae

Vernacular Names: Horse-chestnut (E),*Kanor, Pankor*(H).

Local Name: *Kanor, Bankhor*

Flowering season: May -June.

Local Uses: Fruit are used to cure rheumatism. The fruits are eaten by people after roasting in fire. Fruits are also given to horse suffering from Colic. The nuts are used for curing piles and constipation. The fruits serve as emergency food in the period of drought. The kernels are dried and ground into flour. The flour is directly used in making Halwa (pudding) or mixed with *Fagopyrum* flour to make *chhapati*. The leaves are used as fodder. Peelings of fruits are given to cattle.

5. ***Alnus nitida* (Spach.) Endl**.

Family: Betulaceae

Vernacular Names: Indian alder, Alder (E),*Kosh* (H).

Local name: *Kunish*

Flowering season: September-November.

Local Uses: Plants are fast growing. Trees are planted in land sliding zone to check soil erosion. Leaves have lower and moderate value of fodder to sheep and goat only. Wood is used as fuel and low quality timber.

6. ***Betula alnoides*** **Buch-Ham ex. D.Don**.

Family: Betulaceae

Vernacular Name: Indian Birch (E), *Bhojpatra* (H)

Local Name: *Bhuj*

Flowering Season: May –July and fruits during September – October.

Local Uses: Used in making agricultural implements. Plant parts are used as fuel, pole and timber.

7. ***Betula utilis*** **D.Don**

Family: Betulaceae

Vernacular Name: Birch (E), *Bhojpatra* (H)

Local Name: *Bhuj, Bhooj*

Flowering season: May –July and fruits during September – October.

Local Uses: Medicinal and megico-religious plant. The fungal outgrowth "Bhurj-*granthi*" is locally used against muscular pain and swellings. Papery bark of plant has water proofing quality. The papery bark is used for thatching or packing in slate roof to save underlying wood from getting wet and decay. Wood is used in making agricultural implements and as fuel.

8. ***Carpinus viminea*** **Wall**

Family: Betulaceae

Vernacular Name: Himalayan Hornbeam (E), *Cajun, Khirki* (H)

Local Name: *Khirki*

Flowering season: April –June.

Local Uses: The plant is used for construction of houses. Wood is hard and durable, hence used for making agricultural implements and sport equipments.

9. ***Cedrela serrata*** **Royle**

Family: Meliaceae

Vernacular Names: Hill toon (E), *toon* (H).

Local name: *Daral*

Flowering season: May- June.

Local uses**:** The wood is light used for furniture, bridges, poles and fencing. The wood is used for making agricultural implements like *Shamai (Beam)* etc. Young lopped twigs are added to field which act as rodent repellent.

10**.** ***Cedrus deodara*** **(Roxb.) Loud.**

Family: Pinaceae

Vernacular Names: Himalayan Cedar (E), *Deodar* (H),

Local Name: *Diyar, Keval*

Flowering season: Cones appear in September and October.

Local uses**:** Important timber species of area. Wood is used for the construction of houses, temples, local ladder, furniture and bridges. Due to the religious significance of this tree, it is planted near the temple of village deity and form dominant species of sacred groves. Wood and twigs also find use in havans (religious ceremonies) and marriage ceremony. Wood is distilled for essential oil used for skin disorder in human and cattle and also act as insect repellent.

11**.** ***Celtis australis*** **L.**

Family: Ulmaceae

Vernacular name: Nettle Tree (E), *khark, khirk, roku* (H)

Local name: *Kharak*

Flowering season: April- May

Local uses: Leaves and twigs are lopped for fodder in the dry season. Wood is of good quality and suitable for agricultural implements, poles and fuel.

12. ***Corylus jacquemontii*** **Decne**

Family: Betulaceae

Vernacular name: Hazelnut, Indian Tree Hazel (English), *Bhotiya Badam* (H).

Local name: *Sharoli, Shiontalu*

Flowering season: April –May

Local uses: The leaves and young shoots are lopped for cattle fodder. The fruits (nuts) are edible and used with *moodi* (Parched Rice).

13. ***Ficus palmata*** **Forssk**

Family: Moraceae

Vernacular Names: Wild fig (E), *Abjiri, bedu, Khemri* (H).

Local name: *Pheru*

Flowering season: March-April.

Local Uses: Fruit used in constipation, in the disease of lungs and the bladder. Fruits are edible. The raw fruits are cooked as vegetables**.** The white latex is used to cure moles. Wood is used as timber, agricultural implements and fuel.

14. ***Juglans regia*** **Linn**

Family: Juglandaceae

Vernacular Names: English walnut (E), *Akhrot* (H)

Local name: *Khod*

Flowering season: March- April.

Local Uses: Fruits are edible considered tonic for the brain. Leaves are anthelmintic and astringent. Fruits are used in treatment of rheumatism. The leaves, twigs and bark peeling are used in treatment of toothache and as toothbrushes. *'Dandasa'* – the peeled bark from roots are sold in the market. Wood is used in making furniture and wood carvings. Female uses the leaves to colour their lips, hands and feet. The leaves act as insects repellent and are kept inside the granaries.

15. ***Morus serrata* Roxb.**

Family: Moraceae

Vernacular Names: Himalayan mulberry (E), *Tut* (H)

Local Name: *Keem, Keemu*

Flowering season: March –April.

Local Uses**:** Fruits are edible. The bark is used to treat fever, cough and to promote urination. Bark is used in dental caries. Leaves are used as fodder for cattle during dry season. The wood is used in making furniture and agricultural implements.

16. ***Picea smithiana* (Wall) Boiss**.

Family: Pinaceae

Vernacular Names: Himalayan spruce (E), *Rai* (H).

Local name: *Rai, Rau*.

Flowering season: September -October.

Local Uses: Wood used for construction of houses, boxes and as fuel. Wood has good burning quality and produces less smoke.

17. ***Pinus roxburghii* Sargent.**

Family: Pinaceae

Vernacular Names: Chir pine (E), *Chirh* (H).

Local name: *Chirh, Chalauta*.

Flowering season: April-June.

Local Uses: Trees are main source of oleo- resin, known to possess anti-bacterial properties & applied to cure cuts, wounds and cracks on feet. Wood is used for house construction. Needles owing to its length and un-breakability are used for making broom. All parts of plants including cones are used as fuel.

18. ***Pinus wallichiana* A.B.Jackson**

Family: Pinaceae

Vernacular Names: Himalayan pine, blue pine (E), *Kail* (H).

Local Name: *Kail, Chilta*.

Flowering season: March -April.

Local Uses**:** Trees form one of the most important species used in house construction; for making bridges, water channels and agriculture tools. All parts of plants are used as fuel. The needle are collected and used as cattle bed. Mixture of Needle , young shoots and cow dung are allowed to rot for a year and forms excellent farm yard manure(FYM), used a natural manure in the field. The young plants are used as support for growing Cucumbers and bitter gourd (*Karela*). Used in fencing of fields. Resin has antiseptic properties and applied to cure cuts, wounds and cracks in feet. The bark from young shoots is also used as bandage to join broken bones of human as well as cattle.

19. ***Pistacia integerrima*** **Stewart**

Family: Anacardiaceae

Vernacular name: Pistacia , Kakoai (E), *Akhre, Kakarsingi* (H)

Local name: *Kakda*

Flowering season: May –June

Local uses: The pods after drying are ground to powder and given in fever. Leaves are used as fodder.

20**.** ***Prunus armeniaca*** **Linn.**

Family: Rosaceae

Vernacular Names: Wild apricot (E), *Chauri, Zardalu*(H).

Local name: *Chulli, Chulti*

Flowering season: March - April.

Local Uses: The fruits are antidiarrhoeal, antipyretic and emetic. The seeds are tonic. The fruits are eaten and used for making jam. The unripe and young fruit are used in making chutney while mixing with Mint and *Rumex* leaves. The fruits are dried to make *Schalori (Dried peels of Fruit)* relished in winter or during off season. Oil is extracted from the seed used for cooking. Oil is used in earache. Oil is applied on hair and used in body message especially in infants. The wood is used for making agricultural implements. Wood is hard and used as a fuel specially in winters. The fruits are fermented to make country wine.

21. ***Prunus cerasoides*** **D.Don.**

Family: Rosaceae

Vernacular Names: Wild Himalayan Cherry (E), *Padam* (H).

Local name: *Pajja*

Flowering season: November-March.

Local Uses: Seedlings are used as root stock for Sweet Cherry grafting. Religious plant. Leaves and twigs are offered to Lord Shiva during 'Shivratari'. Wood used as Fuel.

22. ***Prunus cornuta* (Wall. ex Royle.) Steud**.

Family: Rosaceae

Vernacular Names: Himalayan Bird Cherry (E), *Jamun* (H).

Local name: *Jamun*

Flowering season: March - April, Fruiting August -September

Local Uses: Common wild fruit plant of the area. Fruits are edible. Wood is used for minor construction and as fuel.

23. ***Prunus persica* var. *Kateru* Batsch.**

Family: Rosaceae

Vernacular Names: Wild peach (E), *katheru*(H)

Local Name: *Auru, Artee.*

Flowering season: March – April.

Local Uses: The fruits are edible also used for making jam. The fruits are a tonic for the brain, enrich the blood and remove bad smell from the mouth and the sputum. Twigs are used for cleaning teeth. The oil from the kernels is used in earache and stomach troubles of children. Kernels grounded with water and the paste applied on forehead for headache. Young plants and seedlings are used for raising peach fruits.

24. ***Populus ciliata* Wall**

Family: Salicaceae

Vernacular Names: Himalayan popular, silver popular (E), Chalni, *Chalun, Pahari Peepal* (H)

Local name: *Chalna*

Flowering season: April-May.

Local Uses: Used as fuel. The branches are lopped and used as support in apple plant. Due to fast growing property the plants are planted in land sliding areas to check soil erosion.

25. ***Pyrus pashia* Buch. &Ham.**

Family: Rosaceae

Vernacular Names: Wild Himalayan pear (E), *kainth*(H).

Local Name: *Shegal, Moal*

Flowering season: March- April.

Local Uses: The fruits are edible and ripened fruits are eaten by village people. The thorny branches of plant are used for fencing of fields. The branches are also used to cover seed beds of cucumber and

bitter gourd to provide protection against birds and cattle. The wood is also used for making agricultural implements and fuel.

26. ***Quercus floribunda*** **Lindl**

Family: Fagaceae

Vernacular Names: Green Oak, (E), *Mohru* (H).

Local name: *Mohru.*

Flowering season: April -May.

Local Uses**:** It is an important fodder plant during winters and dry season. Besides having wild occurrence, the plants have been traditionally raised near villages. Now the plants are being slowly removed from these areas as population of sheep, goat and cattle in villages is gradually declining. The lopped branches are stacked for fuel. The wood being durable is used for making agricultural implements like plough, beam and smaller tool handles and is also used for making charcoal.

27. ***Quercus leucotrichophora*** **Roxb**.

Family: Fagaceae

Vernacular Names: White Oak, (E), *Banj, Ban* (H).

Local name: *Ban*

Flowering season: April -May.

Local Uses: Wood used as timber, fuel and making agricultural tools specially plough and handles. Leaves are also used as fodder during winters.

28. ***Quercus semecarpifolia*** **Smith**

Family: Fagaceae

Vernacular Names: Brown Oak, (E), *Kharsu* (H).

Local name: *Kharsu , Kwashu*

Flowering season: May- June.

Local Uses: The leaves and young shoots are lopped for cattle fodder. Plants are also used for fuel and making charcoal. Wood is durable and hence used for making agricultural implements.

29. ***Rhododendron arboreum*** **Smith**

Family: Ericaceae

Vernacular name: Rhododendron (E), *Brass* (H)

Local name: *Buransh, Brass*

Flowering season: March -April

Local uses: Flower petals are used for making Chutney and juice. The flowers have religious value. Flowers are put above the doors on the "*Bishoo*" (Baishaki) festival. The flower and leaves are also used in decoration of temples. Wood also used as fuel.

30. ***Rhus punjabensis* Stewart**

Family: Anacardiaceae

Vernacular name: Rhus (E), *Titre* (H)

Local name: *Titri*

Flowering season: May –June

Local uses: The leaves and young shoots are lopped for cattle fodder. Leaves are also used as cattle bed. Wood is used as fuel.

31. ***Rhus succedanea* Linn**

Family: Anacardiaceae

Vernacular name: Wax Tree (E), Arkhol (H)

Local name: *Rakhol*

Flowering season: May –June

Local uses: Poisonous plant. Alkaloids in plant cause rashes in the skin. Green plants are never harvested, however dry twigs can be used as fuel.

32**. *Salix dephnoides* Villars**

Family: Salicaceae

Vernacular name: Salix (E), *Bashal, Biuns* (H)

Local name: *Bhashul, Bhashli*

Flowering season: March -April

Local uses: Plants are used as timber, as fuel and making baskets.

33. ***Taxus wallichiana* Zucc.**

Family: Taxaceae

Vernacular Names: Himalayan Yew (E), *Thuner* (H).

Local Name: *Thuno, Birmi*.

Flowering season: Cones appear in March-May.

Local Uses: *Taxus* plant is source of anti-cancer drug called Taxol. Bark and needles are used in making tea. The young shoots are used in religious and marriage ceremony. The wood being hard and durable is used in making agriculture tools, fencing, mallet and lifting poles. Fruits are edible. Parts of plants are used as fuel.

34. ***Ulmus wallichiana* Planch**

Family: Urticaceae

Vernacular name: Himalayan Ulm (E), *Maran* (H)

Local name: *Maran*

Flowering season: March -April

Local uses: Wood is used for furniture, minor construction and fuel purpose. Leaves are used as fodder.

DISCUSSION:

About 80% of the rural population is dependent on tree diversity for many of the subsistence needs such as providing timber, fuel wood, fodder, animal litter and compost (Singh & Dash, 2002). Most plants are used as multipurpose. Extreme weather condition forms the basis for wooden houses as they are warm during winter. Traditional houses require a large quantity of suitable wood for construction. *Cedrus deodara* and *Pinus wallichiana* are most preferred species for house construction. *Abies species, Picea smithiana, Alnus, B. alnoides* and *Pinus roxburghii* are other plants used in lesser amount.

Cattle and live stock rearing is an essential part of village people. Cattle, Sheep and goat rearing are still practised in the valley. Rearing of cattle provide milk and other dairy products and side by side additional source of generating income. Winters are dry and fodder in outside environment is rare. Farmers rely on their visual observation & experiences in feeding and health management of live stock (Kavana & Masangi, 2005). Tree fodder is valuable for temperate climate particularly during winter months (Singh and Kanstra, 1981, Roder1992). To feed live stocks fodder is to be stacked. This is done by harvesting and stacking the grasses species. However, additional requirement is met by lopping the leaves of trees like *Quercus floribunda, Quercus leucotrichofolia , Morus serrata* . The leaves of *Morus serrata* are stacked and also used in dried form. Other plants which find use throughout the year are *Acer caesium, Aesculus indica, Alnus nitida , Quercus semecarpifolia , Celtis australis , Carpinus viminea , Rhus punjabensis , Corylus jacquemontii and Ulmus wallichiana* which are used as per seasonal requirements . Similar use pattern was observed by Samant (1998) in Uttarakhand N.W. Himalayas.

Wild edible fruits are known to be excellent source of nutrient such as mineral and vitamins (Nahar *et.al.*, 1990). Ten species yield valuable fruits. These plants include *Taxus wallichiana, Aesculus indica , Prunus armeniaca, Pyrus pashia, Prunus cornuta, Prunus persica var. Kateru Ficus palmata, Morus serrata, Corylus jacquemontii and Juglens regia. Juglens regia* is found both wild & cultivated. *Prunus armeniaca, Ficus palmata and Morus serrata are* found growing in and around the boundaries of agricultural fields. Only Fruits of *Juglens regia* are collected and sold in the market. Rest of the fruits species being overshadowed by apple cultivation, find use by school children, cattle growers and people visiting forest. *Prunus armeniaca* fruits are fermented for local wine and served during local fairs and festivals.

Eight species are used as medicinal for treatment of various ailments like skin disorder, colic infection, constipation, dental carries, piles, insecticidal and brain tonic. Prominent medicinal species are Taxus, *Aesculus indicus, Cedrus deodara, Juglens regia, Pyrus pashia var, kateru and Prunus armeniaca.*

Almost all the trees of study area find its use as fuel. Fuel wood is used for cooking, warming and sometimes lightening the houses in remote areas during winters. Wood is used according to its burn quality. Preference to fuel wood varies according to altitude, availability and season. During summer season Pinus *wallichiana, Cedrus deodara, Alnus nitida* and *Pinus roxburghii* are used and for winter *Picea, Celtis, Quercus* species are preferred. Wood of *Cedrus deodara* and *P. roxburghii* owing to high resin content are used as initial source of igniting fire. During night fairs and festivals bundles of these woods are made to burn as 'Mashals'.

Other use includes cooking oil, agricultural implements, food, jams, and sports items, fencing of agriculture fields. *Rhododendron arboreum* and *Pyrus pashia* have cultural, *Cedrus, Taxus* & *Prunus cerasoides* have religious significance.

CONCLUSIONS:

The valley is endowed with some of the beautiful coniferous and other trees. The main aim of study is to identify and record, ethnobotanical uses and anthropogenic pressure on trees. The area is known for apple cultivation. Apples cultivation has dominated the economy of area. Trees like *Abies, Picea and Pinus wallichiana* were felled to meet the demand for apple boxes during last century. Forest land have been encroached to raise apple orchards. This has caused a great loss to tree cover of the valley. Though, putting ban on wooden packing boxes and laws to check indiscriminate removal of forest trees has been enacted. This have saved onslaught on trees to some extent but people's awareness about protecting the forest is still needed. So the emphasis should be on judicious use, protection of existing forests and reforestation of the area with local species.

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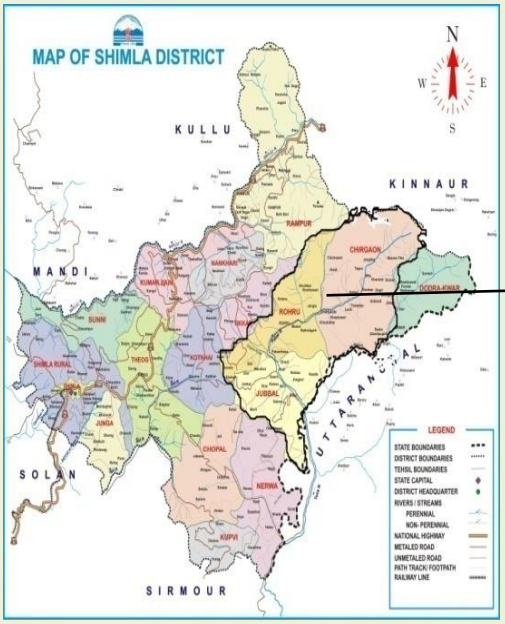

Fig.1: Map: District Shimla, Himachal Pradesh

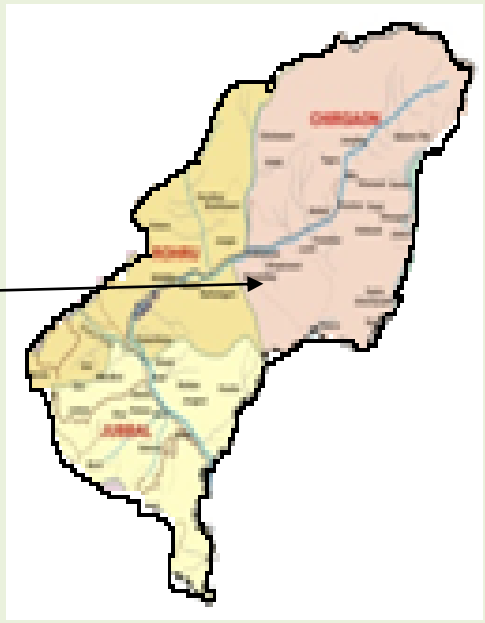

Fig.2:- Map showing study area.

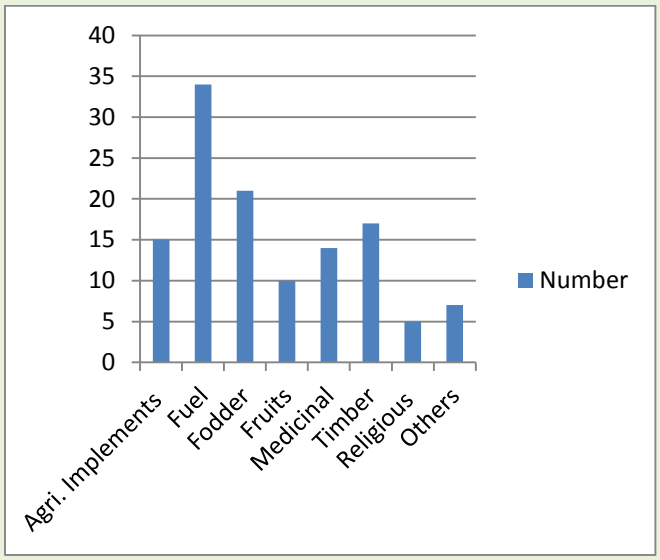

Fig. 3: Bar diagram showing the uses of trees