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Full Length Research Paper

An Ethnobotanical Survey on Fuel Wood and Timber plant Species of Kaghan Valley, Khyber pakhtoonkhwa Province, Pakistan

Gul Jan[1], Mir Ajab Khan[2], Aman khan[1], Farzana Gul Jan[3], Rafiullah Khan[1], Mushtaq Ahmad[2], Atta-Ur-Rehman[1], Muhammad Danish[1], Muhammad Asif[1], Saimdad Khan[1], Muhammad Zafar[2] and Masood Jan[4]

[1]Department of Plant Sciences, Quaid-i-Azam University Islamabad Pakistan.
[2]Department of Botany, Hazara University, Mansehra, Pakistan.
[3]Department of Botany, Post Graduate College Abbottabad, Pakistan.

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A survey was conducted to explore the fuel wood species and timber producing species of Kaghan valleys, Pakistan. Consumption pattern and impact on the forest resources were also taken into consideration. A questionnaire was used as a survey instrument to obtain desired data. For this study, 10 villages were randomly selected. In each village, 10 persons that were randomly selected were interviewed. Only one person was interviewed from a household. A total of 100 respondents were interviewed. The studies revealed that, 75 plant species belonging to 41 families were utilized as fuel wood and 41 species belonging to 25 families were utilized as timber. Three tree species; *Quercus incana*, *Cedrus deodara* and *Taxus wallichiana* was found endangered. There is a dire need to conserve these species.

Key words: Ethnobotany, fuel wood, timber species, Kaghan valleys, Khyber Pakhtoon Khwa Province, Pakistan.

INTRODUCTION

Literally the word; “Kohistan” means the place of mountains (Hamayaun, 2005). Kaghan valleys covers 1 40,351 acres of the coniferous forests situated between latitude 35°9′ to 35°47′ and longitude 71°52′ to 72°22′ in the northern position of the watershed of Panjkora River. Pangkora is a Pashtu word meaning five streams; the five tributaries of the rivers are Azgologh, Zandrai, Shandoor, Gwaldai and Dokdara khwars (Figure 1).

Forests

The upper Kaghan valleys reserved forests fall under the major types of forests (Table 1). The Forests of Dir Kaghan valleys, can be broadly described under the following major types and the total area covered given as: (1) Shrub oak forests, (2) Pure deodar forests, (3) Mixed deodar, kail, fir and spruce forests, (4) Mixed fir and spruce forests and (5) Alpine pastures.

The shrub and oak forests are grown on the lower areas. It ranges from 4000 to 5500 feet. These are subjected to heavy lopping. The regeneration is scanty as lopping stops the growth. Deodar, kail, fir and spruce grow at altitude ranging from 7000 to 11000 feet above the tree limit (11000 feet). Generally, the elevation above 11000 feet is devoid of tree growth. The total area covered (in acres) by forests in Kaghan are given in Table 1.

The gymnosperm consists of *Cupressus sempervirens*, *Abies pindrow*, *Cedrus deodara*, *Picea smithiana*, *Pinus roxburgii*, *Pinus wallichiana*, *Taxus wallichiana*. Several other species like *Aesculus indica*, *Populus ciliate* and *Juglans regia* are also found. Forests as vital life support system, plays an important role in regulating climate, providing habitat for numerous species, maintaining and

*Corresponding author. E-mail: drguljan@yahoo.com. Tel: 0092-300-5720140; 0092-512531123.

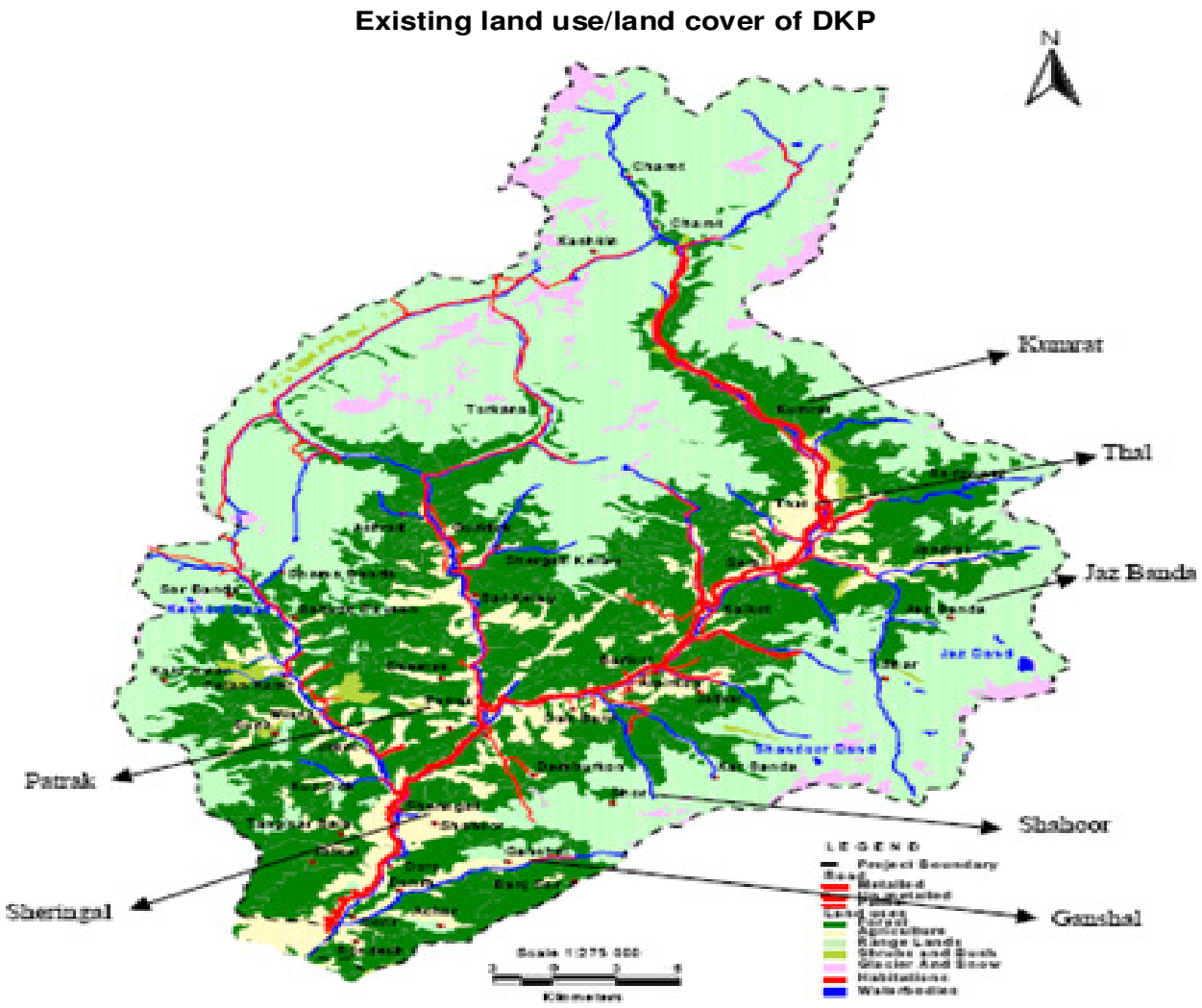

Figure 1. Kaghan valleys map showing the areas from where plants species were collected.

Table 1. Total area covered (in acres) by forests in Kaghan.

Forest type	Area covered/ acres	Percentage
Pure deodar forests	517	0.13
Mixed fir and spruce forests	1325	0.35
Mixed deodar, kail, fir and spruce forests	136277	35.98
Shrub oak forests	11917	3.15
Alpine pasture	226387	59.78
Total		100.00

Sources: District Census Report, Dir Kohistan (1998).

conserving soil resources, regulating hydrological cycles and ensuring water supplies. Forests resource and its use by the stakeholders depend on how social and economic parameters of a society affect such resources and its use (Hamayaun, 2005).

Fuel wood is the main source of energy in the developing world. The use of wood by mankind for energy purposes is as old as human civilization itself. One of the most serious problems in the developing world is shortage of fuel wood. Pakistan is experiencing rapid increase in its national energy consumption with with increasing population and economic development. The

country is poor in forest wealth. The primary reason is that about 70 to 80% of land area falls in arid or semi arid zones with very low precipitation to support tree growth (Hamayaun, 2005).

Sheikh (1987) estimated that, fuel wood meet about 50% of domestic energy requirement while 16% are shared by the fossil fuels and burning dung and crop residues generated 34%. The economic importance of firewood production is evidenced from the fact that its consumption in Pakistan is larger than any other use of wood.

MATERIALS AND METHODS

The survey was conducted to explore the fuel wood species and timber producing species and their consumption and impact on the forest resources of Kaghan valleys. For this study 10 villages were randomly selected. In each village 10 persons were interviewed which were randomly selected. Only one person was interviewed from a household. A total of 100 respondents were interviewed. The target villages of Kaghan valleys were Bar Kali, Biar, Kot Kali, Jaz Banda, Patrak, Shandoor, Sheringal, Kumrat, Ganshal and Thal. Questionnaires were used to obtain desire data. The questionnaire was divided into two parts; the first part contained questions on household size, number of earning members, occupation, education and income level of household head, and the second part contained information about types of fuel used preferences for various fuels and preferred fuel wood species. The respondents were interviewed personally on their homes or farms and data were collected. Plants were collected, identified, pressed, dried, preserved, mounted and ethnobotanical data were collected following the procedure of Martin (1995). They were properly identified through available literature (Nasir and Ali; 1970 to 2001) and were confirmed by the experts in the Department of Plant Sciences, Quaid-i-Azam University Islamabad, Pakistan. The specimens were deposited in the herbarium Department of Plant Sciences, Quaid-i-Azam University Islamabad, Pakistan.

RESULTS AND DISCUSSION

The local people used 75 of the species as fuel wood (Table 2). Wild fuel wood trees consisted of *Acacia modesta*, *A. pindrow*, *A. indica*, *C. deodara*, *Pinus roxburghii*, *Pinus wallichina*, *Populus alba*, *Quercus dialata*, *Quercus incana* and *Taxus baccata*. Cultivated fruit trees also yielded fuel wood after pruning. They were *Diospyrus kaki*, *Malus Primula*, *Prunus domestica*, *Prunus armeniaca* and *Pyrus communis*. *Ailanthus altissima* and *Robinia pseudoacacia* were introduced as fast growing fuel wood species.

Some of the valuable trees like *Q. incana*, *C. deodara, Q. dialata* and *P. wallichina* which are already endangered were utilized ruthlessly as fuel wood and were under immense fuel wood pressure as bulk of the population use these plants for their fuel wood requirements. In the summer season (from April to October) the pressure on the forest for fuel wood was comparatively lesser because local population did not need wood for heating their houses. Mostly dry plants are used for firewood but if not easily available then, green trees are cut. Some people of the area adopted a tricky method for getting dry trees. They cut a portion of the plant stem during early summer season and left the plant standing. After a few months, the plant became dry and they cut it.

Certain shrubs such as *Debregesia salicifolia, Indogeofera heterantha* and *Myrsine africana* were mostly utilized as fuel wood. Poor people even burn stalks of *Zea mays* to cook their food. *Q. dilatata* and *Q. incana* were considered as the best fuel wood. *Morus alba, Morus nigra* and *P. domestica* were also considered as better fuel wood.

There were three major sources of energy; fuelwood, agricultural residues and livestock manure in Kaghan valleys. As a matter of fact, these sources meet about 85% of the total domestic energy requirements. Fuelwood accounts for 80% of the total fuel supply. It has been widely accepted that the production and conservation of forests considerably improves the environment. Its ruthless exploitation greatly damages the land and water resources of an area and strangles its aesthetic values, leading to total deforestation of the ecological landscape. In Kaghan valleys, fuel wood makes about 80% of domestic energy requirements. The other 20% comes from kerosene, liquefied petroleum gas and other wood waste.

The analysis of data revealed that 100% of the sampled households used fuel wood in various quantities to meet their domestic needs for cooking and heating. 35% percent of the sample units consumed fuel wood along with other fuel such as kerosene oil, liquefied petroleum gas and wood waste in various proportions. 40% were used kerosene, 15% were used liquefied petroleum gas and 45% were used wood waste. The rest 65% of the households used only fuelwood for domestic energy.

The average fuel wood consumption per household was 5.43 kg per day. Against this, the consumption of kerosene was 0.76 L and liquefied petroleum gas was 0.06 cylinders per day, while waste wood consumption was about 0.23 kg per day per household. If these results are applied to the total population of the area taking 10 as mean household size of the sample population, the total fuel wood consumption for the population of Kaghan valleys was 20818568.45 kg per annum. In addition to this, the people need about 3268488.22 L of kerosene, 263874.66 cylinders liquefied petroleum gas and 1181668.33 kg of wood waste to meet their total energy needs. The total cost on fuel consumption was Rs: 2722.5 per capita per annum. If these results are applied to the total population of the area, the total cost on fuel consumption for the whole population would be Rs: 341777356.7/per annum. Due to this indiscriminate cutting, not only the forest area is declining but valuable indigenous species are in danger and if this trend continues, the ultimate result would be the extinction of these species from the area.

The common way of using fuel wood is extremely

Table 2. Ethnobotanical Uses of Fuel Wood Species of Kaghan Valley.

S/N	Botanical name	Family	Habit	SE	MU	P	Ethnobotanical uses
1	*A. pindrow*	Pinaceae	T	2	3	2	Leaves are used as a substitute for tea. Fuel wood species.
2	*Acacia catechu*	Mimosaceae	T	1	2	2	Extract from the wood is used as astringent in diarrhea and applied for over spongy gums. Fuel wood species.
3	*Acacia modesta*	Mimosaceae	T	1	2	2	Gum is used as a tonic, for curing dysentery and weakness, and as a stimulant and demulcent. Fuel wood species.
4	*Acacia nilotica*	Mimosaceae	T	1	2	2	Gum is used as tonic, also for curing diarrhea, dysentery and diabetes. Fuel wood species.
5	*Acer caesium*	Aceraceae	T	2	3	2	Fuel wood species.
6	*A. indica*	Hippocastanaceae	T	1	2	2	Leaves are used as fodder for cattle.
7	*A.altissima*	Simarubaceae	T	3	3	1	Bark is anthelmintic. Bark juice is mixed with milk for curing dysentery and diarrhea.
8	*Albizia lebbek*	Mimosaceae	T	1	3	2	Bark and seeds are restorative and astringent used in piles, diarrhea, dysentery and gonorrhea. Fuel wood species.
9	*Alnus nitida*	Betulaceae	T	2	3	2	Catkins are used in cosmetics, used in agriculture appliances and fuel wood species.
10	*Bauhinia variegate*	Caessalpinaceae	T	2	2	2	Bark is ulcerative, anthelmintic, tonic and astringent; used in skin diseases, ulcer and scrofula. Fuel wood species.
11	*Berberis lycium*	Berberidaceae	S	1	2	2	Roots are used for stomachache, intestinal colic, expectorant, used for diarrhea, jaundice and other liver diseases. Fuel wood species.
12	*Betula utilis*	Betulaceae	T	3	3	1	Fuelwood species. Also used in making agriculture tools.
13	*Bombax ceiba*	Bombacaceae	T	2	2	3	Young roots are used as astringent, alterative, restorative, for gonorrhea and dysentery and also used as tonic for brain. Fuel wood species.
14	*Buxus wallichiana*	Buxaceae	S	2	3	2	Whole plant is antirheumatic, diaphoretic, purgative, and febrifuge. Fuel wood specie.
15	*Carissa opaca*	Pipilionaceae	T	3	3	2	Fruit and leaves are cardiac stimulant.
16	*Cassia fistula*	Caesalpinaceae	T	1	2	3	Flower possesses astringent, purgative and febrigugal properties. Fuelwood species. Also used in making agriculture tools.
17	*C. deodara*	Pinaceae	T	1	2	3	Locally the resin is used for the treatment of urtiacaria and skin diseases. The wood is used as timber. Fuel wood species.
18	*Cedrela serrata*	Meliaceae	T	3	3	1	Leaves decoction is used in diabetes. Also used as cooling agent. Fuelwood species.
19	*Cotoneaster nummularia*	Rosaceae	S	3	2	2	Stolon is considered astringent. Fuelwood species.
20	*D. sissoo*	Papillionaceae	T	1	2	2	Leaves are stimulant; decoction is used in gonorrhea. Fuelwood species.
21	*Daphne oleoides*	Thymelaceae	S	3	3	2	Its poultice is used for rheumatism. Fuel wood species.
22	*D. salicifolia*	Urticaeae	S	3	3	2	The aerial parts is powder and mixed with mustard oil and used as antifungal for curing skin rash dermatitis and eczema. Fuel wood species.
23	*Diospyrus lotus*	Ebinaceae	T	2	2	3	Fruit is edible which laxative, purgative and cause flatulence. Wood is used in furniture Fuelwood species.
24	*D. kaki*	Ebinaceae	T	2	2	3	Fruit is laxative. Fuelwood species.

Table 2. continues.

25	*Dodonea viscose*	Sapindaceae	S	1	3	2	Leaves are bitter and astringent used in gout and rheumatism. Fuelwood species.
26	*Elaeagnus parviflora*	Elaegnaceae	T	2	2	2	The fruits are cardiac stimulant. Fuelwood specie.
27	*Ficus carica*	Moraceae	T	2	1	3	Fruit is laxative and demulcent, used in constipation, piles and urinary bladder problems. Fuelwood specie.
28	*Ficus palmata*	Moraceae	T	3	2	3	Fruit is laxative and demulcent, used in constipation, piles and urinary bladder problems. Fuelwood species.
29	*Flacourtia indica*	Flacourtiaceae	T	3	3	3	Fruit is used in jaundice and enlarge spleen. Fuelwood species. Also used in making agriculture tools.
30	*Fraxinus xantholoides*	Oleaceae	T	1	1	3	Wood is used to make agriculture tools.
31	*Gymnosporia royleana*	Celastraceae	S	2	2	3	Fuelwood specie.
32	*Grewia optiva*	Tiliaceae	T	2	2	2	The concentrated paste from leaves is applied to cure joint pains. Fuelwood specie.
33	*Helicteris isora*	Sterculiaceae	T	2	2	3	Root and stem bark is considered expectorant, demulcent, astringent and anti galactagogue. Fuelwood specie.
34	*Hippopphae rhamnoidrs*	Elaegnaceae	S	3	2	2	Fruit is edible. Fuelwood specie.
35	*I. heterantha*	Papillionaceae	S	3	3	3	Fuelwood specie.
36	*Juglanse regia*	Juglandaceae	T	2	1	3	Decoction of the leaves is given in eczema and intestinal worms. Wood is used in furniture.
37	*Juniperus communis*	Cupressaceae	S	3	3	3	Fruit and oil are diuretic, carminative, stimulant and is used in skin diseases. Fuelwood specie.
38	*Justicia adhatoda*	Acanthaceae	S	3	3	3	Leaves and roots are used for cough, bronchities, asthma and rheumatism. Leaves buds are used in diabetes. Fuel wood species.
39	*Lantana camara*	Verbenaceae	S	2	3	3	Whole plant is considered as tonic, diaphoretic, carminative and antiseptic; decoction is given in rheumatism, tetanus and malaria. Fuel wood species.
40	*M. pumila*	Rosaceae	T	3	3	3	Fruit is purgative, source of iron and expectorant. Fuelwood species.
41	*M. philippinensis*	Euphorbiaceae	T	3	2	1	Used in leprosy and in solution to remove freckles and pustules. Used to remove intestinal worm. Fuelwood species.
42	*Melia azedarach*	Meliaceae	T	2	2	2	Leaves juice is used as diuretic, anthelmintic and emmenagogue. Bark has cathartic and emetic properties. Fuelwood species.
43	*M. alba*	Moraceae	T	1	1	2	Fruits are laxative and purgative. Leaves are emollient, used for cleaning throat, cooling agent, anthematic and astringent. Fuelwood species.
44	*M. nigra*	Moraceae	T	1	1	2	Fruit has cooling agent, are anthelmintic and astringent. Fuelwood species. Fuelw
45	*M. africana*	Myrsinaceae	S	2	2	3	Fruit are used as spice, carminative, appetizer, flavoring agent and digestive. Fuelwood species.
46	*Olea ferruginea*	Oleaceae	T	1	1	2	Leaves are used in toothache, as astringent, antiseptic, diuretic and antiperiodic. Fuelwood species.
47	*Picea smithiana*	Pinaceae	T	2	2	2	Fuelwood species.
48	*P. roxburghii*	Pinaceae	T	1	2	1	Resin is stimulant, used for ulcer, snakebites, scorpion stings and blood purifier. Fuelwood species.
49	*P.wallichiana*	Pinaceae	T	1	1	2	Fuelwood species.

Table 2. continues.

50	*P. integerrima*	Anacardiaceae	T	2	2	2	Galls extract is given in jaundice; used for bronchial disease, asthma, snake bite and scorpion bite. Fuelwood species.
51	*P. orientalis*	Plantanaceae	T	2	3	3	Bark is given in toothache and diarrhea. Fuelwood species.
52	*Plectranthus rugosus*	Lamiaceae	H	3	3	3	Decoction of leaves is antiseptic. Fuelwood species.
53	*P. nigra*	Salicaceae	T	2	3	3	Fuelwood species.
54	*P. alba*	Salicaceae	T	2	3	3	Fuelwood species.
55	*P. armeniaca*	Rosaceae	T	3	2	3	Fruit is laxative. Fuelwood species.
56	*P. domestica*	Rosaceae	T	2	2	2	Fruit is laxative. Fuelwood species.
57	*P. persica*	Rosaceae	T	3	2	3	Fruit is edible. Fuelwood species.
58	*P. granatum*	Punicaceae	T	2	2	2	Leaves are used for skin diseases dysentery. Fruit is an astringent and purifies blood. Fuelwood species.
59	*P. communis*	Rosaceae	T	2	2	2	Fruit is blood purifier. Fuelwood species.
60	*Pyrus malus*	Rosaceae	T	3	2	2	Fuelwood species.
61	*Pyrus pashia*	Rosaceae	T	2	2	2	Fruits are edible, astringent, febrifuge, sedative and laxative. Fuelwood species.
62	*Q. dialata*	Fagaceae	T	2	2	3	Seeds are edible, are astringent and diuretic; they are used for diarrhea, indigestion and asthma. Fuelwood species.
63	*Q. incana*	Fagaceae	T	1	2	3	Fruit is used to stop internal bleeding, diarrhea and dysentery. Fuelwood species.
64	*Q. ilex*	Fagaceae	T	1	2	2	Fuelwood species. The wood is also used in making agricultural tools.
65	*R.pseudoaccacia*	Papilonaceae	T	2	2	2	Fuelwood species.
66	*S.denticulata*	Salicaceae	S	2	2	2	Fuelwood species.
67	*Salix tetrasperma*	Salicaceae	T	2	3	2	Fuelwood species.
68	*Salvedara persica*	Mimosaceae	T	2	3	3	Decoction of leaves is used in asthma and cough. Fruits are described as carminative, purgative and diuretic. Fuelwood species.
69	*Staphylea emodi*	Staphyleaceae	S	2	2	2	Fuelwood species.
70	*T. wallichiana*	Taxaceae	T	2	2	3	Leaves are bitter and used in bronchitis, whooping cough and asthma. Fuelwood species.
71	*Viburnum cotinifolium*	Caprifoliaceae	T	2	2	2	Fruits are edible. Fuelwood species.
72	*Ulmus villosa*	Ulmaceae	T	2	2	3	Fuelwood species.
73	*Woodforbia fruticosa*	Lytheraceae	T	2	3	3	Dried flowers are used as astringent, stimulant and used in liver problem. Fuelwood species.
74	*Zizypus mauritiana*	Rhamnaceae	T	2	2	2	Fruits are edible and used as an astringent. Fuelwood species.
75	*Ziziphus nummularia*	Rhamnaceae	T	2	2	2	Leaves are used in scabies and boils. Fruit is laxative. Fuelwood species.

T, Tree; S, shrub; H, herb; SE, value as a source of energy; MU, multiple use (beside fuelwood); P, plantation (natural regeneration, fast growth, yield under local conditions: 1, very good; 2, satisfactory; 3, low rating, unsatisfactory).

wasteful. Adequate preparation of fuel wood, that is,sufficient drying and splitting of large diameter pieces could help to avoid unnecessary losses of energy. The traditional way of cooking on tree stones or a metal ring with three legs is a great loss to energy. If open fires were replaced by stoves, fuel wood consumption could be reduced by one third by the more efficient use of fuel wood and in part also by a change in heating and cooking habits, fuel wood consumption in the area could be effectively cut down. This would substantially reduce the pressure on the natural tree and shrub vegetation and help to avoid high afforestation costs. Khan et al. (1996) studied the impact of fuel shortage on conservation of biodiversity of Hindu-Kush mountainous region. They suggested the solution for the hazardous impacts of fuel shortage by employing various strategies at local,

regional and state levels. They also suggested that,alternative sources of fuel should be explored and fast growing trees should be explored and fast growing trees should be planted in large scale, while protecting the already planted trees and conserving the endangered species.

The whole population of the Kaghan valleys is dependent on forests for timber wood, since no import takes place and substitutes like iron girdera (for house construction) are not common. Consequently, it can be assumed that the total population of the study area depends on the forests for timber for house construction since coniferous timber are mainly used for the carrying parts and for doors and windows. There were 41 timber wood species (Table 3). The timber wood species included *Abies pindrow, A. cappadocicum, A. indica, C. deodara*, *J. regia, M. alba, M. nigra, P. roxburghii, P. wallichiana, P. orientalis, Q. incana* and *Q. ilex T. wallichiana* and other species. The pines wood is traditionally used as a source of durable timber in the study area. The survey revealed that, *C. deodara* wood was preferred for construction. This plant has been cut on such a large scale that it is on the verge of extinction. Chopra (1992) and Gul et al. (2009) highlighted the importance of gymnosperms in nature and human life. The people of the research area live a semi-nomadic life style and their houses varied according to the existing condition and duration of stay. For example the houses in the villages were mostly made of mud and stones wall having bunkers inside. In high mountains meadows, the houses are totally made of wood logs. The houses in Kaghan valleys were constructed in traditional manner with lavish use of timber in walls and roofs. The timber requirements of such houses are exorbitant to the extent that the timber used in one traditional house is enough for the construction of 10 to15 houses constructed in plan area of Kaghan valleys. Such lavish use of timber originated probably from early times when forests covered all the areas and were cleared by early settlers to get land for farming. At present, most of the forests in the surrounding of villages have been severely depleted by cutting the trees indiscriminately, usually *C. deodara* for constructional purpose. There is a dire need to develop active community involvement with improved design of houses requiring minimum quantity of timber and offering better living condition. Timber harvesting is done by local made axe and two-man peg-toothed cross-cut saw. The felled trees are cut into logs and then squared in the form of scants in the forest. Scants are extracted through slides and also through water (streams). Scants so collected at the transit site are then, transported by mules. Timber wood is also smuggled from Kaghan valleys. Sleepers are hidden in trucks loaded with potatoes and are thus, smuggled to different parts of the country. Sleepers are carried in Dir River and then, collected in the low lying areas. Some people have furniture shops in the area and then, take it to their desired destination as furniture which is not checked and confiscated. Influential people are involved in smuggling wood sleepers from the area by using their influences and contacts. Others bribe the pertinent forest officials. Hence, this practice is one of the major factors for deforestation in the area.

Primitive tools and techniques, low timber outturn, lack of planning and absence of harvesting plans for economical outturn, wasteful methods of timber conservation, over harvesting, low literacy rate, management of timber harvest by outsiders, non-available of bank-loans, high timber consumption in local houses and frequent forest fires are some of the reason which are threatening the biodiversity of the Kaghan valleys. Rehman and Ghafoor (2000) studied the human influences on the natural resources of Mount Elum, Swat. Deformation, timber, fuel wood collection, overgrazing, terracing, poverty, ignorance, lack of development initiatives and the ruthless exploitation of wildlife were among the root causes of ecological degradation. The possible solution for the problems identified were social organization for resolving conflicts, raising nurseries for agroforestry and reforestation, range management, agricultural development, commercial fruit culture, fisheries apiculture and poultry development, provision of tap water and investment in gender development. To regenerate barren areas due to deforestation, immediate tree plantation campaigns are required in the barren area. However, community self governance has led to a successful forest through natural regeneration (Webb and Khurshid, 2000). For sustainable utilization of forests resources of Kaghan valleys and to relieve pressure on fuel wood species, the following recommendations are suggested:

1. Natural gas should be introduced in the area as an alternate fuel source. If presently not feasible for Government, liquid petroleum gas (L.P.G.) cylinders can serve the purpose. However, the prices should be kept in the reach of the local population.
2. Introduction of fuel efficient stoves will also be helpful in reducing the pressure on forests for fuel wood requirements.
3. The people of the area are ignorant about the importance of biodiversity and conservation status of the area. They also show poor selection of fuel wood species. As a result, valuable indigenous flora is used as fuel wood species. Awareness programs at grass root level should be introduced in the area to solve the problem.

The study area had a vast area. Aforestation projects should be launched on cultivated waste lands. These projects will not only help conserve the local flora but also will improve the socio-economic conditions of the area.

It is also suggested that, replacement of old tree with new young plants will be vital as most of the world forests had been destroyed due to the fact that old trees were not replaced by the young ones. The old trees provide the site for most of the pathogens. In Pakistan, *D. sissoo*

Table 3. Timber yielding plants.

S/N	Botanical name	Family	Habit	S	T	F
1	*A. pindrow*	Pinaceae	T	o	-	-
2	*A.modesta*	Mimosaceae	T	o	+	+
3	*A.nilotica*	Mimosaceae	T	o	+	+
4	*A. cappadocicum*	Aceraceae	T	+	+	+
5	*A.indica*	Hippocastanaceae	T	o	o	o
6	*A. altissima*	Simarubaceae	T	+	o	+
7	*A. lebbek*	Mimosaceae	T	o	o	-
8	*A.nitida*	Betulaceae	T	o	-	o
9	*B. utilis*	Betulaceae	T	o	-	-
10	*C.deodara*	Pinaceae	T	+	-	+
11	*D. lotus*	Ebinaceae	T	o	-	-
12	*D. kaki*	Ebinaceae	T	o	-	-
13	*F. palmata*	Moraceae	T	o	+	-
14	*G.optiva*	Tiliaceae	T	-	o	-
15	*J. regia*	Juglandaceae	T	-	-	+
16	*M.azedarach*	Meliaceae	T	o	o	+
17	*M.alba*	Moraceae	T	o	-	o
18	*M.nigra*	Moraceae	T	o	-	o
19	*O. ferruginea*	Oleaceae	T	+	+	-
20	*P.smithiana*	Pinaceae	T	o	+	-
21	*P. roxburghii*	Pinaceae	T	+	+	+
22	*P. wallichiana*	Pinaceae	T	+	+	+
23	*P.integerrima*	Anacardiaceae	T	+	-	+
24	*P. orientalis*	Plantanaceae	T	+	-	+
25	*P. nigra*	Salicaceae	T	+	-	o
26	*P.armeniaca*	Rosaceae	T	-	o	o
27	*P.domestica*	Rosaceae	T	o	-	-
28	*P. pashia*	Rosaceae	T	o	+	-
29	*Q.dialatata*	Fagaceae	T	+	+	o
30	*Q. incana*	Fagaceae	T	+	+	o
31	*Q. ilex*	Fagaceae	T	+	+	-
32	*R. pseudoaccacia*	Papilonaceae	T	+	-	-
33	*S.persica*	Mimosaceae	T	-	+	+
34	*S.denticulate*	Salicaceae	T	o	+	-
35	*S.tetrasperma*	Salicaceae	T	-	+	-
36	*U. villosa*	Ulmaceae	T	o	-	-
37	*T. wallichiana*	Taxaceae	T	o	-	-
38	*W.fruticosa*	Lytheraceae	T	o	-	-
39	*Z. armatum*	Rutaceae	T	-	o	-
40	*Z. nummularia*	Rhamnaceae	T	-	o	-
41	*Z. mauritiana*	Rhamnaceae	T	-	o	-

T= Tree; S = structural uses; +, very important; T = tools; o = less important, F= furniture, - = not used.

which previously represented establish population, is at present threatened due to die-back disease. In the case of *D. sissoo,* the old trees are disappearing rapidly.

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