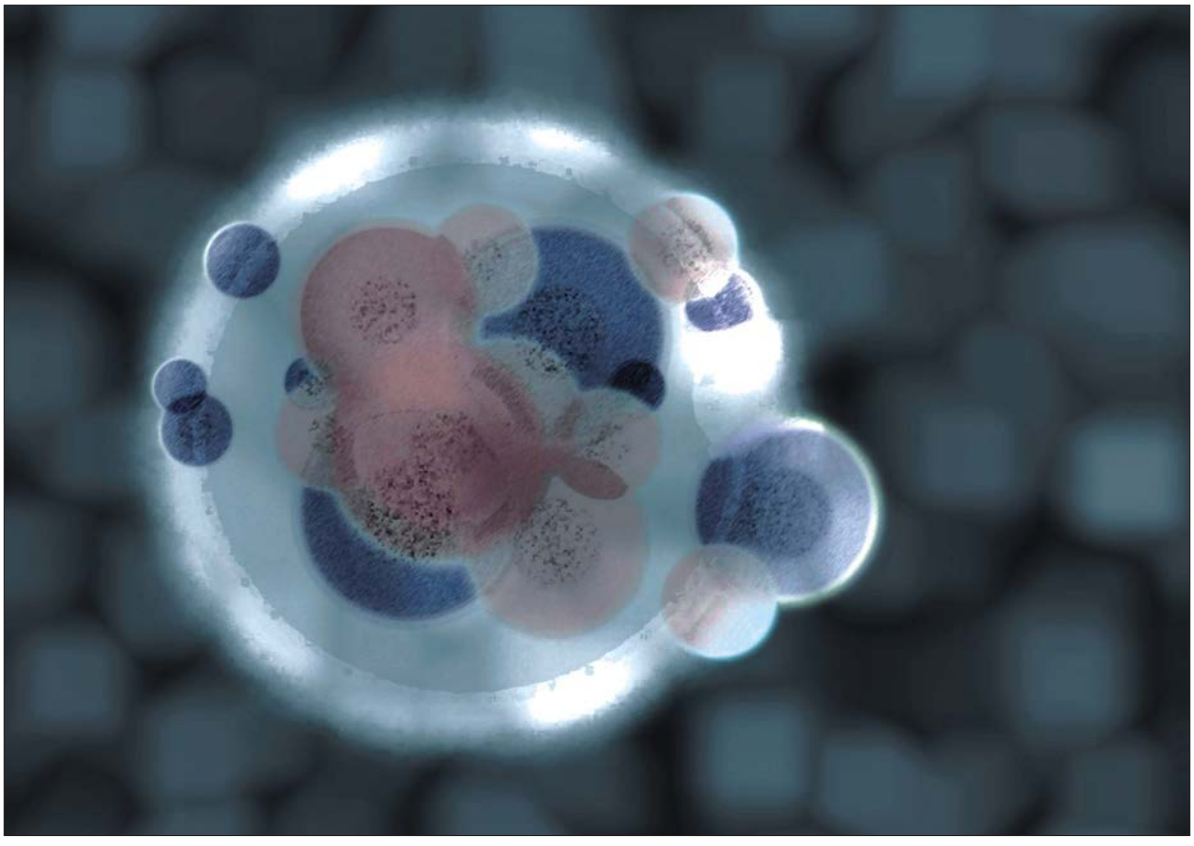

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An Ethnobotanical Note on Fuel Wood and Timber Plant Species of Siran Valley, Pakistan

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Abstract: A survey was conducted to explore the fuel wood species and timber producing species of Siran Valley, 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 were interviewed and they were randomly selected. Only one person was interviewed from a household. A total 100 respondents were interviewed. Studies revealed that 71 plant species belonging to 50 genera and 32 families are utilized as fuel wood and 54 species belonging to 39 genera and 27 families are utilized as timber. Three tree species *Quercus incana* and *Cedrus deodara* and *Taxus wallichiana* has been found endangered. There is a dire need to conserve these species.

Key words: Ethnobotany, fuel wood, timber species and Siran Valley-Pakistan

INTRODUCTION

The study area is located in the Hazara Civil Division, District Mansehra of the North West Frontier Province (NWFP), Pakistan. The Siran River catchments area is commonly known as, Siran Valley. It is situated between 34° 33′ 35″ and 34° 44′ 30″ North Latitude and between 73° 13′ 38″ and 73° 22′ 40″ East Longitude. The Siran River is 130 km in length joining the Indus at Tarbala in Hazara Division. The total area of the tract is 5284.2 km. According to standard classification of forest types of Pakistan (Champion *et al*., 1965), the upper Siran reserved forests fall under the major type Montane Temperate Forests. Gymnosperms consist of *Pinus roxburgii*, *P. wallichiana*, *Abies pindrow*, *Taxus wallichiana* and *Cedrus deodara.* Several other broad-leaved species like *Aesculus indica, Populus ciliata and Juglans regia* are also found. Forests as vital life support systems play an important role in regulating climate, providing habitat for numerous species, maintaining and conserving soil resources, regulating hydrological cycles and ensuring water supplies. Forest resource and its use by the stakeholders depend on how social and economic parameters of a society affect such resources and its use.

Fuel wood is the main source of energy in the developing world. Use of wood by mankind for energy purpose is as old as human civilization itself. One of the most serious problems in the developing world is the shortage of fuel wood. Pakistan is experiencing rapid increase in its national energy consumption with increasing population and economic development. The country is poor in forest wealth. The primary reason is that about 70-80% of land area falls in arid or semi-arid zones with very low precipitation to support tree growth. Sheikh (1987) estimates that fuel wood meet about 50% of domestic energy requirement while 16% are shared by the fossil fuels and burning dung and crop residues generate 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. The idea for conducting this survey was developed because of the fact that the entire population of the Siran Valley is wholly dependent on natural forests for its energy requirements and timber. Fuel is used for cooking and heating of homes. The greatest demand of timber of large dimensions exists in construction sector. This includes residential houses, which, depending on ethnic and traditional origins requires considerable amount of timber for construction of walls and roofs, the bulk needed for roof beams, which have to carry a heavy load in case of mud roofs. The forest resources are under depletion at a very fast rate resulting in ecological imbalance. The people living in the study area are facing serious fuel wood problem. The broad objective of the study is to assess the factors causing forest degradation and to recommend measures to address such causes of forest degradation.

MATERIALS AND METHODS

The survey was conducted to explore the fuel wood species and timber producing species their consumption and impact on the forest resources of Siran Valley,

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Pakistan. For this study 10 villages were randomly selected. In each village 10 persons were interviewed and they were randomly selected. Only one person was interviewed from a household. The total 100 respondents were interviewed. Of which 10 household heads were selected from each village. Target villages of Siran Valley were Jabori, Nawazabad, Jacha, Mandagucha, Jabbar, Devli, Kund, Bakki, Khori and Panjool. A questionnaire was used as a survey instrument to obtain desired data. The questions were designed as brief and to the point. The questionnaire was divided into two main parts i.e., The first part contained questions on household size, number of earning members, occupation, education and income level of household head. Information type of fuel used preferences for various fuels and preferred fuel wood species. The respondents were interviewed personally on their homes or farms. Although the interview schedule was constructed in English, yet the questions were administrated in Hindko and Gujri for the convenience of interviewer and interviewees to get the required information with maximum accuracy. The respondents were interviewed individually at their homes or farms and in their own environments. While interviewing the researcher tried his best to maintain informal and friendly atmosphere in order to obtain the factual opinion of the sample respondents. In this way, one after another, sample respondents were interviewed and data was 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 the available literature (Nasir and Ali, 1971-2001) and were confirmed by the experts in Department of Plant Sciences, Quaid-I-Azam University Islamabad. The specimens were deposited in the Herbarium, Department of Plant sciences, Quaid-I-Azam University Islamabad Pakistan (ISL).

RESULTS AND DISCUSSION

The Studies revealed that 71 plant species belonging to 50 genera and 32 families are utilized as fuel wood and 54 species belonging to 39 genera and 27 families are utilized as timber (Table 1 and 2). The people of the research area utilize fuel wood for cooking and heating their houses in winter. It was observed that fuelwood consumption per household for cooking and heating was minimum during summer (March to October). The data indicated that about 65% additional fuel was needed during winter for meeting, heating needs of the household. During winter months (November to February) the consumption pattern of the household remained the same except the change in quantity consumed. The local community is very selective both for fuel wood and timber species which has resulted in the depletion of these species. All tree and shrub species may be used as fuel if sufficiently dried however, burning properties vary widely. Some species have high caloric values and burn without smoke or sparking. There are species, which burn easily and quickly while others burn slowly and with a small flame. So even when faced with a severe fuel shortage, people are amazingly selective. Some of the valuable trees like *Quercus incana* which are already endangered are utilized ruthlessly as fuel wood. The common way of using fuel wood is extremely wasteful. Adequate preparation of fuel wood i.e., sufficient drying and splitting of large diameter pieces could help to avoid unnecessary losses of energy. The traditional way of cooking on three 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 back. This would substantially reduce the pressure on the natural tree and shrub vegetation and help to avoid high afforestation costs. Mostly dry wood is used as fuel but if not available green trees are cut for fuel wood. Since quantity of fuel wood imported or exported for domestic use is very low, almost the total demand/consumption is produced in the study area itself. Another factor which badly affects the forests of the area is utilization of wood for tobacco curing, as tobacco is the major cash crop grown in the lower Siran Valley. Khan *et al.* (1996) studied the impact of fuel shortage on conservation of Biodiversity of Hindu-Kush Himalayas mountainous region. They suggested the solutions 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 planted in large scale while protecting the already planted trees and conserving the endangered species.

Whole population of the Siran Valley is dependent on forests for timber wood, since no import takes place and substitutes like iron girders (for house construction) are not common. Consequently it can be assumed that the total population of the study of is more or less depending on the forests for timber for house construction since coniferous timber mainly used for the carrying parts and for doors and windows. The Pine wood is traditionally used as a source of durable timber in the study area. The survey revealed that *Cedrus deodara* wood is preferred for construction. This plant has been cut on such a large scale that it is on the verge of extinction. Chopra (1992) highlighted the importance of gymnosperms in nature and in human life. The people of the research area live a semi-nomadic life style and their houses vary according to the

Table 1: Plants used as fuel wood

S. No.	Name of plant	Family	Vernacular name	Habit	SE	MU	P
1	*Abies pindrow*	Pinaceae	Paludar	Tree	2	3	2
2	*Acacia modesta*	Mimosaceae	Phulai	Tree	1	2	2
3	*Acacia nilotica*	Mimosaceae	Kikar	Tree	1	2	2
4	*Acer caesium*	Aceraceae	Trekana	Tree	2	3	2
5	*Acer oblongum*	Aceraceae	Trekana	Tree	2	3	3
6	*Acer pentapomucum*	Aceraceae	Trekana	Tree	2	3	3
7	*Aesculus indica*	Hippocastanaceae	Bankhor	Tree	1	2	2
8	*Ailanthus altissima*	Simarubaceae	Drawa	Tree	3	3	1
9	*Albizia lebbek*	Mimosaceae	Shrin	Tree	2	3	2
10	*Alnus nitida*	Betulaceae	Sharoli	Tree	2	3	1
11	*Bauhinia variegata*	Caesalpinaceae	Kalyari	Tree	2	2	2
12	*Betula utilis*	Betulaceae	Bhuraj	Tree	3	3	1
13	*Broussonetia papyrifera*	Moraceae	Jungli tut	Tree	2	3	1
14	*Cedrela toona*	Meliaceae	Drawa	Tree	3	3	1
15	*Celtis australis*	Ulmaceae	Batkarar	Tree	2	2	2
16	*Cornus macrophylla*	Coruaceae	Kandar	Tree	3	3	2
17	*Corylus colurna*	Betulaceae	Urui	Tree	3	3	3
18	*Cotinus coggygria*	Anacardiaceae	Phan	Tree	3	3	2
19	*Cotoneaster nummularia*	Roseaceae	Looni	Shrub	3	2	2
20	*Crataegus songarica*	Roseaceae	Bat sangli	Shrub	3	2	2
21	*Dalbergia sisso*	Papilionaceae	Tahli	Tree	1	2	2
22	*Daphne mucronata*	Thymelaceae	Kutilal	Shrub	3	3	
23	*Debregeasia salicifolia*	Urticaceae	Changeli	Shrub	3	3	2
24	*Diospyros lotus*	Ebenaceae	Kala Malook	Tree	2	2	3
25	*Dodonea viscosa*	Sapindaceae	Sanatha	Shrub	1	3	2
26	*Elaeagnus umellata*	Elaeagnaceae	Karukoli	Shrub	3	3	3
27	*Eucalyptus camalduleusis*	Myrtaceae	Gond	Tree	2	2	2
28	*Ficus palmata*	Moraceae	Phag	Tree	2	2	3
29	*Fraxinus excelsior*	Oleaceae	Sum	Tree	1	1	3
30	*Glochidion veltuinum*	Euphorbiaceae	Kambeela	Shrub	3	3	2
31	*Grewia optiva*	Tiliaceae	Dhaman	Tree	3	2	2
32	*Gymnosporia royleana*	Celastraceae	Pataki	Shrub	2	3	2
33	*Indigofera gerardiana*	Papilionaceae	Kainthi	Shrub	3	3	3
34	*Juglans regia*	Juglandaceae	Akhore	Tree	2	1	3
35	*Juniperus communis*	Cupressaceae	Bhantri	Shrub	3	3	3
36	*Mallotus philippineusis*	Euphorbiaceae	Kambeela	Shrub	3	2	1
37	*Melia azedarach*	Meliaceae	Dhrek	Tree	2	2	2
38	*Morus alba*	Moraceae	ChitaTut	Tree	1	1	2
39	*Morus nigra*	Moraceae	KalaTut	Tree	1	1	2
40	*Morus serrata*	Moraceae	Tut	Tree	1	1	2
41	*Olea ferruginea*	Oleaceae	Kau	Tree	1	1	2
42	*Picea smithiana*	Pinaceae	Kachal	Tree	2	2	2
43	*Pinus roxburghii*	Pinaceae	Chir	Tree	2	2	1
44	*Pinus wallachiana*	Pinaceae	Biar	Tree	1	1	2
45	*Pistacia iutegerrima*	Anacardiaceae	Kanger	Tree	2	2	2
46	*Platanus orieutalis*	Plantanaceae	Chinar	Tree	2	3	3
47	*Populus alba*	Salicaceae	Safeda	Tree	2	3	3
48	*Populus ciliata*	Salicaceae	Palach	Tree	2	3	3
49	*Prunus armeniaca*	Roseaceae	Hari	Tree	3	2	3
50	*Prunus communis*	Roseacea	Nashpati	Tree	2	2	3
51	*Prunus cornuta*	Roseaceae	Kalakath	Tree	2	3	3
52	*Prunus domestica*	Roseaceae	Aloocha	Tree	2	2	2
53	*Prunus persica*	Roseaceae	Aru	Tree	3	2	2
54	*Punica granatum*	Punicaceae	Daruna	Tree	2	2	2
55	*Pyrus pashia*	Roseaceae	Batangi	Tree	2	2	2
56	*Qnercus baloot*	Fagaceae	Rhenn	Tree	2	2	3
57	*Qnercus dilatata*	Fagaceae	Bharungi	Tree	1	2	2
58	*Qnercus incana*	Fagaceae	Reen	Tree	1	2	3
59	*Robinia pseudo-acacia*	Papilonaceae	Kikar	Tree	2	2	2
60	*Salix acmophylla*	Salicaceae	Binsa	Tree	3	3	2
61	*Salix babylonica*	Salicaceae	Majnoon bins	Tree	2	2	3
62	*Salix denticulata*	Salicaceae	Binsa	Shrub	2	2	2
63	*Sapium sebiferum*	Euphorbiaceae	Charbi	Tree	2	2	2
64	*Staphylea emodi*	Staphyleaceae	Marchoob	Shrub	2	2	2
65	*Taxus wallachiana*	Taxaceae	Barmi	Tree	2	2	3
66	*Ulmus villosa*	Ulmaceae	Mannu	Tree	2	2	3
67	*Ulmus wallachiana*	Ulmaceae	Kain	Tree	2	2	3

Table 1: Continued

S. No.	Name of plant	Family	Vernacular name	Habit	SE	MU	P
68	*Ziziphus jubjuba*	Rhamnaceae	Ber	Tree	2	2	3
69	*Ziziphus mauritiana*	Rhamnaceae	Ber	Shrub	2	2	2
70	*Ziziphus nummularia*	Rhamnaceae	Beri	Shrub	2	2	2
71	*Ziziphus vulgaris*	Rhamnaceae	Singli	Tree	2	2	1

Value as source of energy {SE}, Multiple use (besides fuel wood) {MU}, Plantation (Natural regeneration, Fast growth, Yield under local conditions {P}, 1 = Very good, 2 =Medium, Satisfactory, 3 = Low rating, Unsatisfactory

Table 2: Timber producing trees and shmbs

S.No.	Name of species	Family	Vernacular name	Habit	S	T	F
1	*Abies pindrow*	Pinaceae	Paludar	Tree	O	–	–
2	*Acacia modesta*	Mimosaceae	Phulai	Tree	O	+	+
3	*Acer caesium*	Aceraceae	Trakana	Tree	O	O	–
4	*Acacia nilotica*	Mimosaceae	Kikar	Tree	O	+	–
5	*Ailanthus altissima*	Simarubaceae	Darava	Tree	O	O	–
6	*Aesculus indica*	Hippocastenaceae	Bankhor	Tree	O	O	O
7	*Alnus nitida*	Betulaceae	Sharoli	Tree	O	–	O
8	*Albizia lebbek*	Mimosaceae	Shirin	Tree	O	O	–
9	*Betula utilis*	Betulaceae	Buraj	Tree	O	–	–
10	*Broussouetia papyrifera*	Moraceae	Jungli tut	Tree	O	–	–
11	*Celtis eriocarpa*	Ulmaceae	Batkarar	Tree	O	O	–
12	*Cornus macrophylla*	Coruaceae	Kander	Tree	O	–	–
13	*Cedrela toona*	Meliaceae	Drawa	Tree	O	–	–
14	*Cedrus deodara*	Pinaceae	Diar	Tree	+	–	+
15	*Diospyros lotus*	Ebenaceae	Amlok	Tree	O	–	–
16	*Dodouea viscosa*	Acanthaceae	Snatha	Shrub	O	O	–
17	*Eucalyptus camalduleusis*	Myrtaceae	Gond	Tree	+	O	O
18	*Ficus palmata*	Moraceae	Phag	Tree	O	+	–
19	*Fraxinus hookeri*	Oleaceae	Sum	Tree	–	–	+
20	*Grewia optiva*	Tilliaceae	Dhaman	Tree	–	O	–
21	*Juglans regia*	Juglandaceae	Akhor	Tree	–	–	+
22	*Morus alba*	Moraceae	ChitaToot	Tree	O	+	O
23	*Morus serreta*	Moraceae	Toot	Tree	O	+	O
24	*Melia azedrach*	Meliaceae	Dhrek	Tree	O	O	+
25	*Olea ferrugiuea*	Oleaceae	Kau	Tree	+	+	–
26	*Picea smithiana*	Pinaceae	Kachal	Tree	O	+	–
27	*Pinus roxburghii*	Pinaceae	Chir	Tree	+	+	+
28	*Pistacia chieusis*	Anacardiaceae	Kanger	Tree	+	–	+
29	*Pinus wallachiana*	Pinaceae	Biar	Tree	+	O	+
30	*Populus ciliata*	Salicaceae	Palach	Tree	O	–	–
31	*Prunus cornuta*	Rosaceae	Kala kath	Tree	O	O	O
32	*Prunus armeniaca*	Roseaceae	Khurmai	Tree	–	O	–
33	*Prunus domestica*	Roseac ae	Aloocha	Tree	O	–	–
34	*Populus alba*	Salicaceae	Safeda	Tree	O	–	O
35	*Punica granatum*	Punicaceae	Darunna	Tree	–	+	–
36	*Pyrus pashia*	Roseaceae	Batangi	Tree	O	+	–
37	*Pyrus communis*	Roseaceae	Nashpati	Tree	O	–	–
38	*Querques glauca*	Fagaceae	Barin	Tree	+	+	O
39	*Quercus incana*	Fagaceae	Reen	Tree	+	+	O
40	*Quercus dilata*	Fagaceae	Reen	Tree	O	+	O
41	*Quercus semecarpifolia*	Fagaceae	Banjar	Tree	+	+	O
42	*Quercus leucotrichophora*	Fagaceae	Ban/Reen	Tree	+	+	O
43	*Robinia pseda-acacia*	Papilionaceae	Kikar	Tree	+	–	–
44	*Salix alba*	Salicaceae	Beens	Tree	O	+	–
45	*Salix babylonica*	Salicaceae	Majnoon bins	Tree	–	+	O
46	*Sapium sabiferum*	Euphorbiaceae	Charbi	Tree	O	–	–
47	*Taxus wallachiana*	Taxaceae	Burmi	Tree	O	–	–
48	*Tamarix aphylla*	Tamaricaceae	Jhau	Tree	–	–	–
49	*Ulmus villosa*	Ulmaceae	Mannu	Tree	O	–	–
50	*Ulmus wallichiana*	Ulmaceae	Kain	Tree	O	–	–
51	*Zanthoxylum armatum*	Rutaceae	Timbar	Tree	–	O	–
52	*Zizyphus jujuba*	Rhamnaceae	Ber	Tree	–	O	–
53	*Ziziphus nummularia*	Rhamnaceae	Ber	Herb	–	O	–
54	*Ziziphus mauritiana*	Rhamnaceae	Berry	Shrub	–	O	–

S = Structural uses, + = Very important, T = Tools, etc O = Less important, F = Furniture, – = Not used

prevailing condition and duration of stay. For example the houses in the villages are mostly made of mud and stones wall having bunkers inside. In high mountains meadows the house are totally made of wood logs. A transitional stage includes the stone walls along with wooden frames incorporated in between. In general a house consumes a lot of timber wood. The order of preference for using a certain timber varies as a function of availability/

accessibility of wood. The houses in Siran Valley are constructed 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 construction of 20-30 houses constructed in other areas of Hazara. 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 surrounding of villages have been severely depleted by cutting the trees indiscriminately, usually *Cedrus deodara*, for constructional purpose. Not only the houses consume huge timber but at the same time have limited rooms for living and are unhygienic. 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. A huge amount of wood is lost by traditional methods of felling of trees. 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. The scants are extracted through slides and also through water (streams). The scants so collected at the transit site are then transported by mules. Primitive tools and techniques, low timber outturn, lack of planning and absence of harvesting plans for economical outturn, wasteful methods of timber conversion, over harvesting, low literacy rate, management of timber harvest by outsiders, non-availability of bank-loans, high timber consumption in local houses and frequent forest fires are some of the reasons which are threatening the biodiversity of the Siran Valley. Rehman and Ghafoor (2000) studied the human influence on the natural resources of Mount Elum, Swat. Deforestation, 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 solutions 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 tape 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 of forest through natural regeneration (Webb and Khurshid, 2000). For sustainable utilization of forest resources of Siran Valley following recommendation are made:

- The conservation and afforestation programmes should be launched simultaneously through farm forestry approach with the intimate involvement of the inhabitants.
- Supply of cheap kerosene oil, LPG and other sources of energy can be helpful in reducing pressure on forests being cut for fuel.
- Fast growing fuel wood species should be introduced on private lands.
- Awareness among the people about the conservations of this depleting natural gift should be created through public awareness.
- Non Governmental Organizations should (NGOs) also participate in conservation activities but all works should carry out by co-ordination with forest department.
- The efficiency of fuel wood utilization must be increased so as to make better use of available resources.
- Community should be involved in active afforestation programmes.
- Timber smuggling should be checked by the forest department.
- Traditional methods of felling the trees should be stopped.

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