

Wood as a Fuel Source in the Hindukush: A Case Study of Utror and Gabral Valleys, Northren Pakistan

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Abstract

Fuelwood is an important source of energy in the Hindukush region of northern Pakistan, as firewood is extensively used for cooking and heating purposes in this remote mountainous area. In current study, we recorded data pertinent to fuelwood consumption and its impact on deforestation in Utror and Gabral valleys, located in the upper Swat valley of Pakistan. It was observed that 27 plant species were utilized as fuelwood species in the project area. However, *Cedrus deodara*, *Quercus dilatata* and *Pinus willichiana* were the most exploited fuelwood plant species. We also observed that annually about 4809.86 tons of valuable wood is used for cooking and heating houses. During summer season, pressure on the forest for fuelwood is comparatively lesser as firewood is not used for heating houses during this period.

Keywords: Fuelwood, Deforestation, Hindukush, Northren Pakistan

Introduction

In rural Pakistan due to lack of household energy sources, like electricity and gas, fuelwood is an important component of daily life in Pakistan and it covers about 53% of total annual domestic energy needs [1]. According to estimates, 70–79% of Pakistani households use fuelwood as a main source of energy [2, 3]. Fuelwood is primarily used for cooking and heating purpose in the rural regions of Pakistan where gas is not available for the purpose. Dependency on fuelwood is expected to remain high in Pakistan in the near future, as the country's economic development is not strong enough for a shift from traditional to modern fuels [4]. The high demand for domestic fuelwood is believed to be the cause of Pakistan's rapid depletion of forests [5], and the deforestation rate in the country is estimated

to be the second highest in the World [6]. The World Conservation Union (IUCN) has estimated that with the current population growth, wood consumption in Pakistan would increase by 3% per year. Hence, IUCN [6] claimed that if present rate of deforestation continues, Pakistan's forests may vanish within the next 10–15 years.

Study area

Utror valley is situated between 35° 20' to 35° 48' N latitudes and 72° 12' and 72° 32' E longitudes. The population of Utror is 6888 and the area of the valley is about 47400 hectares. Utror valley is surrounded by Gabral and Bhan valleys on the east, upper Dir on the west, Kalam valley on the south and and Gabral valley on the north. Gabral valley lies between 35° 20' to 35° 48' N latitudes and 72° 12' and 72° 32' E longitudes over an area of about 38733

hectares. The population of Gabral is 3238. The valley is surrounded by Chitral in the north, Utror in the south and south west, upper Dir in the west and Bhan and Mahodand valleys in the east.

Utror and Gabral are located in the Hindukush, but this part of Hindukush climatically resembles the bordering Himalayas, as the Himalayas on the western side of river Indus are known as Karakoram and HindKush. The area shows a typical vegetation of eastern Irano-turanian type [7]. The people living in Utror and some parts of Gabral are known as kohistanis, as they belong to the kohistani dard tribe. The kohistanis are the main land owner group. The Kohistanis are believed to be the remains of the previous occupant tribes of Swat before the invasions of Pukhtoons. The kohistanis seldom migrate along with their families to the lower areas and all kohistanis are believed to be of the same ethnic origin. They inhabit Kalam, Utror, Ushu and adjoining areas of Dir kohistan like Thal, Lamuti, Kalkot etc. The population of kohistanis is estimated to be 60,000 to 70,000 in Districts of Swat and Dir. The kohistanis are the land owners and shareholders of the forest. Some kohistanis tribes also live on the eastern bank of river Indus but they are different from those of tehsil Kalam as their language is more like that of people of northern areas and Kashmir. Gujars are the major ethnic group of Gabral valley. They also own lands in Gabral but got no share in forest revenues [8].

Forests in Kalam kohistan are divided among three dominant communities of Kalamis, Utroris and Ushuwals of the same ethnic origin as per already established tribal system. The boundaries, not yet demarcated are known to all the concerned communities. However there are still some disputes between the Kalamis and Utroris on the ownership of some areas in Desan forest.

However, every community is entitled to allow grazing facilities to nomadic Ajars in their own forests on payment and the revenues thus obtained is distributed among the community members by their elders called Maliks. According to legislation, 60 % of the sale value of forest in Kalam kohistan is paid to the local right holders as royalty. Every community gets the royalty of its own forest and further distribution is made among the tribes of every community according to their own internal distribution system [8].

Information and data on fuelwood collection and consumption in Pakistan and its impact on natural forests are not available, despite of its importance for national economy. This is especially true for the Western Himalayan region in the Northern Areas [9], Karakorums and Hindukush region of Pakistan. The present study has been undertaken to respond to lack of reliable data on fuelwood consumption and to evaluate the impact of fuelwood collection on the ecosystem of Hindukush-Himalayas.

Materials and Methods

This study was conducted during 2002 as data for fuelwood consumption was recorded during different months of the year. Two methods were employed for the collection of data pertinent to the fuelwood consumption in this remote Hindukush region. First, questionnaire was developed for taking representative information pertinent to fuelwood species and the quantities of wood consumed during spring, summer and winter season. Secondly, fuelwood was weighed for 10 households (Five each in Utror and Gabral) and the families were requested to use fuelwood from the already weighed bundles. After 24 hrs, the remaining fuelwood was weighed again, thus obtaining a clear picture of how much fuelwood was consumed during 24 hr. The plants used as fuelwood in the area were

collected from the field, identified and deposited in the herbarium of Quaid-i-Azam University, Islamabad.

Results

Current study showed that 27 plant species were used for fueling household in Utror and Gabral valleys (Table 1). The major fuel wood species include *Cedrus deodara*, *Quercus dilatata*, *Pinus willichiana*, *Abies pindrow*, *Picea smithiana*, *Taxus baccata*, *Juglans regia*, *Malus pumila*, *Olea ferruginea*, *Populus alba* and *Viburnum cotinifolium*. However *Cedrus deodara*, *Quercus dilatata* and *Pinus willichiana* were under immense fuelwood pressure as these three plant species are mostly collected from forest and used as fuelwood. In summer season (June, July and August) the pressure on the forest for fuel wood is comparatively lesser because locals do not need wood for heating their houses. Mostly dry trees are used as fire wood but if not easily available then green trees are cut. The people of the area have adopted a unique method for getting dry trees as they cut a portion of plant stem during early summer season and left the plant standing. After a few months the plant become dry and they cut it.

According to Forest Department estimates, 350 to 500 common sleepers are used every year in only Utror i.e. 15000 cu.f annually. Roughly 80 to 100 truck loads are cut from forest around Utror every year i.e. some 1000 tons per annum [10]. However, ground situation is much different. The people use much more wood than estimated by the forest department. The worse scenario is that due to unawareness, the locals primarily use valuable timber plants like *Cedrus deodara* and *Pinus willichiana* as fuelwood and the accessible forests around Utror and Gabral valleys are thus subjected to some severe deforestation for

meeting fuelwood requirements. The cutting process intensified during the months of January and February when the area is under snow cover. This is because during this season the forest officers seldom visit the area and secondly the transportation of big trees in the snow is much easier.

During the present study, it has been estimated that about 4809.86 tons of valuable wood is used for cooking and warming houses annually. In summer season (June, July, August) each person consume about 20 kg of fuel wood per month, during spring (March, April and May) about 35 kg of fuel wood is consumed per person, in early winter, when snow fall has not yet started, 43 Kg of fuel wood per person is utilized while during months of snow fall (November, Dec, Jan and Feb) this amount increases to 55 Kg due to additional requirements of fuel wood for keeping their rooms warm (Table 2; Fig. 1).

Discussion

Huge quantities of valuable wood are used for meeting energy shortages in the rural communities of Pakistan. During winter, the fuelwood consumption increases many folds as wood is used for cooking and heating the rooms as well. Current study revealed that in Utror and Gabral about 4809.86 tons of valuable wood is used for cooking and warming houses annually. In summer season (from April to October) each person consume about 25 Kgs of fuelwood per month, while during winter (from November to March) this amount increases to 60 Kgs due to additional requirements of fuel for keeping their houses warm. We observed that *Cedrus deodara*, *Quercus dilatata* and *Pinus willichiana* are under immense fuelwood pressure as bulk of the population of the study area uses these three plant species for their fuel requirements.

Table 1: Plant species used as fuelwood in Utror and Gabral Valleys, District Swat

No.	Plant Name	Local Name	Family	Usage
1.	<i>Abies pindrow</i> Royle	Chokar/Char	Pinaceae	Moderate use
2.	<i>Alnus nitida</i> (Spach.) Endl.	Geiray	Betulaceae	Rare use
3.	<i>Betula utilis</i> D. Don	Birch	Betulaceae	Rare use
4.	<i>Cedrus deodara</i> (Roxb. ex Lamb.) G. Don	Loo/Diyar	Pinaceae	Extensive use
5.	<i>Cotoneaster nummularia</i> Fisch. & Mey.	Karwara	Rosaceae	Rare use
6.	<i>Daphne mucronata</i> Royle	Laighonai	Thymeliaceae	Rare use
7.	<i>Diospyros lotus</i> L.	Toor amlook	Ebenaceae	Rare use
8.	<i>Elaeagnus parviflora</i> Wall. ex Royle	Ghanum rangai	Elaegnaceae	Rare use
9.	<i>Indigofera heterantha</i> Wall. ex Brand.	Ghoureja	Fabaceae	Rare use
10.	<i>Juglans regia</i> L.	Ghuz	Juglandaceae	Moderate use
11.	<i>Malus pumila</i> Mill.	Manara	Rosaceae	Moderate use
12.	<i>Olea ferruginea</i> Royle	Khona	Oleacea	Moderate use
13.	<i>Onopordum acanthium</i> L.	Shojesh	Asteraceae	Rare use
14.	<i>Picea smithiana</i> (Wall.) Bois.	Rawn	Pinaceae	Moderate use
15.	<i>Plectranthus rugosus</i> Wall ex Benth.	Burtus	Lamiaceae	Rare use
16.	<i>Populus alba</i> L.	Sperdad	Salicaceae	Moderate use
17.	<i>Prunus armeniaca</i> L.	Khubani	Rosaceae	Rare use
18.	<i>Prunus domestica</i> L.	Alucha	Rosaceae	Rare use
19.	<i>Prunus persica</i> (L.) Batsch.	Shaltalu	Rosaceae	Rare use
20.	<i>Punica granatum</i> L.	Ananghorai	Punicaceae	Rare use
21.	<i>Quercus baloot</i> Griffith	Tor Banj	Fagaceae	Rare use
22.	<i>Quercus dilatata</i> Royle	Banj	Fagaceae	Extensive use
23.	<i>Quercus incana</i> Roxb.	Speen Banj	Fagaceae	Rare use
24.	<i>Quercus semecarpifolia</i> Sm.	Meer	Fagaceae	Rare use
25.	<i>Salix tetrasperma</i> Roxb.	Wala	Salicaceae	Rare use
26.	<i>Viburnum cotinifolium</i> D. Don	Kasarbotay	Caprifoliaceae	Moderate use
27.	<i>Viburnum nervosum</i> D. Don	Asos	Caprifoliaceae	Rare use

Table 2: Monthly and annual consumption of fuelwood (tons) in study area

Villages	Population	Monthly (Summer)	Monthly (Winter)	Summer Season	Winter Season	Annual Consumption
Kanai	741	18.52	44.46	129.68	222.3	351.98
Utror	3642	91.02	218.52	637.35	1092.6	1729.95
Gabral	1760	44.0	105.6	308.0	528.0	836.0
Sazgal	1527	38.18	91.62	267.23	458.1	725.33
Baila	484	12.1	29.04	84.7	145.2	229.9
Jabba	490	12.25	29.4	85.75	147.0	232.75
Behan	978	24.45	58.68	171.15	293.4	464.55
Karin	504	12.6	30.24	88.2	151.2	239.4
Total	10126	253.15	607.56	1772.06	3037.8	4809.86



Fig. 1: Traditional Stove for room heating

When asked why they use *Cedrus deodara* for heating rooms and cooking purpose in presence of other firewood species, an old man replied that they like to burn *Cedrus* as it does not produce any sound during combustion. In a similar study

[11], it was recorded that *Acacia modesta*, *Acacia nilotica*, *Buxus papiosa* and *Dodnaea viscosa* are under fuelwood pressure in Margalla Hills National Park, Islamabad.

Firewood collection from the forest is one of the most important causes of deforestation in Utror and Gabral, as the winters are very harsh and long. People need fire for both heating and cooking purpose. The local people being mostly illiterate are unaware about the conservation of valuable indigenous plants of the area. They just took his/her axe, go to the nearest forest and cut trees. Due to this indiscriminate deforestation for fuel purpose, the forest cover is on rapid decline and valuable indigenous plant species are in danger and if this trend continues, these forests will be ultimately wiped out.

In order to save the remaining forests and relieve pressure on firewood species, following recommendations are suggested.

- Natural gas (Sui gas) may be introduced in the area as an alternate fuel source. If construction of gas pipe-line is not feasible for Government, then subsidized LPG cylinders can serve the purpose too.
- Provision of fuel efficient stoves, following the example of Ayubia National Park will also release some

- pressure on forests for firewood requirements.
- The people of the area need to be educated about the importance of these forests, about biodiversity and conservation, and about selection of plants for firewood consumption. Such awareness programs would greatly help in checking the deforestation process.
 - Reforestation projects should be launched on cultivable waste lands. These projects will not only help conserve the local flora but also improve the socio-economic conditions of the area.

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