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Forests and People: A Case Study of Kathua Forest Division, J&K, India

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Abstract: The human economy without plants and animals is quite unthinkable. Forests constitute one of the prized assets of man which not only moderate climate, reduce soil erosion, regulate stream flow but this resource is a backbone of the modern economy too, as it provides every possible kind of material value as fuel, building material, industrial raw materials and many by-products. The socio-economic activities of man are greatly influenced by forest and forest resources. Forestry, particularly wood and fuel, play an important role for the down trodden, tribal people of the third world countries. Man's life in one way or the other depends upon forest. Forests play a very important role in maintaining the ecological balance and provide food, fuel, fodder, fruits and medicine to the human beings. In the present study, an attempt has been made to know the status of forest resource utilization in Kathua Forest division. The whole study is dependent upon the information collected from the primary data obtained through the primary survey of the different parts of the study area by dividing the division into three different zones on the basis of altitude. The simple statistical techniques are used to analyze the data. From the analyses, we find that still a large proportion of population is dependent upon the forests for their daily life.

Keywords: Forest; economy; asset; backbone; ecological; fodder; fuelwood.

1. Introduction

Population of plants and animals occurring together in an area are always characterized by several interactions. Thus, there exists a relationship between individuals of same species, or between the individuals of different species. The interaction which takes place between different organisms (may be plants, animals, or both) occurring together in an area or habitat constitutes the term biotic factor. In other words 'the influence of organisms on other organism' is known as biotic factor. Such interactions are also known as coactions (Tiwari, 2005).

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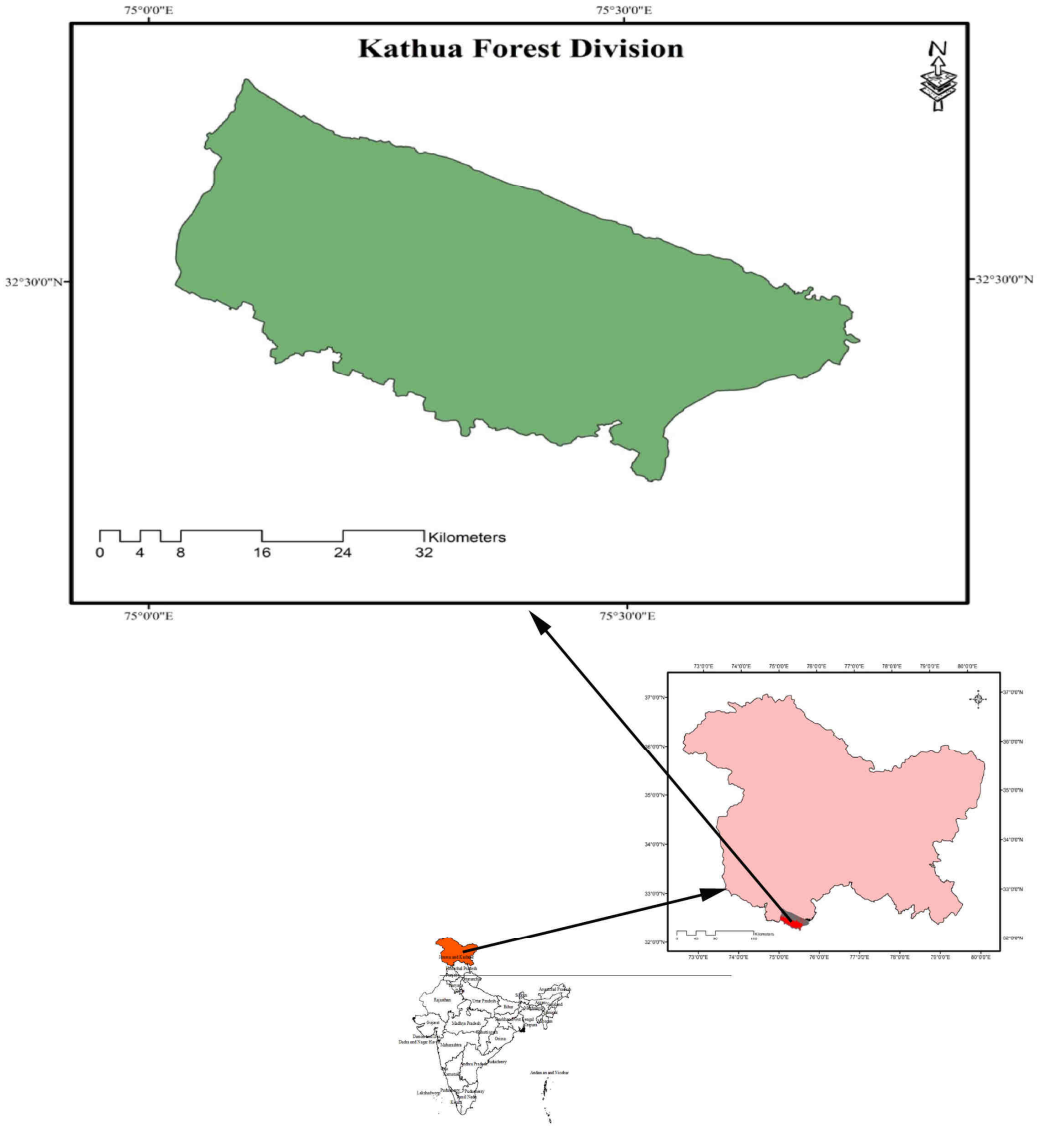
Ethnobotany, an area of human ecology, defines the interface between people and their forests and offers clues needed for rural development based on sustainable yields of forest products (Focho *et al.*, 2009). Human beings and his surrounding natural environment both are interrelated and interdependent. Dependency of man on nature and their adjustment to the environment is as old as human civilization. The households of the study area are dependent on forest for the fulfillment of their various requirements such as fuel, fodder, making agricultural implements, construction of huts and basket making. To fulfill these requirements the people of the study area visits the nearby forest. The present study was conducted to assess the existing biotic interaction in the various altitudinal levels so that the quantification of various biotic interactions available in study area can be done.

2. Material and methods

2.1 Study area

The Kathua forest division is situated between 32° 23' and 32° 44' North latitudes and 75° 02'and 75° 44' East longitudes. The division has boundaries with Jammu forest division in the west, Billawar forest division in north and Pathankot forest division of Punjab in the east.

The NH-44 forms it's boundary in the south. The whole tract lies in the Shiwalik Belt. Major part of the division is called Kandi area and is characertised by rugged, hilly terrain with harsh climate. The elevation of the Forest division varies from 343 m to 1276 m from mean sea level. The divisions starches between river Ravi and river Devak.



Location Map of Study Area

2.2 Methodology

The present study is based on both primary and secondary data. The secondary data has been collected from the published and unpublished records of the various departments like District statistical hand books, the various working plans of the Kathua Forest Division, state forest corporation, range officers progress reports of the various ranges of the Kathua Forest Division, Forest statistical hand book of different years, wildlife department Of Kathua Forest Division, census of India 2001 and 2011.

For the collection of primary data the study area was divided into three zones on the basis of altitude i.e., zone I, lying between 300mts to 600mts, zone II lies between 600mts to 900mts and zone III lies 900mts and above. In each altitudinal zone 100 respondents were interviewed in order to assess the variation in the forest resource utilization owing to climatic variation. In total 300 well structured questionnaires were filled. And simple statistical techniques are used to analyze the data.

3. Results and Discussions

Time and season for forest visit

Most of the people living in and around forests are usually visit the forest for different purposes. It depends upon the requirements of the households. People gather fuelwood, fodder material, wood for construction of huts, agricultural implements etc. from the forests.

The preference of the people to visit forest also depend upon the nearness of the forest i.e. people living close to the forest visit regularly than those living away from the forest. The increase in altitude from the mean sea level also affects the visit. Some people visit the forest for the whole year but some visit season by season intervals.

Table 1 shows the percentage of households visiting forest in the study area. It clearly indicates that the percentage of households visiting forest varies from zone I to zone III. In zone I, people prefer morning time to make their visit to the forest but the season of their preference is different, as 40% households visit forest during winters, 45% households in summer and remaining 15% of households made their visit for the whole year. In case of zone II, 25% households made their visit in the morning, 25% in evening and remaining 50% have no specific time. As far as season of preference is concerned 30% households in winters, 20% households in summer and 50% households made their visit during the whole year. The scenario is different in zone III that 80% households residing within the vicinity of forests make their visit at any time and for the whole year. Only 10% of the households made their visit in evening and 10% in the morning during summer and winter season, respectively.

Table 1. Zone-wise percentage of households visiting forest (timing and season of forest visit)

Zone	Percentage	Timing		Season	
I	50	Morning	100%	Winters	40%
		Evening	Nil	Summer	45%
		Any time	Nil	Whole Year	15%
II	67	Morning	25%	Winters	30%
		Evening	25%	Summer	20%
		Any time	50%	Whole Year	50%
III	84	Morning	10%	Winters	10%
		Evening	10%	Summer	10%
		Any time	80%	Whole Year	80%

Source: *Based on Field Survey*

Fuelwood

Fuelwood is any wooden material that is gathered and used for fuel. Generally, fuelwood is not highly processed and is in some sort of recognizable log or branch form, compared to other forms of wood fuel like pellets or chips. Fuelwood is renewable resource. The fuelwood is used extensively throughout the study area but their percentage of usage varies as we move upward to the higher elevation. Out of 90 tree species (Annexure I) and 51 species of shrubs and herbs (Annexure II), found in Kathua forest division, 23 of them are used for fuelwood purposes. The important species used as fuel in study area are as given in Table 2.

The households in zone III use maximum amount of fuelwood as compared to zone II and zone I (Fig., 1). In zone I, 95% of the total households use fuelwood at an average rate of 6.95kg/day. In zone II, the percentage of households using fuelwood increased to 96% with an average of 10.55 kg/day. In zone III, the percentage of households and average rate of quantity used per day increases to 99% and 13.19 kg/day, respectively. In all the three zones of the division the percentage of households using Fuelwood remains above 95% but the average quantity used per day increases from zone I to III. In zone I the connectivity with the town provides easy availability of modern sources like LPG, Kerosene oil etc., on the other hand, the households of zone II and III do not

enjoy this facility, hence are dependent on fuelwood only and more quantity usage of fuelwood has been noticed besides economic backwardness, dependency on agriculture and lack of means of transport. The migration of educated people to cities has also been noted.

Table 2. Trees and shrubs used for fuelwood in Kathua Forest Division

Botanical name	Common Name	Family
Acacia nilotica	*Kikar*	Mimosacae
Acacia catechu	*Khair*	-do-
Acacia modesta	*Phulai*	-do-
Acacia farnesiana	*Exotic Acacia*	-do-
Aegle marmelos	*Bel*	Rutaceae
Lannea grandis	*Kamel*	Anacardiaceae
Broussonetia papyrifera (introduced)	*Paper Mulberry*	Urticaceae
Cassia fistula	*Amaltas/Karangal*	Caesalpinieae
Dalbergia sissoo	*Shisham*	Papilionaceae
Eucalyptus terecticornis (introduced)	*Hybrid Safeda*	Myrtaceae
Eucalyptus citriodora (introduced)	*Safeda*	-do-
Eucalyptus camaldulensis	*Safeda*	-do-
Syzygium cumini	*Jamun*	-do-
Ficus glomerata	*Rumbal*	Urticaceae
Grewia disperma	*Dhaman*	Tiliaceae
Melia azedarach	*Drek*	Meliaceae
Pinus roxburghii	*Chir Pine*	Pinaceae
Wendlandia exerta	*Pansar*	Rubiaceae
Ziziphus jujuba	*Ber*	Rhamnaceae
Adhatoda vasica	*Brainkar*	Acanthaceae
Carrisia spinarum	*Garna*	Apocynaceae
Dodonaea viscosa	*Santha*	Sapindaceae
Calotropis gigantia	*Aak*	Solanaceae

Source: *Based on Field Survey*

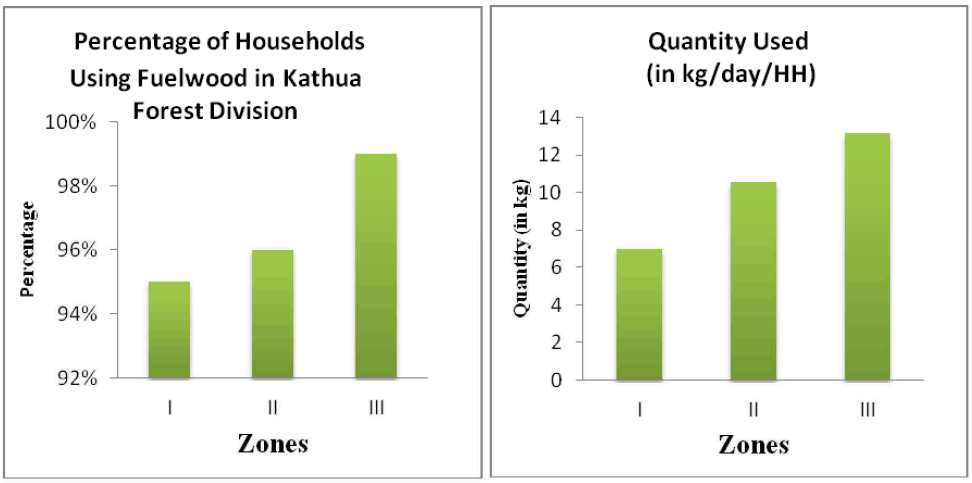


Figure 1. Zone-wise percentage of households using fuelwood and quantity of Fuelwood used per day in Kathua Forest Division

Fodder

Fodder refers to food given to the animals including plants carried to them, rather than that which they forage for themselves. Tree leaves, being a natural part of the diet of ruminant; have been use conventionally as sources of fodder. Tree fodders are important source of nutrients for small ruminants. Tree fodders are rich protein and mineral contents as compared to grasses and thus can be supplemented to low quality grasses (Aganga and Tshwenyane, 2003). Fodder trees currently provide concentrates to the livestock population of both the sedentary, marginal and the nomadic farmers. The landless population who own small herds of sheep and goats depend on shrubs and tree feed resources growing near the village, roadsides, and on community lands. The trees provide valuable feeds at low cost and are easily accessible. When the sources in the vicinity of the villages are depleted, the rural women frequent reserve forest areas, sometimes walking 10-15 km in the hills to meet the daily requirements of ruminants (Raghavan, 1989).

Different types of tree and shrubs are available in the study area for different type of animals. Out of 90 tree species (Annexure I) and 51 species of shrubs and herbs (Annexure II), in the study area, 12 of them are highly used as fodder for livestock. Most of the households without agricultural and barren land are totally dependent on forests for fodder for their livestock. The main trees and shrubs use as fodder are *Dhaman*, *Lasini*, *Bahera*, Bamboo, *Pipal*, *Karangal*, *Garna*, *Drek*, *Ber*, *Santha* etc. (Table 3).

Table 3. Trees and shrubs used for obtaining fodder in Kathua Forest Division

Botanical name	Common Name	Family
Grewia disperma	*Dhaman*	Tiliaceae
Ficus benghalensis	*Ber*	Urticaceae
Terminalia bellercia	*Bahera*	Combretaceae
Melia azedarach	*Drek*	Meliaceae
Ficus religiosa	*Pipal*	-do-
Dalbergia sissoo	*Shisham*	Papilionaceae
Dendrocalamus strictus	*Bamboo*	Graminae
Acacia modesta	*Phulai*	Mimoseae
Albizzia lebbeck	*Kala Siris*	Mimoseae
Albizzia procera	*Safed Siris*	-do-
Carrisia spinarum	*Garna*	Apocynaceae
Dodonaea viscosa	*Santha*	Sapindaceae

Source: *Based on Field Survey*

Figure 2, shows that at an average 81.33% of the households of the study area obtain fodder for their livestock at the rate of 43.75 kg/day/HH. Regarding the zone wise usage of the fodder, zone III has the maximum usage of fodder as 90% of the households obtain fodder at an average rate of 48kg/day/HH. Interestingly 10% of the population in Zone III does not obtain fodder as they are engaged in tertiary activities and as reflected in above table they do not keep cattle population. In zone II, 80% of the households obtain fodder at an average of 42.25 kg/day/HH., and in zone I, 74% of the household obtain fodder with an average of 41.01 kg/day/HH. Such an irregularity in the percentage of household obtaining fodder from zone I to zone III is because of the reason that most of the households in zone I do not rare animals since they are engaged in secondary or tertiary activities. In zone II and III, with the increase in altitude the households are dependent on animals for ploughing their fields due to undulating topography as well as for the milk production.

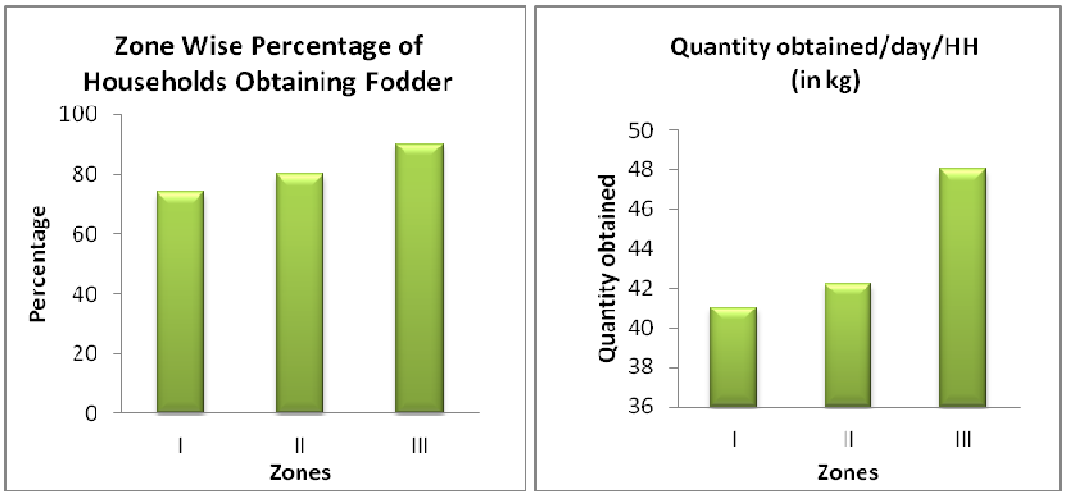


Figure 2. Zone Wise Percentage of Households Obtaining Fodder and Quantity Obtained per Day

Medicinal Plants

The term of medicinal plants include a various types of plants used as herbs and some of these plants have a medicinal activities. These medicinal plants consider as a rich resources of ingredients which can be used in drug development and synthesis. Besides that these plants play a critical role in the development of human cultures around the whole world. Moreover, some plants consider as important source of nutrition and as a result of that these plants recommended for their therapeutic values. These plants include ginger, green tea, walnuts and some others plants. Other plants their derivatives consider as important source for active ingredients which are used in aspirin and toothpaste (Rasool, 2012). Total 31 species are available for medicinal purposes (Table 4).

Table 4. Medicinal plants in Kathua Forest Division

Scientific Name	Local Name	Parts Used and Uses
Acacia catechu	*Khair*	Bark paste used in conjunctivitis and haemoptysis. Flowers top with Cumic, milk, and sugar used in Gonorrhoea. Kathua used in treatment of dysentery, piles uterine haemorrhages, leucorrhoea gleets, atonic dyspepsia, Bronchitis etc.
Abelmoschus moschatus	*Kasturi Dana*	Seeds used as stimulant, tonic and aphrodisiac.
Acacia modesta	*Phulai*	Twigs used as tooth brush
Achyranthes aspera	*Put kanda*	Flowers used in renal dropsy and Bronchial disorders.
Adiantum capillusuveneris	*Hans Raj*	Leaves used as diuretic and febrifuge.
Aegle marmelos	*Billan*	Fruits used in chronic diarrhoea and dysentery.
Aloe barbadensis	*Kuwad kandal*	Leaves used in treatment of fever, liver and spleen ailments, skin diseases, Gonorrhoea, constipation, piles and jaundice.
Azadirachta	*Neem*	Green twigs used as tooth brush. Leaves and fruits are biopesticides. Used in nervous problems, skin disorders and as an antiseptic.
Alistonia scholaris	-	Bark used as a remedy for chronic diarrhoea and dysentery.
Adhatoda vasica	*Bhainkar*	Flowers, leaves and roots are considered antispasmodic and are used in case of Asthama, cough and fever.

Butea monosperma	*Plah*	Astringent gum obtained from the tree is used in medicine.
Calotropis procera	*Madar*	Flowers used in treatment of cold, cough and asthma.
Cannabis sativa	*Bhang*	Leaves and flowers used as sedatives and aphrodisiac.
Cyperus rotundus	*Deela*	Trichip oil is prepared which is used for treatment of Alopecia, Dandruff and to prevent hairfall.
Cassia fistula	*Amaltash*	The pulp of pods is used as purgative especially for children.
Cassia tora	*Elma*	Cold and cough.
Dioscorea deltoidea	*Kins*	The steroid hormone obtained from tubers is used in treatment of Rheumatism, ophthalmic ailments and in preparation of contraceptive pills.
Cinnamomum camphora	*Capoor,* camphor	Camphor is used for treatment of burns, as an sedative and as an analeptic stimulant.
Emblica officinalis	*Amla*	Fruits are rich source of vitamin C. Used as laxative and in the treatment of piles, liver and stomach complaints.
Holarrhaena antidysentrica	*Ivory tree*	Bark is used for treatment of dysentry, piles, diarrhoea and leprosy.
Jatropha curcas	*Physic nut*	Seeds are purgative. Oil from seeds is a strong purgative.
Mallotus philippensis	*Kamla*	Fruits used in treatment of tapeworms and skin ailments. *Kamla* oil is used in hair fixers and ointments.
Moringa oleifera	*Drumstick*	Leaves have Ephedrine which is used for trearment of asthma and hay fever.
Murraya koenigili	*Curry leaf*	Leaves used in case of dysentery and nausea.
Pueraria tuberosa	*Badad*	Tubers used in medicinal preparations.
Pinus roxburghii	*Chirpine*	Vegetable turpentine is obtained. Resin has many pharmaceutical uses.
Ricinus communis	*Castor*	Oil from seeds used as a purgative.
Solanum nigrum	*Black night shade*	Used in treatment of liver cirrhosis.
Syzygium cumini	*Jamun*	Fruits are antidiabetic and syrup used in treatment kidney stones.
Terminalia bellerica	*Bahera*	Fruits are used treat dropsy, piles, Diarrhoea, leprosy and cough.
Vitex negundo	*Chinese taste tree*	Used in preparation of antirheumatic and anti-arthritic dazzle capsules along with Boswellia and Withania.

Source: *Working Plan, Kathua Forest Division.2001*

The vegetation found in Kathua forest division is broad leaved mix deciduous. The study area has variety of different medicinal plants. The above table shows the number of medicinal plants, their botanical names and their parts which are used for medicinal purposes. But from the primary survey it is noticed that the people living in the study area do not take benefits of this resource because most of the people do not know about their medicinal importance. There are some medicinal plants which are grown by people in their households such as Tulsi, Neem, Amla and used them frequently. Tulsi is mainly use for making 'aark' for curing cold, cough and stomach problems. Neem is mainly used for skin diseases, stomach problems, purifying blood and its twigs are used as tooth brush. Amla has great medicinal value as it contain vitamin 'C'. People of the study usually use it for preparing pickles, candies, jams etc.

Agricultural Implements

More than 12 thousand years ago, human beings particularly in tropics started using tools of white granite stones in hunting animals as well as in dressing them. The pointed stone tools were fixed to the ends of spear and arrow.

Gradually they turned from hunting to fishing and then to cultivation. When stone tools were used to manually open up land to sow seeds, remove weeds and cut ripe crops. Metals were discovered first as soft metals like copper, lead, tin and gold followed by alloy like brass and bronze and then hand metal like iron craftsmanship and artisanship grew stronger and stronger as professions resulting in development of crafts and skills so much so that agriculture was blessed with the present day trowel and sickle (Das and Nag, 2006). Total 12 species were used for making agricultural implements like the plough, plank and grips of the trowel, sickle, etc. which are used for cultivation (Table 5).

Table 5. Trees and shrubs used for making agricultural implements in Kathua Forest Division

Botanical name	**Common Name**	**Family**
Wendlandia exerta	*Pansar*	Rubiaceae
Ziziphus jujuba	*Ber*	Rhamnaceae
Pinus roxburghii	*Chir Pine*	Pinaceae
Melia azedarach	*Drek*	Meliaceae
Lannea grandis	*Kamel*	Anacardiaceae
Eucalyptus citriodora	*Safeda*	Myrtaceae
Dalbergia sissoo	*Shisham*	Papilionaceae
Bambusa arundinacea	*Bamboo*	Poaceae
Bambusa natans (cultivated)	*Bamboo*	Poaceae
Cassia fistula	*Amaltas/Karangal*	Leg- caesalpinieae
Acacia nilotica	*Kikar*	Mimoseae
Acacia catechu	*Khair*	-do-

Table 6 shows that 43.6% of the total household of the division used wood for agricultural implements at an average of 27.81kg per 2 years. It is 21% in zone I at the rate of 27.38kg per 2 years. In zone II, it is increased to 40% households at the rate of 27.50kg per 2 years and nearly 70% household of the in zone III used agricultural implements at the rate of 28.57kg per 2 years. The percentage of wood used for agricultural implements has been increased from zone I to zone III. Most of the agricultural land in zone I is plain and most of the people used tractors for ploughing the fields and only 21% of the household used wood for agricultural implements, most of them are small farmers. The percentage of household was increased in zone II because in this zone some farmers have their fields which are inaccessible for tractors. Almost every household having agricultural land in zone III used agricultural implements because in this zone the fields are in terraces.

Table 6. Zone-wise percentage of household using wood for Agricultural Implements

Zone	**Percentage**	**Quantity Used/ 2 Years/HH** (in kg)
I	21.0%	27.4
II	40.0%	27.5
III	70.0%	28.6
Average	43.6%	27.8

Construction of Huts

Throughout history, the unique characteristics and abundance of wood have made it a natural material for homes and other structures, furniture, tools, vehicles, and decorative objects. Today, for the same reasons, wood is prized for a multitude of uses. All wood is composed of cellulose, lignin, hemicelluloses, and minor amounts (usually less than 10%) of extraneous materials contained in a cellular structure. Variations in the characteristics and proportions of these components and differences in cellular structure make woods heavy or light, stiff or flexible, and hard or soft. The properties of a single species are relatively constant within

limits; therefore, selection of wood by species alone may sometimes be adequate. However, to use wood to its best advantage and most effectively in engineering applications, specific characteristics or physical properties must be considered (Wiemann, Michae). Huts made up of wood are considered to be the primary source of shelter for human beings. The species found in Kathua forest division are best suited for this purpose. With the passage of time the construction of huts for human shelter is also decreased. Today only those populaces who are very poor or living below poverty line construct huts for their survival. Generally, huts are constructed by the peoples for their livestock shelters (Table 7).

Table 7. Trees and shrubs used for construction of huts in Kathua Forest Division

Botanical name	Common Name	Family
Bambusa arundinacea	Bamboo	Bambuseae
Bambusa natans (cultivated)	Bamboo	-do-
Acacia nilotica	*Kikar*	Mimoseae
Acacia catechu	*Khair*	-do-
Bombax ceiba	*Simbal*	Malvaceae
Cassia fistula	*Amaltas/Karangal*	Caesalpinieae
Toona ciliata	*Tun*	Meliaceae
Dalbergia sissoo	*Shisham*	Papilionaceae
Ficus benghalensis	*Ber*	Moraceae
Ficus glomerata	*Rumbal*	Moraceae
Eucalyptus citriodora	*Safeda*	Myrtaceae
Melia azedarach	*Drek*	Meliaceae
Pinus roxburghii	*Chir Pine*	Pinaceae
Wendlandia exerta	*Pansar*	Rubiaceae

Table 8 shows the percentage of households using wood for the construction of huts in the study area. It reveals that 69% households in the study area use wood for the construction of huts with an average of 3.93 quintals/4 years. In zone I, 42% households use wood for this purpose with an average quantity of 3.90 quintals/4 years. In zone II, the percentage of households using wood for the construction of huts increased to 75% with an average of 3.86 quintals/4 years.

Table 8. Zone Wise Percentage of Households Using Wood for Construction of Huts

Zone	Percentage	Quantity Used/ 4 Year/HH) (in Quintals)
I	42	3.90
II	75	3.86
III	90	4.04
Total	69	3.93

In zone III, 90% households use wood for construction of huts with an average of 4.04 quintals/4 years. It also indicates that the percentage of households using wood for the construction of huts increase as we move from zone I to zone III. The reason behind this is the economic backwardness of the households' increases from zone I to zone III, easy availability of the raw material in the upper parts of the division and replacing of huts with cemented sheds in zone I of the study area.

Basket Making

Basket making is the process of weaving pliable materials into a basket or other similar form. It is also known as basket weaving or basketry. People and artists who weave baskets are called basket makers or basket weavers. Basket is made up of variety of fibrous or pliable materials i.e. any material that will bend and form a shape such as pine straw, stems, animal hair, hide, grasses, thread, bamboo sticks and fine wooden splints. Indigenous peoples are particularly renowned for their basket making techniques. These baskets are traded for goods and also be used for religious ceremonies. Basket weaving is one of the widest spread

crafts in the history of human civilization. In the study area, the baskets are mainly made from the wood obtained from bamboo. Usually low caste people are indulged in basket making and earn their livelihood. The reason for this is due to lack of agricultural land and they have to depend upon these types of activities. They used to buy the bamboos from landlords but mostly they have to depend upon forests.

Conclusion

The socio-economic activities of man are greatly influenced by forest and forest resources. Man's life in one way or the other depends upon forest. The present study shows that the people of the study area use forest for various purposes in one way or the other in the lives of the rural community. The households of the study area make use of the forests for different requirements i.e. fuel, fodder, making agricultural implements, constructing huts and basket making.

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Annexure I

Botanical name	Common Name	Family
Acacia nilotica	*Kikar*	Mimosaceae
Acacia catechu	*Khair*	-do-
Acacia modesta	*Phulai*	-do-
Acacia farnesiana	Exotic Acacia	-do-
Aegle marmelos	*Bel*	Rutaceae
Albizzia lebbeck	*Kala Siris*	Mimosaceae
Albizzia procera	*Safed Siris*	-do-
Albizzia odoratissima	*Kramblu*	-do-
Artocarpus heterophyllus	*Katahal*	Moraceae
Azadirachta indica	*Neem*	Meliaceae
Bambusa arundinacea	Bamboo	Bambusaceae
Bambusa natans (cultivated)	Bamboo	-do-
Bauhinia variegata	*Kachnar*	Cesalpinaceae
Bauhinia purpurea	*Kachnar*	-do-
Bombax ceiba	*Simbal*	Malvaceae
Broussonetia papyrifera (introduced)	Paper Mulberry	Urticaceae
Butea monosperma	*Dhak/Plash*	Papilionaceae
Cassia fistula	*Amaltas/Karangal*	Cesalpinaceae
Casearia tomentosa	*Chilla*	Flacourtiaceae
Cassia glauca (introduced)	Cassia	-do-
Cassia siamea (introduced)	Cassia	-do-
Toona ciliata	*Tun*	Meliaceae
Celtis australis	*Kharik*	Urticaceae
Chenopodium murale	*Karun*	Chenopodiaceae
Cinnamomum comphora	*Capoor*	Lauraceae
Crataeca religiosa	*Barna*	Bixaceae
Dalbergia sissoo	*Shisham*	Papilionaceae
Dendrocalamus strictus	Bamboo	Poaceae
Diospyros coranona	-	Ebenaceae
Ehretia laevis	*Chamror*	Boraginaceae
Ehretia acuminata	*Chamror*	Boraginaceae
Emblica officinalis	*Amla*	Euphorbieceae
Erythrina suberosa	-	Papilionaceae
Eucalyptus terecticornis (introduced)	*Hybrid Safeda*	Myrtaceae
Eucalyptus citriodora (introduced)	*Safeda*	Myrtaceae
Eucalyptus camaldulensis	*Safeda*	Myrtaceae
Syzygium cumini	*Jamun*	Myrtaceae
Euphorbia royleana	*Thor*	Euphorbiaceae
Ficus benghalensis	*Ber*	Moraceae
Ficus religiosa	*Pipal*	Moraceae
Ficus palmata	*Fagora*	Moraceae
Ficus glomerata	*Rumbal*	Moraceae
Ficus hererophylla	-	Moraceae
Ficus hispida	-	Moraceae
Ficus cunea	-	Moraceae

Ficus infectoria	-	Moraceae
Ficus roxburghii	*Trimal*	Moraceae
Ficus rumphii	-	Moraceae
Ficus auriculate	*Trimal*	Moraceae
Flacourtia ramontchi	*Kakoa*	Flacourtiaceae
Flacourtia cataphracta	*Kakoa*	Flacourtiaceae
Flueggea virosa	*Rathin*	Haemodoraceae
Gmlelina arborea	*Gumari*	Verbinaceae
Grewia disperma	*Dhaman*	Tiliaceae
Grewia oppositifolia	*Dhaman*	Tiliaceae
Grewia hirsuta	*Dhaman*	Tiliaceae
Holarrhaena antidysentrica	*Kogar*	Apocyanaceae
Jacaranda mimosifolia	*Jacaranda*	Leguminosae
Kigelia pinnata (Exotic)	-	-do-
Lagerstroemia indica (cultivated)	*Panjtara*	Lythraceae
Lannea grandis	*Kamel*	Anacardiaceae
Litsea chinensis	-	Lauraceae
Madhuca indica	*Mahua*	Sapotaceae
Mallotus philippinesis	*Kamila*	Euphorbiaceae
Mangifera indica	-	Anacardiaceae
Melia azedarach	*Drek*	Meliaceae
Mitragyna parvifolia	*Pholdu/Kaam*	Rubiaceae
Moringa pterygosperma	*Swanjna*	Moringaceae
Morus alba	*Mulberry*	Urticaceae
Nyctanthles arbortristis	*Harsinghar*	Oleaceae
Ougeinia oojenensis	*Sandan*	Papilionaceae
Oroxylum indicum	*Tetar*	Bignoniaceae
Phoenix humilis	*Khajoor*	Palmae
Pinus roxburghii	*Chir Pine*	Pinaceae
Populous spp	*Poplar*	Salicaceae
Rhus spp.	-	Anacardiaceae
Salix tetrasperma	*Bed*	Salicaceae
Salix spp.	*Bed*	Salicaceae
Sapium insigne	*Khindra*	Euphorbiaceae
Sapindus mukorossi	*Reetha*	Sapindaceae
Tamarindus indica	*Imli*	Caesalpiniaceae
Tectona grandis	*Teak*	Verbinaceae
Terminalia bellercia	*Bahera*	Combretaceae
Terminalia chebula	*Harar*	Combretaceae
Terminalia arjuna (cultivated)	*Arjan*	Combretaceae
Trema orientalis	*The Charcoal Tree*	Urticaceae
Trema politoria	-	-do-
Wendlandia exerta	*Pansar*	Rubiaceae
Wrightia tomentosa	*Dudhi*	Apocyanaceae
Ziziphus jujuba	*Ber*	Rhamnaceae

Annexure II

Botanical Name	**Common Name**	**Family**
Achyranthes aspera	*Parkanda*	Amaranthaceae
Adhatoda vasica	*Brainkar*	Acanthaceae
Aloe barbadensis	*Kuad gandal*	Liliaceae
Aloe vera	-	-do-
Arrua scandens	-	Amaranthaceae
Callicarpa macrophylla	-	Verbinaceae
Calotropis procera	-	Asclepiadaceae
Cannabis sativa	*Bhang*	Urticaceae
Capparis spinarum	-	Capparidaceae
Carrisia spinarum	*Garna*	Apocynaceae
Cassia tora	-	Caesalpiniaceae
Cassia occidentalis	-	-do-
Centella asiatica	*Brahmi bhuti*	Umbelliferae
Cirsium arvense	*Bhus*	Asteraceae
Colebrookia oppositifolia	-	Lamiaceae
Cynoglossum lanceolatum	*Shudri*	Borainaceae
Cyperus compactus	*Deela*	Cyperaceae
Datura fastuosa	*Dhatura*	Solanaceae
Dialiptera bupleuroides	*Kalu grass*	Acanthaceae
Dodonaea viscosa	*Santha*	Sapindaceae
Duranta plumeris	*Duranta*	Verbinaceae
Fleminigia chapper	-	Papilionaceae
Gomphrena celosioides	*Dattani*	Asteraceae
Ipomoea carnea	*Ah*	Convolvuliceae
Jatropha curcas (introduced)	-	Euphorbiaceae
Lantana camara	*Panj phuli*	Varbinaceae
Lathyrus aspera	*Mithu grass*	leguminaceae
Loranthus spp.	-	Loranthaceae
Malvastrum coromandelium	*Baryar*	Malvaceae
Murraya koenighii	*Drankli*	Rutaceae
Nerium odoratum	*Gandila*	Apocynaceae
Opuntia spp.	*Chhiter thor*	Cactaceae
Parthenium hysterophorus	*Congress grass*	Asteraceae
Phoenix acaulis	-	Palmae
Pupalia lappacea	*Jajra*	Amaranthaceae
Punica granatum	*Anar*	Lythraceae
Randia dometorum	-	Rubiaceae
Reinwardtia indica	*Basant panchami*	Linaceae
Ricinus communis	*Arnid*	Euphorbiaceae
Sida cordifolia	-	Malvaceae
Solanum nigrum	*Kayan kothi*	Solanaceae
Solanum erianthum	*Ban tabacoo*	Solanaceae
Tribulus terrestris	*Pakhra*	Zygophyllaceae
Tulipa stillata	*Kayalu*	Liliaceae
Taraxacum officinale	*Phul dudli*	Asteraceae
Urena lobata	-	Malvaceae
Vitex negundo	*Bana*	Verbinaceae
Woodfordia fruticosa	-	Lythraceae
Woodfordia floribunda	*Dhain*	Lythraceae
Xanthium strumarium	*Jojra*	Asteraceae
Ziziphus nummularia	*Malah*	Rhamnaceae