



Full Length Research Paper

Fodder and Fuel Utilization Trends in Village Khatruee (Tarrah), District Jammu (Jammu & Kashmir), India

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Abstract

The present study was conducted in village Khatruee (Tarrah), Jammu, J&K to understand resource utilization pattern with special reference to fodder and fuel. The common fodder types used were green fodder, top feeds, crop residues and tree leaves. The crop residue consumption was found to be highest (15.83 kg/day/family) while top feed was least consumed (1.33 kg/day/family). The major fuel types fulfilling the energy demands of local people in the study area were wood, kerosene, LPG and electric heaters. Electricity constituted the major share of consumption which was 26.31×10^6 k cal/month while LPG consumption was found least. The total fuel consumption in study area was 43.78×10^6 k cal/month.

Keywords: Fodder, Fuel, Environment, Resource.

Introduction

Sustainable utilization of forest and associated land resources is a complex issue that encompasses societal needs, ethical and cultural values and economic status of communities (Chettri and Sharma, 2009). At present, our resource usage is increasing at an alarming rate which is threatening sustainability and the whole course of sustainable development. It is necessary to provide and ensure adequate availability of energy sources and fodder, especially in rural areas to support the process of rural development as it is a major instrument for improving household living standards, and increasing agricultural and livestock production. Biomass acts as a chief source of energy in the developing countries of the world. Throughout the developing world, biomass energy is the primary source of energy for domestic use (Bhatt and Sachan, 2004). Fuel wood is the most widely used form of biomass. Crop residues and dung cakes are also used in place of fuel wood where there is scarcity of wood (Madubansi and Shackleton, 2006).

Agriculture has very strong linkages with rural energy system in India. It provides energy in the form of non-commercial fuels such as crop residues, animal dung and wood to the households and feed for animal. The use of crop residues varies from region to region and depends on their calorific values, lignin content, density, palatability and nutritive value. Residues of most of the cereals and pulses have fodder value. The dominant use of crop residues in India are as fodder for cattle, fuel for cooking etc. (Ravindranath et al., 2005).

India is predominantly an agricultural country and has the largest livestock population in the world. About 30-50% of total animal feed is derived from forests and grasslands (Bajracharya, 1999). The fodder energy is returned by the livestock in the form of manure, milk and traction power etc. However, this crucial relationship is now facing increasing pressure and threat from different sources (Jodha and Shrestha, 1990). The most serious problem is the unavailability of green forage, particularly in winter, causing deficiency of protein and vitamins, resulting in low milk production, shortened breeding span and decreased working capacity of Bullocks (Palni et al., 1998).

Due to use of huge quantities of fuel and fodder resources, there is a detrimental impact on the forests which results in deforestation, disturbed ecosystems, erratic rainfall, increase in soil erosion, loss of habitat of wild animals and loss of biodiversity. Due to increase in population and changing socio-economic conditions of the people, fuel, fodder, timber and other forest resources are becoming scarce. Keeping in view the above mentioned facts, a detailed study was carried out to study fuel and fodder consumption pattern in village Khatruee of Panchayat Tarrah, District Jammu (India).

Materials and Methods

Village Khatruee of Panchayat Tahra is located in block Dansal of Tehsil and District Jammu. The study area is situated between 32.83° N latitude and 75.01° E longitude within Shivaliks, the foothills of Himalayas about 50 km from state capital city Jammu. The study area is bordered by Jhazzar stream in north and river Tawi in south. The climate of the study area is of sub-tropical type. Major crops e.g., Kharif crop Maize (*Zea mays*) [March to August] and Rabi crop Wheat (*Triticum aestivum*) [October to March] are grown in the study area.

For the collection of data, a detailed questionnaire was prepared involving the various aspects such as demographic status of area, types of occupation, land use pattern, details of bovine population, infrastructural facilities and resource endowments. Sources and

other details of fuel and fodder collection, utilization, quantity and types of fuel consumed along with other miscellaneous information were also collected. The survey was conducted in thirty houses on random basis from centre of the village to the periphery to obtain the real pattern of information. The survey of demographic status of the study area involved the use of adult units i.e., one man =1 adult unit, one woman=0.8 adult unit and one child=0.5 adult unit so as to find out the average size of family (Sharma, 1993). For calculating the landholding, the units used were, one kanal =1/8 Acre, and one hectare=2.471 Acres. All kinds of livestock in the sample household were converted into cow units using equality coefficients i.e., 1 cow unit for one cow, 1.5 cow units for one buffalo, 0.15 cow unit for one goat/sheep and 1.5 cow unit for one bullock (Jackson, 1981). Units used for quantity of animal droppings were 15 kg/day, 10 kg/day and 02 kg/day for bullock, buffalo, he-buffalo, cow and sheep/goat, respectively (Rao, 2000). Energy units used for different fuel types were, one kilogram of firewood=4000 k.cal, one kilogram dung cake=2400 k.cal, one kilogram crop residue=3200 k.cal, one kilogram of LPG=10800 k.cal and one liter kerosene=7900 k.cal (Venna, 1988). Similarly, for collection of the information regarding fuel wood and fodder, the season of the year has also been taken into consideration.

Results and Discussion

A comprehensive study was carried out at household level to find out the annual income, land holding, livestock population, dung production, literacy status, fuel and fodder consumption pattern with its environmental impacts interrelating socio-economic and demographic factors in the study area.

Socio-economic and literacy status

The human population of the study area belonged to both Hindu and Muslim community. Houses were of 'kuchha' as well as 'pacca' type and made up of mud, bricks, stones and wooden sleepers. In case of roofing in *kuccha* houses, it consisted of wooden planks of *Dalbergia sisso*, *Eucalyptus sp.*, *Acacia sp.*, *Toona ciliata*, and *Acacia modesta*. Population of the study area was divided into four classes viz. very low, low, medium and high on the basis of their monthly income (Figure 1). The representation of low income class group was found to be higher (33.33%), followed by medium and high (both 30%). The very low income class was least represented (6.66%). The highest representation of low income class (33.33%) was due to the reason that majority of the population of the study area was without government jobs and entirely dependent on agriculture and other such activities and that too in rain fed non- irrigated area. In a similar type of study, Akhter and Malaviya (2014) in village Chak Chua of district jammu found a high gap between medium income classes and other income classes due to the large land holding of medium class with at least one of the family members was employed. The average annual income was found to be 1,19,920 rupees per family. Literacy status of males and females in the area was 83.5 percent and 72.82 percent, respectively (Figure 2). This is high as compared to the overall literacy status of Jammu and Kashmir which is 78.26 percent for males and 58.01 percent for females. Comparatively low literacy rate among females is probably due to the fact that people are not aware about the importance of women literacy and most of the STs do not even send their female children to school to get primary education. About 23% of households had at least one person employed. Agriculture activities, working as laborers and loading of trucks and tractors with sand and *bajri* (pebbles and gravels) were found to be the employment sources for the inhabitants of the study area.

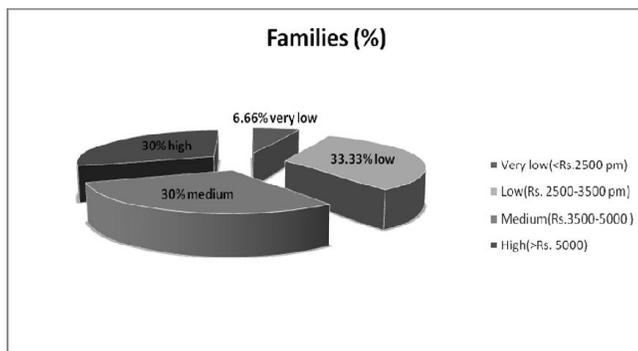


Fig 1: Representation of different income classes (%) in the study area.

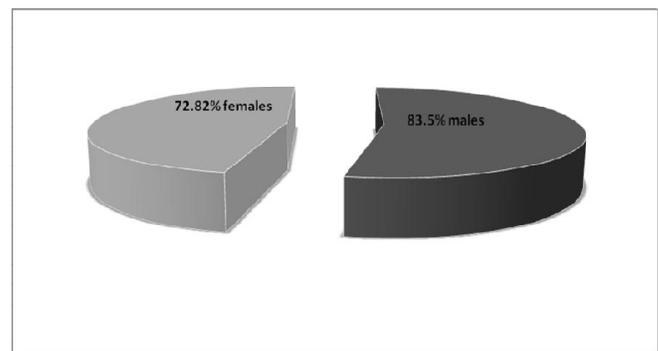


Fig 2: Literacy (%) among male and female population in the study area.

Fodder consumption pattern

The common fodder types used in the study area were green fodder, crop residues, top feeds, and tree leaves (Figure 3). The crop residue consumption was found to be highest (15.83 kg/family/day), followed by green fodder (14.3 kg/family/day), tree leaves (6.16 kg/family/day) and top feeds (1.33 kg/family/day) (Table 1). The highest consumption of crop residue followed by green fodder was also reported by Mathur (2012) in village Mandhera of district Samba (J&K). While studying some environmental issues of Dandesar village of Rajouri district with special reference to resource utilization, Kumar (2002) reported the highest consumption of green fodder, followed by crop residue. Highest consumption of green fodder was also reported by Qureshi et al. (2015). It was estimated that major consumption of crop residue and green fodder varied in different seasons; crop residue dominated during rainy season because of availability of rain water. The total cow units in the study area were found to be 200.55. The average cow units per household were calculated as 6.68 cow units with total fodder requirements found to be 37.32 kg/day/household. Thus, fodder requirement per cow unit per day was calculated as 5.58 kg/day (i.e. one cow unit requires 5.58 kg of fodder per day). This indicates

that cattle were more dependent on grazing rather than stall feeding. Our studies were found to be inconsistent with the studies conducted by Sharma (2013), who estimated the fodder requirements per cow unit per household to be 10.90 kg. In general, easy availability and less distance to be covered for collection were the main reasons for the higher consumption of crop residue and green fodder in the study area. The minimal consumption of top feeds was due to the fact that it had to be purchased from the market which was far away from the study area with no transportation facility. The consumption of tree leaves was season dependent as they were frequently consumed during summer and rainy seasons when they were available in plenty.

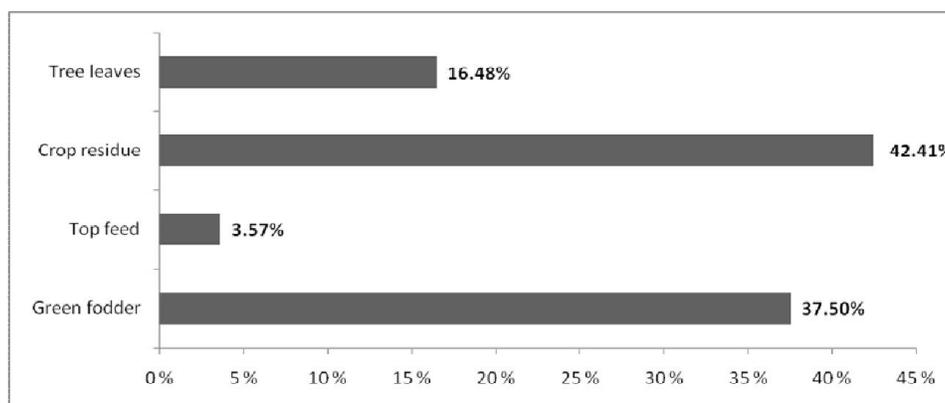


Fig 3: Total requirement (%) of different fodder types in the study area.

Table 1: Fodder consumption pattern in the study area.

S. No.	Fodder type	Quantity required (kg/day/family)	Source of Collection	Average distance covered for collection (km)
1.	Green fodder	14.3	Agricultural fields Markets	0.5
2.	Top feed	1.33	Agricultural fields Forests,	10
3.	Crop residue	15.83	common	0.5
4.	Tree leaves	6.16	Lands and closures	2

Fuel consumption pattern

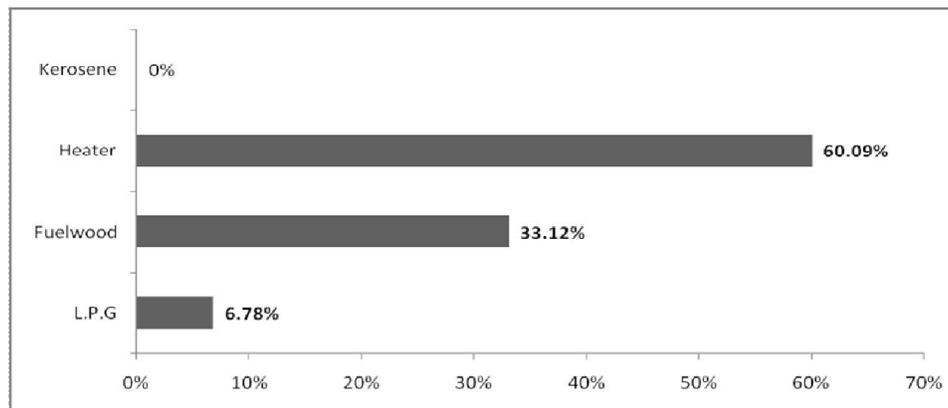
The study of fuel consumption pattern was conducted among different land holding categories (LHCs) of the study area. The major fuel types consumed were wood and liquefied petroleum gas (LPG). Kerosene oil use was not found in practice either due to its non availability or due to reluctance of people concerning its use. However, most of the villagers were found using electric heaters for cooking purpose. The utilization of each fuel type is given in Table 2 and Table 3. Figure 4 shows that the highest percent share among different fuels used was found to be of electric heaters (60.09%), followed by fuelwood (33.12%) and LPG (6.78%). However, Qureshi *et al.* (2015) reported highest share of LPG (62.57%), followed by wood (19.3%) and dung cake (18.13%). Fuel wood utilization accounted for the highest consumption in small LHC (54.48%), followed by medium LHC (45.52%), which may be due to lack of affordability of small LHC for other fuel types. Easy availability of dry wood from nearby hills was also an important factor behind use of fuelwood as major fuel source. The consumption of LPG was highest in medium LHC (54.54%), followed by small LHC (45.46%). High consumption of LPG among medium LHCs was probably due to their good economic condition and their preference for clean and easily utilizable fuel. The lower consumption of LPG among small LHC was due to their low income and easy availability of fuelwood from fields and nearby forests. The use of electric heaters was highest in small LHC (61.76%) and moderate in medium LHC (38.23%). Lack of electricity metering system in the study area was also an important factor behind excessive use of electric heaters for cooking. The use of Dung cake was found to be negligible in the study area.

Table 2: Percentage share of different fuel types in terms of their usage in the study area.

S. No.	Type of Fuel	Total Fuel used Kcal/month	Percentage
1.	LPG	2.97x10 ⁵	6.78%
2.	Fuelwood	14.5x10 ⁵	33.12%
3.	Heater	26.31x10 ⁵	60.09%
4.	Kerosene	-	-

Table 3: Fuel Consumption Pattern in the Study Area.

S. No.	Land Holding category	Fuelwood Kcal/month	LPG Kcal/month	Heater Kcal/month	Dung cake Kcal/month
1.	Marginal	-	-	-	-
2.	Small	7.9x10 ⁵ (54.48%)	1.35x10 ⁵ (45.45%)	6.25x10 ⁵ (61.76%)	-
3.	Medium	6.6x10 ⁵ (45.51%)	1.62x10 ⁵ (54.54%)	10.06x10 ⁵ (38.23%)	-
4.	Large	-	-	-	-

**Fig 4:** Total fuel consumption (%) in the study area.

Conclusion

In the study area, families belonging to large land holding category were the major consumer of all type of energy resources while the least consumption of energy resources was found in case of small land holding class. Electricity, fuel wood, LPG and crop residue constituted the major share of fuel and fodder consumption. Proper education, awareness and better fuel and fodder availability in the study area can lead it towards the path of sustainable development.

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