



## Assessment of Fuel-wood Dependency on Forest in Different Villages of Sirsi Taluk in Uttara Kannada District

\*Pallavi P. Banavasi, \*\*Koppad, A.G.

\* Pallavi P. Banavasi, PG Student, Department of Natural Resource Management, College of Forestry, Sirsi 581 401 University of Agricultural Sciences, Dharwad, Karnataka, INDIA.

\*\* Dr. Arjun G. Koppad, Professor and Head (NRM) and Major advisor Department of Natural Resource Management College of Forestry, Sirsi 581 401 University of Agricultural Sciences, Dharwad, Karnataka, INDIA.

**Abstract :** *The study was conducted in two watersheds (5B1A5 and 4D4F5) of Sirsi taluk, Uttara Kannada district, Karnataka, to assess the fuel-wood dependency on forest in the villages of the watersheds. The data was collected by personnel interview method in an informal atmosphere in the village households. Five villages in each of the watersheds were selected and about 10% of the total households were surveyed in each village having different family sizes i.e. small, medium and large families. The results indicated that the highest percentage of households collecting fuel-wood from forest was found to be in 4D4F5 watershed (77.7%) than in 5B1A5 watershed (67.5%). The second most preferred source was bettaland in 5B1A5 watershed (43.2%) and agriculture land in 4D4F5 watershed (9.94%). The average quantity of fuel-wood collected from forest in the villages of 5B1A5 watershed was 12,380.92 tonnes/year and 805.90 tonnes/year in 4D4F5 watershed. The use of alternate and efficient source of energy can reduce the use of fuel-wood from forest. The other sources like bettaland, agroforestry, agriculture land, etc can be used to access fuel-wood. The use of clean energy like LPG, Solar cookers, etc can also reduce the pressure on forest.*

**Keywords:** Forest, fuel-wood, household, source, watershed.

### 1. Introduction

Forests are important in the livelihoods of local people in most developing countries. Local people depend on forests resources for various products such as fuel wood, construction materials, medicine, and food. Globally, it is estimated that between 1.095 billion and 1.745 billion people depend to varying degrees on forests for their livelihoods and about 200 million

indigenous communities are almost fully dependent on forests (Chao, 2012). Forest is mainly preferred as the source of fuel-wood by the villagers because of the easy and cost free availability of the fuel-wood, inaccessibility to clean energy, poor economic status of the family and lack of education regarding the ill effects of fuel-wood collection. Forest areas contribute some 46% of the total fuel-wood (either purchased or collected). The demand of the villagers near forest areas is generally



satisfied through removal of headloads of fuel from forest, mostly by women and children. Frequency of forest visits varies seasonally & according to farming activity. In rainy days mostly there is no fuel-wood collection. More forest visits in summers, as they need to store fuel-wood for the next season. Wood fuels account between 50-90% of the fuel used. Two billion people cook with firewood or animal dung. In other words, half the meals for Earth's six billion people are cooked with wood fires each day. Therefore, fuel-wood collection is considered as one of the major driver of deforestation. (Vimal, 1989).

In rural communities households rely primarily on traditional fuel sources of fuel-wood and dung because of poor social services, infrastructure, and low quality and limited availability of fuel sources. As fuelwood becomes scarce, households use inconvenient burnable materials including crops residues, further depleting the environment (Masekoameng *et al.*, 2005). The jump between transition and modern fuels is harder due to income, availability, and ease of use (Heltberg, 2003).

The demand for the most important source of traditional energy for domestic use has grown faster than the supply. As one of its dimensions, the natural forests are being consumed at a much faster rate than their regeneration both natural and artificial. It has been estimated that India requires about 274 million m<sup>3</sup> fuel-wood annually. The total forest growing stock of 87.62 million m<sup>3</sup> finds it very difficult to meet the requirement and therefore illicit felling has become a malpractice (Singhal *et al.*, 2003). Poor households showed high dependence on the forest resources

despite most collection/usage being illegal (Langat *et al.*, 2016). Consequently, the biological capital of forests and soils has been reduced considerably. The rapid depletion of forest has led to the serious problems of erosion, floods, siltation and desertification. The heavy exploitation has also effects on the watershed areas. Watershed is the area of land where all the water that is under it or drains off it goes into the same place. In watershed, the species biodiversity will have great impact due to large scale collection of tree species for fuel-wood. Thus the fuel-wood derived from natural and planted forests has become a matter of critical concern in the most of the developing countries (Shanavas *et al.*, 2003).

To reduce pressure on forest resources and increase supply of fuel-wood, the Indian Government has taken several policy measures from time to time. India's NFP (National Forest Policy) of 1952 suggested having at least 33% of the national land area under forest cover; NFP of 1988 reiterated this target. The 10th five year plan of India set a target of having 25% of the country's geographic area under forest and tree cover by 2007 and 33% by 2012. However, even the target for 2007 has not been achieved yet and fuel-wood still remains in short supply.

Sirsi is a hill station and the town is surrounded by lush green forest. The vegetation in the region is mainly moist deciduous and valuable timber is commonly found in the forests of this region. Owing the rich flora and fauna, deforestation and poaching have been the causes of concern in recent year. One of the important causes of deforestation is heavy exploitation of fuel-wood in this region. The estimated annual harvest of fuel-wood here from these species along



with the other species is around 4.2 tonnes per ha which is more than 8 times the level of production (*Shastri et al., 2002*). Thus, there is a need to realize the problem and take steps to conserve forests. Hence, this study was undertaken in Sirsi, Uttar Kannada district, Karnataka with the objective to assess the fuel-wood dependency on forest in the villages of the watersheds.

## 2. Material and methods

The present study was carried out during 2016-2017 in the watershed area of Sirsi taluk, Uttar Kannada District. District lies between 13°55` and 15°31` N latitude and 74°09` and 75°10` E longitude with an altitude about 700 m. The watersheds 5B1A5 and 4D4F5 were

selected for study. The details of the selected study areas are given in table 1.

The questionnaire was prepared keeping in view the objectives of the study. The questionnaire was used for the collection of information from different sized families across the selected villages of the two watershed areas. The data was collected by personnel interview method in an informal atmosphere in their houses. The households of the selected villages were surveyed of about 10% of the total households of the village. The information regarding the source, quantity of fuel-wood collection, was recorded.

**Table 1: Details of the study area selected**

Watershed areas	Villages selected	Population (No.)	Forest area (ha)
Watershed area 1 (5B1A5)	Devnalli	28051.000	600.370
	Jaddigadde	544.000	749.785
	Kadabala	598.000	144.692
	Muregar	183.000	330.396
	Vanalli	474.000	298.889
Watershed area 2 (4D4F5)	Bidralli	314.000	58.119
	Kabbe	532.000	27.072
	Kerekoppa	557.000	69.581
	Sugavi	936.000	436.381
	Narebail	455.000	164.392

## 3. Results and discussion:

From the study, it was found that forest nearby the villages was the main source of fuel-wood in the study area. The highest percentage of

households collecting the fuel-wood from forest was found to be in 4D4F5 watershed (77.7%) than 5B1A5 watershed (67.5%). The second most preferred source was bettaland in 5B1A5 (43.2%) and agriculture land in 4D4F5



(9.94%)(Figure 1). In 5B1A5, households of Jaddigadde village were more dependent on forest for fuel-wood, followed by Vanalli and Devnalli (92.9%, 82.4% and 80%, respectively). In Kadabala and Muregar, dependency was more on bettaland (84.2% and 80%) than forest (42.1% and 40%). Market and plantations were also the source in Vanalli (23.5%) and Jaddigadde (7.1%) respectively. In 4D4F5 watershed, households of Bidralli village were more dependent on forest for fuel-wood, followed by Kabbe and Sugavi (9.25%, 85.6% and 80.2% respectively). Other sources used in Bidralli were bettaland (9%) and agriculture land (5.8%) and it was agriculture land (9%) and plantations (5.4%) in Kabbe village. Bettaland, agriculture land, plantations and markets were the other source of fuel-wood collection in Kerekoppa (9.5%, 29.1%, 3.8% and 2.6%, respectively) and Sugavi (11.7%, 5.8%, 1% and 1.3% respectively) (Table 2).

The average quantity of fuel-wood collected from forest in the villages of watershed 5B1A5 was 12,380.92 tonnes/year and 805.90 tonnes/year in watershed 4D4F5. Within the surveyed villages of the watersheds, Devnalli was found to collect maximum fuel-wood of 13,878.16 tonnes/year only from forest in watershed 5B1A5. In 4D4F5 watershed, Kabbe village was found to collect

maximum fuel-wood of 247.75 tonnes/year from forest (Table 3). The major reasons for preferring the wood as fuel was determined through questionnaire survey. It was found that among the fuel-wood collectors from forest, the main reason for choosing the wood as fuel was its availability in free of cost. The other main reason was the comfort in use of fuel-wood compared to the other fuels (Figure 2 and 3).

The households having large land holding depend mainly on the bettalands. A part of fuel-wood requirement by the village households are met by agriculture land and plantations (if present in village and allowed to collect by the forest department). Household determinants of use of different sources for fuel-wood collection suggest that age, gender and education levels of the household head influence a household's choice of fuel-wood collection sources. Household labor supply in terms of the number of children, and adult male and female members also influence household fuel-wood collection sources (Behera *et al.*, 2015). In Plain region more quantity of dry wood is available due to presence of deciduous forest in plain region and hence the fuel-wood availability is comparatively higher in plain region as compare to evergreen and semi evergreen forests of ghat and coastal region (Beerappa, 2008).



**Table 2: Sources of fuel-wood for households in different villages of the watersheds**

Watershed area	Village	Households using different sources for fuel-wood (%)					
		Forest	Betta land	Agriculture land	Plantation	Market	Others
Watershed area 1 (5B1A5)	Devnalli	80.0	15.0	20.0	0.0	0.0	0.0
	Jaddigadde	92.9	7.1	14.3	7.1	0.0	28.6
	Kadabala	42.1	84.2	10.5	0.0	0.0	5.3
	Muregar	40.0	80.0	110.0	0.0	0.0	0.0
	Vanalli	82.4	29.4	0.0	0.0	23.5	5.9
	<b>Average</b>	<b>67.5</b>	<b>43.2</b>	<b>11.0</b>	<b>1.4</b>	<b>4.7</b>	<b>7.9</b>
Watershed area 2 (4D4F5)	Bidralli	92.5	9.0	5.8	0.0	0.0	0.0
	Kabbe	85.6	0.0	9.0	5.4	0.0	0.0
	Kerekoppa	50.2	9.5	29.1	3.8	2.6	0.0
	Narebail	80.0	0.0	0.0	0.0	0.0	20.0
	Sugavi	80.2	11.7	5.8	1.0	1.3	0.0
	<b>Average</b>	<b>77.7</b>	<b>6.03</b>	<b>9.94</b>	<b>2.06</b>	<b>0.77</b>	<b>4.0</b>

**Table 3: Quantity of fuel-wood procures from forest by the villages per year**

Watershed area	Village	Total demand for fuel-wood in the village	Forest as a source of fuel-wood in the villages	
			%	Quantity in tones/year
Watershed area 1 (5B1A5)	Devnalli	17347.7	80	13878.16
	Jaddigadde	389.43	92.9	361.78
	Kadabala	341.94	42.1	143.96
	Muregar	45.23	40	18.09
	Vanalli	217.87	82.4	179.52
	<b>Total</b>	<b>18342.1</b>	<b>67.5</b>	<b>12380.92</b>
Watershed area 2	Bidralli	160	92.5	148.00
	Kabbe	289.43	85.6	247.75



<b>(4D4F5)</b>	Kerekoppa	213.5	50.2	107.18
	Narebail	81.58	80	65.26
	Sugavi	292.69	80.2	234.74
	<b>Total</b>	<b>1037.2</b>	<b>77.7</b>	<b>805.90</b>

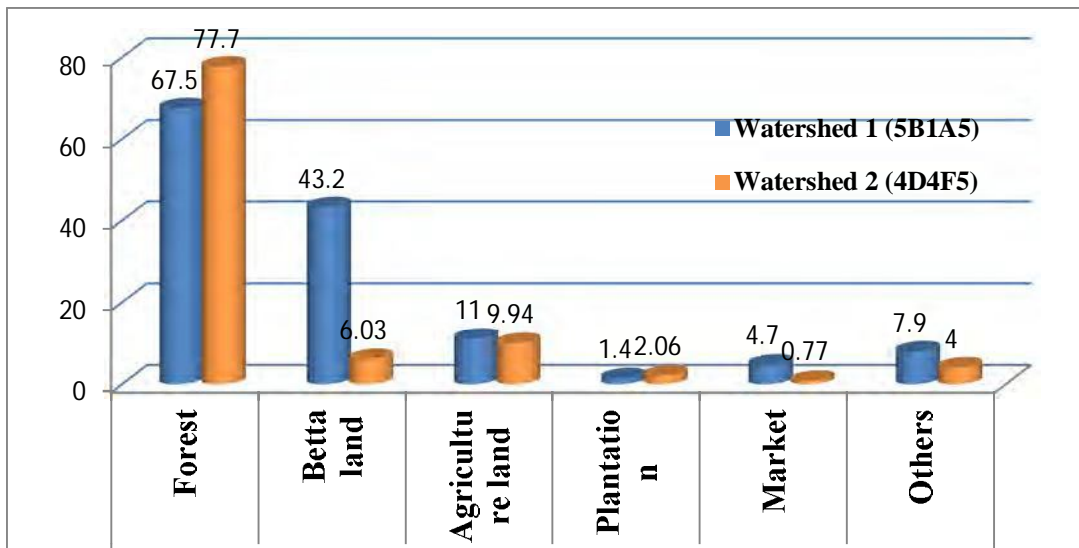


Figure 1. Households using different sources for fuel-wood (%)

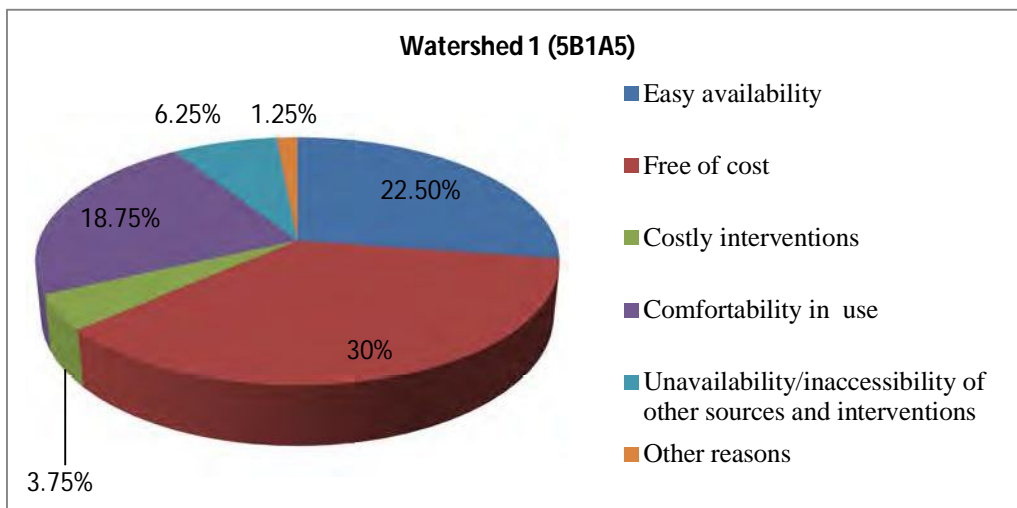
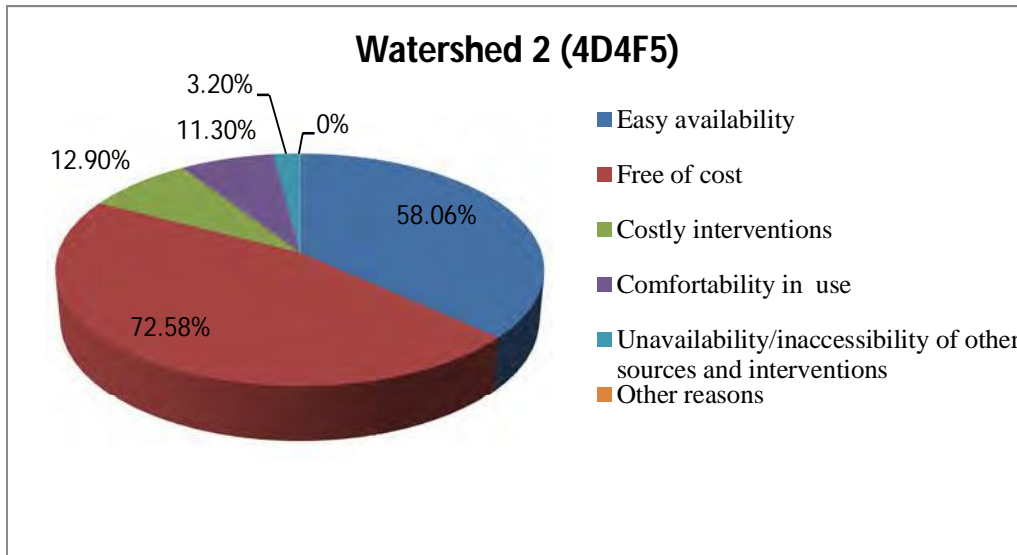


Figure 2. Reasons for preferring wood as fuel in households of 5B1A5 watershed



**Figure 3. Reasons for preferring wood as fuel in households of 4D4F5 watershed**

#### 4. Conclusion

Fuel-wood is the important source of energy in the study area and forest is the most preferred source for the collection of fuel-wood because of easy availability, free of cost, no investment required. But the increased demand and the unsustainable harvesting of the fuel-wood are negatively affecting the forest resources by causing degradation and deforestation. The use of alternate and efficient source of energy can reduce the use of fuel-wood from forest. The other sources of fuel-wood like bettaland, agroforestry, agriculture land, etc can be utilized and clean energy like LPG, Solar cookers, etc can be used to reduce the pressure on forest.

#### Acknowledgement:

I would like to express my gratitude and sincere thanks to **IORA Ecological services, New Delhi** for financial support and encouragement throughout the research work.

#### References

- 1) Beerappa M. (2008): "Characterization of energy utilization pattern in different family sizes in Uttar Kannada district," M. Sc (For) Thesis, University of Agricultural Sciences Dharwad, Karnataka.
- 2) Behera, B., Rahut, D. B., Jeetendra, A. and Ali, A. (2015), "Household collection and use of biomass energy sources in South Asia," Energy, Vol. 85, pp. 468-480.
- 3) Langat, D. K., Maranga, E. K., Aboud, A. A. and Cheboiwo, J. K. (2016), "Role of Forest Resources to Local Livelihoods: The Case of East Mau Forest Ecosystem, Kenya," International Journal of Forestry Research.
- 4) Heltberg, R. (2003), "Household fuel and energy use in developing countries: A multi-country study,"



- World Bank, Oil and Gas Policy Division, 14 May.
- 5) Masekoameng, K. E., Simalenga, T. E. and Saidi, T. (2005), "Household energy needs and utilization patterns in the Giyani rural communities of Limpopo Province, South Africa," *Journal of Energy in Southern Africa*, Vol. 16, No. 23, pp. 22-29.
  - 6) Chao, S., (2012), "Forest People: Numbers across the World," Forest Peoples Program, Moreton-in-Marsh, UK.
  - 7) Shastri, C. M., Bhat, D. M., Nagaraja, B. C., Muruli, K. C. and Ravindranath, N. H. (2002), "Tree species diversity in a village ecosystem in Uttar Kannada district in Western Ghats of Karnataka," *Current Science*, Vol. 82, No. 9, pp. 1080-1082.
  - 8) Vimal O.P. and Bhatt, M. S., (1989), "Wood energy systems." K.L. publications, New Delhi, page. 99.