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RESEARCH ARTICLE

CONSUMPTION TRENDS OF FUEL WOOD AND THEIR IMPACT ON FOREST IN JHANSI DISTRICT, UTTAR PRADESH, INDIA

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ABSTRACT

Biomass has been considered as one of the primeval resources of energy and among the most fovoured matter utilized by mankind since over 5 lac year. Fuel wood is one of the commonly used sources of domestic energy in the rural areas of many developing nation. The primary source of fuel wood is cutting down of dry and diseased tree, collecting fallen wood scraps or by lopping branches. Jhansi district falls under the backward areas of the country in terms of standard of living. According to a survey more than 70% of the rural population is dependent on fuel wood for cooking and other domestic purposes which in turn causes inauspicious impact on our forest resources which is already a limited resource. The extension of demand of fuel wood is seen as one of the reasons for biodiversity degradation and the quality of Mother Nature. The study reveals that felling of tree for fuelwood is far greater than the rate of vegetational growth. Collecting large quantities of dead wood from forests for one's own use is one of another way of degrading forest ecosystem.

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INTRODUCTION

Energy is one of the critical inputs in the economic development of any country as most development activities are associated with a massive requirement of energy. Per capita income is strongly correlation with the per capita consumption of commercial energy in both developing and industrial countries. Non-commercial energy, comprising wood (W), crop residues (C.R.), cow dung cakes (D.C.) and also fossil fuels of low grade coal (PC, 1999). Non –commercial energy is largely consumed in the rural areas, with cooking as its dominant end-use activity. The high cost and non-availability of alternate commercial fuel has led to the continued dependence by rural households on traditional fuels. It is to be noted that about 83% of the population was living in rural India in 1953 but due to growth in urbanization this percentage has gone down to about 72% in 2001. In terms of real numbers, the rural population of India has increased from about 300milion in 1953 to 720 million in 2001 due to population growth, thereby increasing the demand for non-commercial energy. The main source of non-commercial energy in developing countries is biomass. Biomass is commonly available in two forms: charcoal and fuel wood. Charcoal is energy that is made from wood, while fuel wood is collected and used directly from the forest (FAO, 2012). Over-exploitation of fuel wood is responsible for a number of environmental problems such as deforestation, loss of biodiversity, deterioration of watershed functions, release of carbon dioxide into the atmosphere and soil erosion. However in this region of central India, people are mainly dependent on forest for their livelihood due to erratic monsoon and less developed agriculture. As per, Special Project study of Bundelkhand in 2012 reported that the consumption of fuelwood is around 1.22 kg per person/day. The population of Bundelkhand is 82.32 lakh, if the total consumption of fuel wood is extrapolated with total population there is 36.64 lakh MT requirement of fuel wood. This level of fuel wood consumption has resulted in over exploitation of natural resources; consequently, the region is experiencing dearth of fuel wood. The region necessitates the raising of energy plantation in degraded lands and wastelands to narrow the gap of demand and supply. However, there is a conspicuous lack of knowledge with regard to the fuel wood characteristics of tree and shrub species of central India (Chavan et al.2016) Therefore, the present study was undertaken to evaluate consumption trend of fuel wood and their impacts on forest area of Jhansi district.

MATERIALS AND METHODS

Study Area: Jhansi is well known district of Bundelkhand region of Uttar Pradesh in India with a geographical area of 502.75 thousand hectare. The district is situated in the south west corner of the region at 24º11' N - 25º57' N latitudes and 78º10' E- 79º23' E longitudes. Population of Jhansi is near about 4, 79,612. The western area of the district is covered with hillocks. It is located in the plateau of central India dominated by rocky reliefs and different types of minerals underneath the soil. There is no forest-belt in this district. However, small patches of flora could be seen along the rivers Yamuna, Betwa and Pahuj. The total forest area reported in the Distt. Gazetteer (1989) is 26,502 hectares, which presently is in denuded state. The 314 km PWD roadsides are under Forest Deptt.'s management. There are two botanical divisions in the district namely Dry Deciduous Scrub and Ravine Thorn Forest.

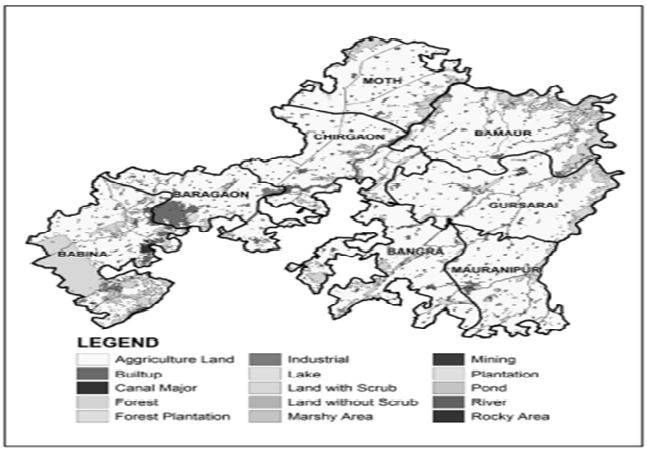

Fig. 1. Map of Study Area

Data Collection: Our study has been conducted, survey based in different area of Jhansi, it cover 10 km of high density of population area.

The information was collected and recorded from Taal or wood seller interview of different areas of Jhansi. The study revealed socio-economic survey, consumption of wood and diversity of plant species used as fuel wood for domestic and commercial uses, calorific value of wood. The total calorific value of a wood is collected from various literatures.

RESULTS AND DISCUSSION

Fuel wood Consumption and Source: The data has been collected from different tall of Jhansi who supply or sell fuel wood. It was totally questionnaire based; the result shown that total amount (3150 kg/day) of fuel wood has been consumption in 10 km of Jhansi (Table-1).

The result also shown that the economic weaker wards are uses maximum fuel wood in different sector i.e. cooking, small tea stall, hotels etc. the survey indicates that all fuel wood dealers are dependent on the local forest area.

Name of Plant Species sell by dealer: During the investigation we find out that 15 species (Mango, Mahuwa, Shishum (Chilam only), Barry, Khowa, Neem, Siris, Chiroal, Babul, Eutiliptus, Chchid, Aamrood, Umar, Pepal, Chola) of plants were sell by dealer in Jhansi. In which maximum selling plant species was Mango, Babul, Neem and Chirol (Table-2).

Socio-economic value of plant species used as fuel wood: In all plant species 10 species ((Mango, Mahuwa, Shishum (Chilam only), Barry, Neem, Siris, , Babul, Eutiliptus, Aamrood, Pepal) shown the socio-economic value in field of Medicine, Fiber, Religious and Ecological Value.

Calorific value of plant species used as fuel wood in Jhansi: Maximum calorific value of fuel wood plant was recorded in Mango-4742 Kcal/kg, Mahwa-8742 Kcal/kg, Sheesham-5,200 Kcal/kg, Ber-4878 Kcal/kg, Neem-4500 Kcal/kg, Babool-4950 Kcal/kg, Amrood-6450 Kcal/kg, Sirsi-4300 Kcal/kg.

Table 1. Consumption of fuel wood in different area Taal in Jhansi

S.No.	Area of data Collection	Number of Tall	100-200 Kg	200-500Kg	500-1000 kg
1	Haiwat Market	2	+	-	-
2	Kasai Mahula Kurash Nagar	3	-	+	-
3	outside Khanderao Gate	4	-	-	+
4	Minurwa	2	-	+	-
5	New Basti	2	+	-	-
6	Govind Churaha	3	-	+	-
7	Chand Gate	2	-	+	-
8	Siprri	4	-	-	+

Table: 2. Name of plant species used as Fuel wood

S.No.	Name of plant wood used as a fuel	Haiwat Market	Kasai Mahula Kurash Nagar	Minurwa	Khanderao Gate	New Basti	Siprri	Govind Curaha	Chand Gate
1.	Mango	+	+	+	+	+	+	+	+
2.	Mahuwa	+	-	-	+	+	+	+	-
3.	Shishum(Chilam only)	-	-	-	-	-	+	-	-
4.	Barry	+	+	-	-	-	-	-	-
5.	Khowa	+	-	-	-	-	-	-	-
6.	Neem	+	+	+	+	+	+	+	+
7.	Siris	+	-	-	-	-	-	-	-
8.	Chiroal	+	+	+	+	-	+	-	-
9.	Babul	-	+	+	+	+	+	+	+
10.	Eutiliptus	-	-	-	+	-	+	+	-
11.	Chchid	-	-	-	+	-	+	-	-
12.	Aamrood	-	-	-	+	-	-	-	-
13.	Umar	-	-	-	+	-	-	-	-
14.	Pepal	-	-	-	-	-	-	+	+
15.	Chola	-	-	-	-	-	-	-	+

Table 3. Socio-economic value of plant species used as fuel wood in Jhansi

S.No.	Name of plant wood used as a fuel	Botanical Name	Family	Use as fuel	Use as fodder	Use as medicine	Use as fibre	Use as furniture	Religious value	Ecological value
1.	Mango	*Mangifera indica*,	Anacardiaceae	+		+	+	+	+	+
2.	Mahwa	*Madhuca longifolia*	Sapotaceae.	+	+	+	+	_	-	+
3.	Sheesham	*Dalbergia sissoo*	Fabaceae	+	-	-	-	+	-	+
4.	Barry	*Alangium salviifolium (L. f.) Wangerin*	Alangiaceae	+	-	+	-	+	-	+
5.	Neem	*Azadirachta indica*,	Meliaceae	+	-	+	+	+	+	+
6.	Babul	*Vachellia nilotica*	Fabaceae	+	+	+	+	-	-	+
7.	Eucalyptus	*Eucalyptus deglupta*	Myrtaceae	+	-	+	-	+	-	+
8	Amrood	*Psidium guajava*	*Myrtaceae*	+	+	+	+	-	-	+
9.	Pepal	*Ficus religiosa*	*Moraceae*	+	+	+	-	-	+	+
10.	Siris	Albizia spp.	Fabaceae	+	+	+	-	+	-	+

Table 4 . Calorific value of some plant species used as fuel wood in Jhansi

S.No.	Name of plant wood used as a fuel	Botanical Name	Family	Calorific value Kcal/Kg	Smoky Less /Smoky
1.	Mango	*Mangifera indica*,	Anacardiaceae.	4742	Less smoky
2.	Mahwa	*Madhuca longifolia*	Sapotaceae.	8742	Less smoky
3.	Sheesham	*Dalbergia sissoo*	Fabaceae	5,200	Less smoky
4.	Ber	Zizyphus mauritiana	Rhamnaceae	4878	Less smoky
5.	Neem	*Azadirachta indica*,	Myrtaceae	4500	Smoky
6.	Babool	*Acacia nilotica*	Fabaceae	4950	Less smoky
7.	Amrood	*Psidium guajava*	*Myrtaceae*	6450	smoky
8.	Siris	Albizia spp.	Fabaceae	4300	Less smoky

Source: Wikipedia.org

CONCLUSION

We quantified the amount of fuel wood consumption in Jhansi, where the forest ecosystem is facing threats due to subsistence activities of the local poor people. The annual fuel wood consumption in smallest area was 113100 tonnes, which is higher than in other parts of the Bundelkhand. To cope with the threat of climate change, protecting forests is vital but poor people are dependent on forests for their daily needs. This study will help to design forest conservation by ensuring sustainable resource use of forests in the Bundelkhand as well as in Jhansi.

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