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Knowledge and Awareness of Rural Women on Energy Sources

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ABSTRACT Energy in rural areas refers to most of the non- commercial energy sources used for domestic purposes. The present study was planned to assess the energy sources available in rural areas and the knowledge of women about the use and conservation of these energy sources at the household level. The study was conducted in the five villages of Dharwad district adopted under the All India Coordinated Research Project on empowerment of women. A total of 100 women respondents were randomly selected at the rate of 20 respondents from each village. An interview schedule was administered to collect the data. As high as 98 percent of the respondents used electricity as a principle source for lighting and it was available free of cost (55 percent) under Bhagyajyothi scheme of government. Agricultural waste was the principle source of energy for 96 percent of the respondents for cooking. Maximum percentage of respondents (47 percent) opined that cooking was a very demanding activity which required energy for more than 4 hours a day. Only 25 percent of the respondents were aware of the improved non- portable or portable *chulhas* which can save energy. Around 43 percent of the respondents were having knowledge and awareness about pressure cooker, an energy saving cooking device. More than 50 per cent of the respondents expressed that they didn't know the merits and problems of improved cooking devices. The poor awareness and knowledge of the respondents on the use of biomass fuels on the kitchen environment was noticed in the present study.

INTRODUCTION

Energy is the basic essential of any living being. Energy generally has been defined as the ability or capacity to do work. The availability of adequate supplies of energy is a matter of great concern as it is linked with industrial output and agricultural output. The major energy consuming sectors are industry, transport, agriculture and household sector. The demand for energy of these sectors is met by different sources and varies from place to place (Murugan 2011).

The energy sources can be classified as commercial and non-commercial sources. Commercial sources of energy are the ones which command a price for their utilization. For example, coal, petroleum, electric power are the chief commercial sources in India. Non-commercial sources of energy are firewood, vegetable waste and cow dung and these are supposed to be free and command no price in rural areas but in urban area they command a price.

Energy is also classified as renewable and non-renewable sources. Renewable sources of energy help the nation to keep the environment clean and green and these are pollution free but they do not reach people to the expected level. In India, households account for 40 percent of direct energy use (commercial and non-commercial energy together) and influence 70 percent of the total energy use (considering the energy required for goods and services consumed by households) (Pachauri 2009). The pattern of household energy consumption represents stage of economic development of family and the state of the women welfare (Reddy and Nathan 2012).

Household energy consumption can be defined as the energy consumed in homes to meet the needs of the householders themselves. All household related activities are women centric. Energy related activities in household are no exception. Since, typically women get involved in household chores including biomass collection and cooking, the energy situation can affect women positively and negatively. Because of their socially determined roles, women assume a higher proportion of the burden of low quality fuel use and the resulting energy services. The modern energy services which are more user-friendly leading to improvement of the household in social ladder, particularly for the women of the family (Reddy and Nathan 2012).The importance of women as 'key drivers of development in environment and energy' needs to get the attention it deserves (UNDP 2007). As per NSSO (2007), 90 percent of rural households do

not use clean cooking fuels and 45 percent of them do not have access to electricity.

Majority of the rural households are caught in the vicious circle of 'low energy use-low productivity-low energy use' due to the crises in availability of the energy sources and poverty. In such situation there is need to assess the knowledge and awareness of the rural people about the consumption pattern of energy sources for domestic activities and the time demand on the energy sources for various domestic activities. This will help to plan programmes for rural women to help in building awareness about alternative energy sources, energy saving devices and energy conservation. Hence an attempt is made to know the consumption pattern of energy in the rural households and knowledge of energy sources in rural areas of Dharwad *taluka*.

The present study is planned to assess the energy sources available in rural areas and the knowledge of women about the use and conservation of these energy sources at the household level with the following specific objectives.

1. To study the principle and subsidiary sources of energy used for domestic and agricultural purposes in rural areas.
2. To study the time load on energy usage for various purposes.
3. To study the knowledge of rural women on domestic energy devices and their merits.

METHODOLOGY

The study was conducted in the five adopted villages under the All India Coordinated Research Project (AICRP) on Home Science namely Hebballi, Nigadi, Uppinbetageri, Kavalageri and Nayakana Hulikatti. Totally 100 women respondents actively participating in the AICRP programmes were randomly selected as representative sample from all five villages at the rate of 20 women respondents from each village.

An interview schedule developed by the AICRP-FRM components was administered to collect the data from the women. The women were interviewed in an informal atmosphere and data was collected in detail. The data was coded and tabulated and frequency and percentages were used to present the results of the study.

RESULT AND DISCUSSION

Energy Sources for Household Consumption

Household sector is the one of the major consumers of energy in India. In India about 75 percent of the total population lives in villages and need energy for lighting, cooking and water supply and transport.

Table 1 presents the details of the sources of energy used for domestic purposes and their availability. The commercial sources of energy used are LPG, kerosene and electricity. As high as 98 percent of the respondents used electricity as a primary energy source for lighting and it is mainly used for lighting purpose and a few people used it for irrigation (water pumping) purpose in their fields. Electricity is available to 55 percent people at free of cost under the schemes of government like Bhagyajoti scheme for people below poverty line and about 43 percent of the respondents paid money for the electricity they use.

The non-commercial sources of energy used are agricultural waste consisting of crop stalks, sawdust, wood, coconut *pitu* and cow dung cake. That were the primary source of energy for about 96 percent of the respondents for cooking activity. This was available free of cost to 78 percent households. Only 22 percent households purchase the agricultural waste needed for cooking purpose. Only 15 percent of the respondents possessed LPG gas and used it as a principle source for cooking purpose and it was purchased by the households. These results are on par with the study conducted by Murugan (2011) on an analysis of rural household energy consumption in Kanyakumari district, Tamil Nadu.

Kerosene was the subsidiary sources of energy for 84 percent of the respondents who used it for both cooking and lighting purpose. Only 2 percent used this as a principle sources for both domestic and agricultural purposes. All 86 percent of the respondents purchased kerosene needed for the family activity. Negligible percentage of respondents used other energy sources like biogas, petrol and diesel for domestic, agricultural and transport purposes.

Women's Time Demand on Energy Sources for Various Activities

The traditional form of energy (bio fuels), which dominates the energy spectrum, is differ-

Table 1: Sources of energy used for domestic purposes and their availability (N=100)

Fuel used	*Principal source (%)*	*Subsidiary source (%)*	*Availability Free (%)*	*Purposes (%)*	*Purchased*
Agriculture waste (Stalks, saw dust, wood, coconut pitu etc), cow dung	96	4	78	22	Cooking and water boiling
Kerosene	2	84	-	86	Cooking
Charcoal	-	4	-	4	Cooking
LPG	15	3	-	18	Cooking
Electricity	98	-	55	43	Lighting and pumping water
Bio gas	-	1	-	1	Cooking and water boiling
Petrol	-	3	-	3	Transport
Diesel	3	2	-	5	Transport

Table 2: Time demand on energy sources for various activities (N=100)

Activity	*Time demand*				
	Very demanding >4hrs	*Demanding 3-4hrs*	*Moderately demanding 2-3hrs*	*Less demanding 1-2hrs*	*Very less demanding <1hr*
Domestic					
Cooking	47.00	34.00	11.00	8.00	
Lighting	26.00	38.00	28.00	8.00	
Water boiling	1.00	1.00	5.00	42.00	51.00
Agricultural					
Threshing					
Tractor		1.00	3.00	1.00	
Pumping water	1.00	1.00	1.00	4.00	

Table 3: Awareness of rural women on cooking stoves / *chulhas* and devices (N=100)

Type of chulha	*Awareness*		*User*		*Don't know*
	Yes	*No*	*Yes*	*No*	
Improved *chulha*	25.00	65.00	4.00	96.00	10.00
Improved portable *chulha*	1.00	89.00	-	100	10.00
Nutan stove	2.00	88.00	-	100	10.00
Bio gas stove	28.00	65.00	-	100	7.00
Any other (*Oorja, Sigadi*)	13.00	80.00	-	100	7.00
Cooking Devices					
Steam cooker	20.00	75.00	7.00	93.00	5.00
Pressure cooker	43.00	53.00	25.00	75.00	4.00

ent from its counterparts such as kerosene, LPG, or electricity in one respect. Unlike others, the preparations like collection, transportation, cutting of bio fuel is done by the households themselves. Women being the primary cook in the household, by default are given the responsibility of cooking related activity and water-fetching. Even in the twenty- first century, bio fuels still prevail in rural households and so does the drudgery of women (Reddy and Nathan 2012).

The time demand of energy sources on various activities is presented in Table 2. Among the domestic activities maximum percentage of respondents (47 percent) opined that cooking was a very demanding activity which required energy for more than 4 hours a day, followed by 38 percent agreeing to lighting as the next energy demanding activity for about 3 to 4 hours and 28 percent opining it as moderate energy demanding activity (2-3 hours per day). As far

Table 4: Knowledge of respondents on the merits and problems of improved cooking devices (%)

Opinion	*Yes*	*No*	*Don't know*
Saves fuel	40.00	4.00	56.00
Intermediate inspection not necessary	39.00	3.00	58.00
Preserves nutrient quality	34.00	5.00	61.00
Food is done well and tastes good	35.00	7.00	58.00
Improved cooking devices are easy to operate and maintain	36.00	5.00	59.00
Saves time in cooking	40.00	3.00	57.00
More than one item could be cooked using improved cooking devices	36.00	5.00	59.00
Fuel is expensive	13.00	26.00	61.00
Improved cooking devices are difficult to operate	3.00	36.00	61.00
Food is not cooked properly and quality is not acceptable	-	38.00	62.00
Takes more time	1.00	38.00	61.00
Improved cooking device is a cumbersome equipment	1.00	35.00	64.00
Cooking devices have indicators to monitor the cooking process	31.00	6.00	63.00

Table 5: Knowledge of respondents on the use of biomass fuels on the kitchen environment (%)

Kitchen environment	*User*		*Don't know*
	Yes	*No*	
Smoke filled in kitchen is hazardous to health	42.00	58.00	-
Soot formation on walls keeps the kitchen environment dingy.	99.00	1.00	-
Soot formation on cooking vessels demands more time for cleaning.	98.00	2.00	-
Biomass fuels cause frequent dust allergy.	7.00	82.00	11.00
Biomass fuels cause frequent cough and cold.	12.00	78.00	10.00
Fire hazards are common with the use of biomass fuels.	7.00	83.00	10.00
Biomass Use cause ecological imbalance	11.00	11.00	78.00
Global warming is the result of green house gases generated by biomass burning	5.00	9.00	86.00
Food will be tasty if cooked on biomass chulhas	88.00	3.00	9.00
Smoke in the kitchen controls mosquitoes and cockroaches.	66.00	30.00	4.00

as water heating activity is concerned 51 percent said it very less energy demand activity with less than one hour and 42 percent expressed as less demanding (around 1-2 hours) activity, which actually depends on the family size. According to Reddy and Nathan (2012), the time spent by women on these survival tasks is largely invisible; it does not enter into the reporting of energy patterns and statistics. For example, while the energy used by an electric pump for water pumping can be easily measured and reported, but the energy expanded by a women for fetching water goes unmeasured, unmonitored and unrecorded in energy statistics. It is evident that, in ESMAP energy survey of Indian rural households in 1996 (ESMAP 2004) have accounted the time spent by different households in cooking and fuel collection activities.

Awareness and Knowledge of Rural Women towards Improved Cooking Device and Improved *Chulha*

A series of awareness training programme on use of biogas was conducted in the villages by government schemes and NGO's resulting in very good response for the use of biogas for cooking activity in the households (Tulsidas et al. 2007). It is evident from Table 3 that only twenty- eight percent of respondents were aware about the biogas stove followed by twenty five percent knowing the improved chullas. Most of the respondents were not aware about any of the improved chullas.

When asked about the time and energy saving cooking device, again majority of the respondents did not have any awareness about either steam cooker (75 percent) or pressure cooker (53percent). About 43 percent of the respondents were aware about pressure cooker and 25 percent are the users of this cooker. Whereas only 20 percent respondents were aware of steam cooker, and only 7 percent were the users of this type of cooker.

Table 4 indicates the opinion on the merits and problems of improved cooking devices. More than 50 per cent of the respondents told that they don't know about the merits and problems of improved coking devices because they are using traditional cooking devices as they said improved cooking devices are costlier and

food cooked is not tasty. Among the known households, 31-40 per cent of them had good opinions on the merits of improved cooking devices such as they save fuel, intermediate inspection not necessary, preserve nutrient quality, food is done well and tastes good, improved cooking devices are easy to operate and maintain, saves time in cooking, more than one item could be cooked using improved cooking devices and cooking devices have indicators to monitor the cooking process. Meanwhile 26–38 per cent of them did not agreed that fuel is expensive, improved cooking devices are difficult to operate, food is not cooked properly and quality is not acceptable, takes more time, improved cooking device is cumbersome equipment.

As per World Health Organisation (WHO), indoor air pollution which is referred to as 'killer in the kitchen' is responsible for 1.6 million deaths per year, which means one life is lost in every 20 seconds (UNDP 2007). Table 5 depicts the opinion of selected respondents on the use of biomass fuels on the kitchen environment. More than 80 per cent of the respondents expressed that soot formation on walls keeps the kitchen environment dingy, soot formation on cooking vessels demands more time for cleaning, food will be tasty if cooked on biomass *chulhas,* followed by 66 per cent of the respondents agreed that smoke in the kitchen controls mosquitoes and cockroaches. Meanwhile more than 50 per cent of them did not agree that the smoke filled in kitchen is hazardous to health, biomass fuels cause frequent dust allergy, biomass fuels cause frequent cough and cold and fire hazards are common with the use of biomass fuels. Biomass use causes ecological imbalance and global warming is the result of greenhouse gases generated by biomass burning were not known by 78 and 86 per cent of the respondents respectively.

CONCLUSION

Agriculture is the main occupation in rural areas. The agricultural wastes like crop residues, animal dung form the main source of energy for household needs, especially energy required for cooking and water heating. Women are the ultimate users of these energy sources in the household. The present study depicts the energy status of the selected villages and the knowledge level of women about the alternate energy sources. The rural women have to be enlightened about the present energy sources, energy crises, consumption methods and renewable energy sources, which will help them to be the partners in addressing the energy crises.

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