



HOUSEHOLD ENERGY CONSUMPTION PATTERN IN SELECTED AREA OF MYMENSINGH SADAR UPAZILA

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ABSTRACT

The study was carried out through interviewing of one hundred farmers in two villages of Mymensingh Sadar Upazila, Bangladesh, during the period of Jan- May, 2011 to assess the availability and utilization of energy from different sources at household level. The common sources of biomasses are wood, tree twigs and leaves, crop residues, jute sticks, rice husk, rice straw, cow dung, etc. and constitute about 60% of total energy consumption in rural households. The total energy consumption was found to be (350-500) kg/month according to the sizes of family. The share of non commercial energy sources i.e. cow dung, tree leaves, rice husk, jute sticks, crop residues varied from (85-95)% and commercial sources i.e. electricity & kerosene contributed (5-10)% energy. Energy saving technologies should be encouraged for efficient use of available biomass in the country. Biogas plants, improved cooking stoves, biomass briquettes were such efficient technologies. These technologies need to be standardized and encouraged for dissemination at rural household levels in Bangladesh. However, many households may need financial support for owning these technologies. The Government along with NGOs and private sector institutions should initiate programs for extension and dissemination of these technologies.

Keywords: energy consumption, household

INTRODUCTION

Energy is considered as one of the basic elements that are essential for the progress of human civilization and development of the world. Generally, energy sources are broadly classified into two categories, conventional fossil fuel and renewable energy. It is recognized that the conventional sources of energy such as oil, coal and natural gas would be available to mankind only for a limited time. The proven gas reserves may support electricity generation, fertilizer production, industrial, domestic, commercial, transportation and other needs for about 50 years or more (Khan 2002). Mechanized equipment, lighting, information and communications equipments, drying and processing of agricultural products are the common sectors for using of energy in rural areas of Bangladesh. Common sources of energy in rural area can be broadly divided into three distinct groups: fossil fuels, fissionable nuclear fuels and non-nuclear energy sources. Agriculture waste

materials like rice-husk, paddy-straw, jute stalk, cow dung, tree leaves and cotton sticks represents some of the most renewable agricultural based rural fuel materials in the world. In Bangladesh biomass fuel is the main sources of energy in rural areas for cooking and parboiling of paddy. Renewable energy is the vital sector of future energy sources of Bangladesh like other developing country. Many renewable energy technologies are already in use and more are being developed. Solar, wind, mini/micro hydro, tidal and wave power, biomass and biogas have been successfully exploited and used in different parts of the globe with great advantages. Bangladesh is one of the environmentally threatened countries suffering from scarcity of fuels, especially biomass fuels. Biomass fuels comprise trees, tree residues and agricultural residues, animal excreta, kitchen by products etc. The country has rather small coverage of forest (about 15% of the total area of the country) and actual tree coverage may not however, be more than 7-8%. Around 90% of total fuel wood supply

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comes from homestead forest and the rest come from conventional forest and other areas (Islam *et al.* 1998). Total biomass consumed per year in the country is about 39 million tones of which about 50% come from agricultural residues (Atikullah and Eusuf 2005). Information about energy using pattern and their amount need to know in order to solve problem related to energy crisis. Following were the objectives of this research:

1. To estimate the energy consumption by rural households for different aspects of the selected areas.
2. To identify the energy use pattern by rural households.

MATERIALS AND METHODS

The present study was done based upon field survey where primary data were collected systematically by means of a questionnaire. Individual householders were visited personally by the researcher for data collection.

Selection of the study area: The study was conducted in the Mymensingh rural area of Bangladesh. Considering the socio-economic and educational status of the households, 85 households were selected randomly from different parts of the rural areas such as Fokira Kanda and ShalaKanda under Boira union of Mymensingh Sadar Upazila.

Collection of data: It was very difficult to get accurate data, since house owners in most cases do not keep written records. Data were collected on a specifically designed schedule through personal interview. Recall method was used for recording time spent on various household activities. In order to collect relevant information on data sheets, the single interview technique was followed i.e. primary data was collected directly from the household members. A questionnaire was prepared prior to data collection, which was presented by a few sample data collection and then modified into the presentable form.

Processing, converting and analyzing data: After completion of the data sheets, the collected data were summarized. After completing the pre-tabulation task, processed data were transferred to a master sheet. The tabulated data were then analyzed in the computer for presentation in graphical and tabular forms.

RESULTS AND DISCUSSION

Total 85 households with a total number of family members of 400 were investigated in order to complete this research. The number of family members per household varies from 2 to 9 with an average of 5. Out of 400 members of 85 households, 52.25% was male and 47.75% female (male-female ratio is 52.25/47.75) and also 9.25 % represented

infants, 43.75% student age group, 41.75 working age group and 5.25% retirement group. Around 63.5 % were illiterate and 28.25% educated in the selected research area. In selected villages out of 85 households 5.9% were landless, 10.6% marginal, 62.3% small and 21.2% medium farmer. Based on the monthly income, the households were categorized as low, medium, and high level of income. 84.7% household's represented low, 14.1% medium, 1.2% high family income.

Energy Consumption Appliances in Rural Area

The common electrical appliances used at household level are TV, radio, DVD/VCD, freeze, fan, iron, charge light and heater. Table.1 shows the number of households using electrical appliances at home.

Monthly consumption of electrical energy by the households ranges from 120 kWh to 260 kWh per household per month with an average of 132.9 kWh per month (Table. 1). Use of electricity depends on the availability and the cost of system. Except 5 landless farmers, 80 households produce substantial amount of rice straw, wheat straw and other agricultural residues. Major portion of rice and wheat straw is used for animal feed. Some portion is used for fencing and some as fuel.

Energy Sources for Cooking: All the 85 households use wood and tree leaves as fuel, 81 (95.3%) use rice husk briquette and 31 households (36.5%) use animal dung for cooking. 71 households (83.5%) use animal dung as manure. Out of 85 households, about 96% use traditional cooking burner (made of soil and use biomass as fuel) for cooking and 9.4% households use kerosene for cooking, and 100% household use kerosene for lighting, when electricity is unavailable.

CONCLUSION

The choice of energy source depends on the availability, price and also the purchasing capacity of the people. Many of the low income people living in the village cannot afford to buy electricity or gas for cooking, even if these are available at the door steps. Those who can afford, choose electricity for lighting and to operate the electrical and electronic household equipment. Working class families with very low income uses kerosene lamp for lighting.

Cooking by electric heater is expensive as consumption of electricity is high. So gas is the first choice, if it is available in the village. The problem is that the users have to pay for establishing the connecting gas pipeline (from the main supply line to the household), which is not affordable by many users. So the low income families have no access

to gas for cooking. This class of people use biomass fuel such as fuel wood, rice husk saw dust and rice husk briquettes, etc. Following are the recommendation for the development of the energy sector of Bangladesh:

- Biomass is playing an important role for daily energy needs of rural households in Bangladesh. The biomass such as rice husk, tree leaves, animal dung, jute stalk, crop residues, fuel wood, etc constitute about 96% of total energy consumption in rural areas of Bangladesh. So proper use of the resources can

be maintained through training and spreading knowledge to the rural people.

- Energy saving technologies should be encouraged for efficient use of available biomass in the country. Biogas plant, improved cooking stoves like triple mouth chula (Hoque and Suman 2006), biomass briquettes are efficient technologies. These technologies need to be standardized. The Government along with NGOs and private sector institution should initiate programs for extension and dissemination of these technologies.

Table 1. Monthly consumption of electrical energy and biomass availability

Electricity consumption (kWh)	No. of HH	% of total HH	Income level	Biomass available (kg)	No. of HH	% of total HH
Do not use	9	10.6	3,000-4,000	96-200	18	21.2
120 – 130 kWh	23	27.1	3,000-20,000	203-380	21	24.7
133 – 150 kWh	24	28.2	3,000-15,000	430-550	11	12.9
155 – 170 kWh	23	27.1	4,000-20,000	635-980	17	20.0
175 - 200 kWh	3	3.5	8,000-15,000	1000-1500	13	15.3
205 - 260 kWh	3	3.5	8,000-30,000	1660-2275	05	5.9
Total	85	100			85	100

Table 2. Energy sources for cooking and food processing

Energy sources	Technology	No. of families	Rate (%)
Fuel wood & tree leaves	Traditional	85	100.0
Rice husk briquette	Traditional	81	95.3
Animal dung	Traditional	31	36.5
Kerosene	Stove	08	9.4
Electricity	Electric heater	01	1.2
Natural Gas	Gas burner	Nil	0.0

Table 3. Amount of biomass fuel used for cooking in the research area

Family size in number	Biomass and dung fuel used for cooking (kg/month)	Equivalent energy (kWh)/month
2	125	520
3	153	637
4	155	645
5	173	720
6	179	746
7-9	180	750

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