

Rural farm households energy consumption pattern in district Kangra of Himachal Pradesh

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ABSTRACT

The rising demand for energy has led to prices spiraling up and the deterioration of environment. A study was conducted to assess energy requirements in the farm households of district Kangra of Himachal Pradesh. A sample of 60 households from two villages namely Chandpur and Bharmat was selected through stratified sampling technique. The data were collected through personal interview method using schedule consisting questions regarding energy use patterns in the households. Actual measurements as well as recall methods were used for determining the quantities of different fuels and the costs of fuels were computed at prevailing rates in the area, daily consumption estimates were made in the original units for each energy source and then converted into mega joules (MJ). The data thus collected were statistically analyzed. Firewood, dung cakes, agriculture forest waste, kerosene and LPG were found to be commonly used in the farming families. The majority of farming families spend large amount of human energy consumption so that the farm women can be made aware of the importance of conserving energy by using non conventional energy like solar energy and bio gas.

KEY WORDS : Energy, Consumption, Conventional, Non conventional

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INTRODUCTION

Energy has been termed as the fuel of economic progress. Man has to spend energy in one form or the other to meet these needs. The household sector is one of the major energy consuming units accounting for half the Country's energy demand. Rural energy occupies cent restage in rural development issues (Laksmi *et al.*, 2003) Household activities are one of the most important activities in rural India from the point of view of energy expenditure for human life support. The most important fact about energy consumption in rural areas is that a major part of energy comes from non commercial sources like firewood, animal dung and agricultural/ forest wastes. The consumption of energy is dominated by domestic sector, as in village, energy requirements are often dominated by heat requirements for cooking. Most of the household energy in farm houses is produced locally from human labour, fuel wood, animal and crop residues and a

significant amount of non-conventional fuels is obtained free and collected by final consumers. Kumar et al (2003) studied that pattern of non- commercial energy consumption and availability in the Indian domestic sector and found that dung cakes and firewood were found to be the two main resources for cooking. The household energy needs take up a large position of the resources of many households. Over use of fuels like firewood and coal may create sever environmental problems and effect agriculture productivity. The biomass has traditionally been meeting most of energy requirements for rural domestic activities and manure requirements of animal feed and manure for crop production. The rising demands for energy have led to spiraling up the deterioration of environment.

Keeping in view all the above mentioned factors that the rural farm families may be facing a crisis in meeting their fuel demands from conventional sources. A better understanding of energy consumption pattern and energy

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resources is important for estimating future requirements and in the designing of a new strategy for energy use. Thus, a study was designed to know the energy consumption pattern in farm households in the villages of Kangra district with objective, to determine the types and expenditure of fuels used for household activities by the farm households.

METHODOLOGY

The study was conducted in two villages namely Chandpur and Bharmat of Kangra district of Himachal Pradesh. Stratified sampling techniques were used for the selection of sample. A sample of sixty farm households was taken each from two that is nuclear farming and joint farming families for the present investigation. The data were collected through personal interview using an interview schedule. Actual measurements as well as recall method was used for determining the quantities of different energy sources that is human, non conventional sources. After knowing the daily conventional consumption estimates in original units for each conventional source, they were converted into Mega joules (MJ) for the purpose of calculating total energy consumption. The data collected were statistically analyzed.

OBSERVATIONS AND DISCUSSION

The results are summarized below according to objectives of the study :

Activity wise total human energy consumption:

From the perusal of Table 1 it can be seen that nuclear farming families spent 27.50 MJ energy on

household activities as compared to joint families which is 41.81 MJ. The maximum energy was spent on meal preparation and service being 10.61 MJ by the nuclear farming families. More energy was required for meal preparation and service 8.98 MJ. Animal care 3.33 MJ and activities miscellaneous 3.67 MJ in nuclear families, whereas, it was 12.24 MJ for meal preparation and service, 6.77 MJ for fuel gathering and preparation and 5.77 MJ for miscellaneous activities in farming joint families reason for this may be more consumption of non- commercial fuels, larger herd size and hence larger need of water in case of joint farming families.

In general, the maximum share of human energy that is 30.64 was spent on food preparation and service followed by fuel gathering and preparation (14.24%) in case of both the nuclear farming and joint farming families. The results are in agreement with the findings of Bakhshi (1989) that in rural areas the main activities were food preparation, animal care and fuel preparation.

Energy consumption from non conventional and conventional energy sources:

The non- conventional fuels were firewood, dung cakes and agricultural waste, Table 2 shows the daily consumption of farming families of fire wood was 10.18 kg, Dung cakes 1.61 kg and Agricultural waste/ forest waste 1.86 kg. It is evident from Table 2 that daily energy consumption from firewood was 183.24 MJ, dung cakes 28.98 MJ and agricultural waste was 33.49 MJ. Nasima *et al* (2010) in an analytical study in Jorhat district of Assam reported that in the selected households 97.5 per cent used firewood as fuel for cooking followed by 67.5 per cent of agricultural waste whereas, dung cakes are not used

Table 1: Activity wise total human energy consumption

| Activities | Farming families | | |
|---|------------------|--------------|--------------|
| | Nuclear(30) | Joint(30) | Total(60) |
| Meal preparation and service | 8.98(32.65) | 12.24(29.27) | 10.61(30.64) |
| Utensil washing | 2.08(7.56) | 3.49(8.34) | 2.78 (8.03) |
| Housing cleaning | 1.07(3.89) | 1.73(4.13) | 1.40 (3.00) |
| Washing and care of clothes | 1.38(5.01) | 2.45(5.85) | 1.19 (5.51) |
| Fuel gathering and preparation | 3.10(11.20) | 6.77(16.14) | 4.93 (14.24) |
| Fetching of water | 1.63(5.92) | 2.32(5.54) | 1.97 (5.69) |
| Animal care | 3.33(12.10) | 3.82(9.13) | 3.57 (10.31) |
| Child care | 0.57(2.07) | 1.12(2.69) | 0.84 (2.42) |
| Shopping | 1.69(6.14) | 2.10(5.02) | 1.89 (5.45) |
| Miscellaneous activities (Making beds, leisure time activities and personal care) | 3.67(13.34) | 5.77(13.80) | 4.72 (13.63) |
| Total energy(MJ) | 27.50 | 41.81 | 34.62 |

Figures in the parenthesis are percentages

Table 2 : Daily consumption of non conventional fuels

| Non conventional fuels | Farming families | | |
|---|------------------|-------------------|-------------------|
| | Nuclear (30) | Joint (30) | Total(60) |
| Firewood (kg) | 9.50 ± 0.36 (30) | 10.87 ± 0.45 (30) | 10.18 ± 0.30 (60) |
| Dung cakes (kg) | 1.53 ± 0.21(26) | 1.68 ± 0.13 (20) | 1.61 ± 0.11(55) |
| Agro/Forest waste | 1.67 ± 0.09 (30) | 2.05 ± 0.12 (29) | 1.86 ± 0.08(59) |
| Energy from non-conventional fuels | | | |
| Firewood (kg) | 171.00 ± 6.54 | 196.00 ± 8.25 | 183.24 ± 5.46 |
| Dung cakes (kg) | 27.54 ± 3.84 | 30.24 ± 2.50 | 28.98 ± 2.04 |
| Agro/Forest waste | 30.06 ± 1.77 | 36.90 ± 2.17 | 33.48± 1.45 |

Values are mean standard error

Figures in parentheses indicate number of families

Table 3 : Daily consumption of conventional fuels

| Non conventional fuels | Farming families | | |
|---|------------------|------------------|------------------|
| | Nuclear (30) | Joint (30) | Total(60) |
| Electricity (kwh) | 1.60 ± 0.10 (30) | 1.54 ± 0.12 (30) | 1.58 ± 0.08 (60) |
| Kerosene (l) | 0.13 ± 0.01(15) | 0.11 ± 0.01 (12) | 1.12 ± 0.01(27) |
| LPG | - | 0.35 ± 0.07 (4) | 0.35 ± 0.07(4) |
| Energy from non-conventional fuels | | | |
| Electricity (kwh) | 19.00 ± 1.43 | 18.37± 1.46 | 18.85± 1.00 |
| Kerosene (l) | 5.37 ± 0.76 | 4.55± 0.59 | 4.96 ±0.47 |
| LPG | - | 17.5 ±3.50 | 17.5 ±3.50 |

Figures in parentheses indicate number of families

Values are mean ± standard error

cooking fuel. Instead dung is used as manure.

Three main sources namely electricity, Kerosene and LPG were the conventional fuels utilized in farm household for cooking and lighting purpose. Table 3 shows that in rural areas farm households, whether, nuclear or joint families electricity was mainly utilized for lighting purpose. Families mostly used Kerosene followed by electricity few families used LPG and the consumption was 0.35 kg. Only 18.85 MJ electricity, 4.96 MJ Kerosene and 17.5 MJ LPG was consumed by farming families. The consumption of energy from conventional sources was more in joint families which might be due to larger family size and hence, more was the requirement. (Ramachandern and Subramaniam, 2000) also conducted that in ninety villages of Kumta Taluk most of families still used traditional stoves for cooking (97.92) and water heating (98.3%).

Conclusion:

It can be concluded that the consumption of energy from electricity, Kerosene and LPG was 18.85, 4, 96 and 17.5 MJ in the farming families. The energy consumption from firewood, dung cakes and agricultural / forest waste was 183.24, 28.92 and 33.48 MJ. The total energy consumption from all the sources was 280.47 MJ for nuclear farming families and 345.37 MJ for joint farming

families. The share of non- conventional, conventional and human energy sources was 78.57, 10.36 and 11.07 per cent, respectively. From the findings of the study it was concluded that the requirements of household energy in rural farm households was mainly met from non-conventional sources like firewood, agricultural / forest waste and animal dung. The electricity was mainly used for lighting purposes. Kerosene was used as a supportive fuel for lighting chulla and preparing meal. Very few families use LPG. The maximum human energy was used for preparing meal and service followed by fetching of water and animal care. Thus the findings of the study shows that a large amount of non conventional energy is being used in rural homes, thus efficient energy management, proper conservation of energy and wise selection of alternates energy source is important. The homemaker can be made aware of the importance of conserving this energy by using non conventional energy sources like solar energy and bio-gas.

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