

## ENERGY CONSUMPTION PATTERNS IN THE DISTRICT

A survey of 164 households covering 5 blocks and two agro-ecological zones was conducted to elucidate the energy consumption pattern of the households. Ten per cent of the total households in each block was randomly selected for interviews. The consumption patterns of the alpine blocks were assessed by the key informant method because of inaccessibility and time constraint. The major findings are discussed below.

### Energy Consumption Patterns in the Temperate and Subtropical Zones

#### *Types of Energy*

Firewood. The average annual firewood consumption rates per household were  $13.8\text{m}^3$ . in the temperate zone and  $12.2\text{m}^3$ . in the subtropical zone. The survey showed that 72 per cent of the of the household firewood needs were met by oak, while only 28 per cent were met by pine. Oak is preferred because of higher energy content.

The ownership of wet land as a proxy for household income was observed to have little effect on the firewood consumption rate for cooking. However, statistical tests showed that per capita firewood consumption varied with family size. The average per capita annual consumption of firewood for cooking ranged from 0.55 m<sup>3</sup> for a 22 member household to 18 m<sup>3</sup> for a one member household. The mean firewood consumption for cooking in these two zones was 13.2m<sup>3</sup> per household.

Firewood for cooking is gathered from two main sources: (i) a green tree may be felled at will from nearby State forest land paying a royalty of Nu. 95 per trunk and is usually stored for use after cutting and drying, and (ii) dead fallen trees may be collected at will from State forests free of cost. Usually a tree is felled around May and the product is used until cull collection is needed around September.

Income plays an important role in determining the use of firewood for heating. Households owning at least 1.33 acres of wet land are the only users of firewood for heating. The mean firewood use for heating is 0.28m<sup>3</sup>. The location of blocks strongly influences the time spent in collecting firewood. On average, households collect firewood four times a week after their stocks from the felling of green trees are used up. Overall, 30.5 per cent of households take two hours or less to collect firewood whereas 69.5 per cent of the households take more than two hours. The mean time spent to collect firewood on a trip was 3.77 hours.

Liquid petroleum gas (LPG) is used by a very few rural households which are located along the roads and have enough income to support its use. LPG is imported by a private company and is sold mainly in the urban areas. Electricity is not used for heating even in the urban areas although the cost of heating with electricity compares with the cost of using firewood.

Kerosene. The data show that kerosene use for lighting is uniform across blocks and agro-ecological zones. This is to be expected because there is no substitute to kerosene use for lighting except in urban areas and in a few rural areas which receive electricity supplies. The use of kerosene for lighting was not observed to be influenced by income levels. On average, 31.2 litres of kerosene per household were used for lighting.

Electricity. The use of electricity for lighting is confined to the temperate zone blocks supplied by grid extension. The average number of electric outlets per household using electricity is 3.6. Thirty one per cent of the households use two outlets, 23 per cent use three outlets and 46 per cent use four or more outlets. Income levels affect electricity use.

Petrol and Diesel. Petrol and diesel are mostly used for transporting logs and agricultural products and for public transportation to some extent. The use of these fossil fuels is independent of block location or agro-ecological zones. Households with 0.5 to 3 acres of wet land used up to 2,000 litres/year of these fuels whereas those with 4 to 8 acres used up to 9,000 litres/year.

Among agro-processing activities only grinding used any non-animate energy in the sample: one household used 1,000 litres of diesel per annum. Grinding is usually carried out manually or with traditional water wheels and threshing is carried out manually.

Organic Manure and Fertiliser. The use of organic manure or fertiliser does not vary significantly by block or agro-ecological zone. The ownership of wet land is not a good proxy for income in explaining organic manure or fertiliser use as they are mostly used in kitchen gardens. The average use of organic manure and fertiliser is estimated to be 8.84m<sup>3</sup> and 39.6 kilograms per household respectively.

## **The Energy Consumption Pattern in the Alpine Zone**

### *Energy Uses*

Cooking and Heating. The people in some blocks of this zone use dried cowdung cakes mixed with scrubs whereas in other blocks pine trees and dung cakes are used. The dung cakes are dried, stored, and used whereas the scrubs and pine tree biomass are collected at will from surrounding areas. A tin box with a grill cover is used for cooking and heating, the side of the box has a small door to insert cowdung and wood. The daily consumption of dung cakes varies from 10 kg to 20 kg depending upon the family size.

Lighting. Kerosene is the most important lighting fuel in this zone followed by torchwood (Pine tree) and glow from the cooking fire. Kerosene is scarce in the area because of transportation difficulties. However, lighting is not in great demand because people go to sleep at dusk.