ENERGY PLANNING FOR RURAL BANGLADESH: COMPARATIVE ASSESSMENT OF ENERGY SITUATION IN AN ELECTRIFIED AND A NON-ELECTRIFIED VILLAGE OF MYMENSINGH DISTRICT.

THESIS

Submitted to the Department of Urban and Regional Planning, Bangladesh University of Engineering and Technology, Dhaka in partial fulfilment of the requirements for the degree of MASTER OF URBAN AND REGIONAL PLANNING.

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CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

1.1 Problem Statement

Bangladesh is a small country of 143998 square kilometres having agro-based economy. Most of the country consists of the fertile delta of the Padma - Jamuna (Ganges - Brahmaputra) river system. The latter provides it into an Eastern and Western Zone. With a population of about 100.5 million in 1985 and an average density of 698 person per square kilometre, Bangladesh is one of the most densly populated country of the world, a situation exacerbated by the continuing high rate of population growth (2.4% per year). More than 85% of the total population live in rural areas. Agriculture contributed 54.3% of the gross domestic product (GDP). Land holdings are generally very small and the proportion of landless agricultural labours is high. The proportion of households having less than the prescribed daily minimum caloric intake of 2273 kilo-calories (3.47 GJ/person/year) has increased from 59% in 1975-76 to 76% in 1981-82 (GOB 1985).

The country has a very low level per capita energy consumption. The Third Five Year Plan (1985-90) records that per capita consumption of commercial energy in Bangladesh is around 41 kg of oil equivalent (1.72 GJ) - about only 15% of the average of the low income countries (GOB 1985). In rural areas of Bangladesh commercial energy consumption is only 16% (Parikh, 1980) and 81% of household energy consumption in rural areas in provided by biomass fuels like cow dung, straw, jute sticks, twigs, wood (Parikh, Kennes, 1983).

According to Bangladesh Energy Planning Project the estimated total energy consumption of Bangladesh in 1983-84 was 598.3 PJ, of which 81.7% has been supplied by traditional fuels (i.e. Biomass) 69% has been consumed in domestic sector (GOB 1985a). In Bangladesh the major share of the total energy is consumed in rural areas. Thus it is imperative that the problem of assuring a reasonable supply be recognized and an effective plan for this be formulated, particularly for the majority of the consumers, maintaining their growing demand for both traditional and commercial energy.

It is estimated that the per capita consumption of commercial energy will grow at about the same rate (8.7%) per annum in the Third Five Year Plan as in the Second Plan. As a commercial energy, electricity can play a vital role in meeting rural energy needs. But at present the number of electrified villages is 4600 (6.7% of the total villages) in 1985 (GOB, 1985a) which indicates that the rural people have a little access to the electricity.

In this background of energy consumption pattern combined with growing population (98.7 million in 1985 with projected growth rate 1.8 to 2.2% upto the year 2000) and limited arable land (about 13.1 million hectares) the energy development planners of Bangladesh faces the following **challenges** (GOB, 1985a):

i) In order to increase food production, more intensive agricultural practices will have to be adopted (e.g. irrigation pumping, fertilizer application and number of crops grown per year) and associated social and institutional changes will be necessary;

ii) Employment opportunities in agriculture will be limited and the provision of new jobs for a growing population will centre around industry and the cities.

These two factors will lead to an increase in the energy intensity of the economy and particularly to greater requirements for commercial fuels.

Increase in energy supply for meeting subsistence and productive need is considered an important aspect to achieve the development objectives.

On one hand, it would be necessary to maintain the supply of traditional fuels at a regenerative rate through proper planning on the other hand input of commercial fuels is also to be increased to meet the energy need for production and overall development.

1.2 Need For Rural Energy Planning

In Bangladesh majority of the people live in rural areas and mainly depend on agriculture for their survival. Therefore, the development of rural areas means the development of agriculture sector which constitute the major part of our socio-economic development plan. Due to high population density, available farming land is found to be insufficient to produce necessary food for her population using traditional agricultural technology. Therefore, intensive agricultural system has been considered to increase food and other agricultural crops. Intensive agricultural production systems in turn demand input of energy directly for irrigation and indirectly for production of fertilizer and pesticides. Energy is also needed for processing and transporting agricultural crops and for producing finished goods. On the other hand, agricultural sector is not only the producer of human food but also the important source of animal fodder, building materials, and biomass fuels. Within the rural context the supply and demand of energy resources are closely related to agricultural sector.

Various types of biomass fuels consumed in Bangladesh (woodfuel, agricultural residues and animal dung) are available from agricultural sector. In rural areas these fuels not only satisfy household energy requirement but also used in supplying energy for many rural industries such as brick kilns, lime kilns, tea and tobacco processing units, smithies and pottary units. Biomass fuels, specially fuelwood is also used in urban areas for domestic cooking in commercial units. Some of the important observations made with reference to unplanned use of biomass fuel resources are:

(a) overcutting of tree resources for fuelwood resulting deforestation

(b) continuous use of agricultural and animal residues as fuel depriving soil from valuable nutrients.

It may be mentioned that at present major portion of total energy consumed is supplied by biomass fuel resources but it cannot meet the demand of all the end uses.

Although in respect of area, Bangladesh is a small country but due to the variations of agroclimatic and hydrological conditions different types of farming system are found to be in practice in different zones. As a result supply and demand of energy resources are conditional to specific location. Within a particular location there is also variation in supply and demand of energy resources among different households due to the variation of physical and ownership accessibility of the resources producing biomass fuels. For a particular household variation in supply and demand of energy resources also occur with the seasons.

Biomass resources grown on land has competitive as well as complementary uses. As for example residues obtained from paddy crop may be directly used as fuel or different portion may be used for different purposes depending on their quality.

At the national level as the major share of export earning is consumed for the import of petroleum fuels; 'energy crisis' is often meant as the crisis of oil. To the ecologists the 'other energy crisis' is meant the scarcity of fuelwood. In reality Bangladesh is acutely suffering from two energy crises namely the crisis of commercial fuels including petroleum oil and crisis of biomass fuels. In rural areas the requirement of both the sources of energy is closely associated and need simultaneous attention. It may further be stressed that the importance of specific type of energy sources (viz, commercial, traditional) is not dependent on the quality **and quantity of consumption of specific type of fuel.**

Natural gas is the main source of commercial energy in Bangladesh. Distribution of natural gas via electricity has been considered as an appropriate mode of delivery of commercial energy in rural areas. Distribution of electricity in rural areas has been considered to increase production, to provide employment and also to improve the quality of life. In this context it may be noted that even with assertive policy towards rural electrification it will take quite sometime to bring the total rural areas of Bangladesh under the coverage of rural electrification. Even if electricity is available in a particular rural location it may not be technically and economically suitable to meet the demand of all the end users. Therefore, the supply of other type of commercial sources also have to be considered to meet the demand of rural population.

Reduced dependence on imported energy sources (e.g. petroleum fuels, coal) and rational use of all types of indegenous energy sources (e.g. biomass fuels, natural gas, hydro-power, peat etc.) are the two main objectives of national energy planning. Within this context the need for rural energy planning as an integral part of national energy planning requires no further emphasis. With a view to undertake integrated energy planning process their is a need to understand the nature of inter-linkages of energy sector with other sectors of national economy and the complex inter relations to meet various end uses.

1.3 Need for the Present Study

Because of location specific nature of supply and demand of energy resources, rural energy planning should be considered in a decentralized manner both spatially as well as institutionally. There is a need for location specific reliable data base to prepare rural energy plan based on decentralized approach. The present study is aimed to generate some data in a specific location of Bangladesh, which may be used for rural energy planning.

2.0 LITERATURE SURVEY

A brief review of rural energy studies carried out in Bangladesh have been presented in the following sections with a view to decide the strategies for the present study.

2.1 Biomass Fuels Consumption Studies

It has been mentioned in previous chapter that more than 80% of the total energy consumed in Bangladesh is supplied by biomass fuel resources. Various studies carried out for assessing the consumption of biomass fuel resources have been presented in Table 2.1. The table contains biomass fuels consumption data obtained by both macro (GOB, 1976; Tyers, 1979) and micro (Brisco, 1979; Hughart, 1979; Islam, 1980; Douglas 1981; Quader and Omar, 1982; Islam 1982) studies. It may be observed from the table that the consumption of biomass fuels estimated by different village energy surveys (micro studies varied from 4.3 to 8.7 GJ/person/year. For the assessment of biomass fuel consumption BEPP studies (GOB, 1985_a) assumed specific energy consumption for rural household cooking of food as 4.44 GJ/person/year (90%) and biomass fuel consumed at household level for crop processing (e.g. paddy parboiling and gur making) have been estimated separately as 0.49 GJ/person/year (10%). Therefore, biomass fuels used for to household cooking (food cooking and crop processing) was estimated as 4.93 GJ/person/year.

It may be noted that the values of per capita consumption of biomass fuels estimated by the previous studies (GOB, 1976; Tyers, 1979; Brisco, 1979; Hughart, 1979; Islam, 1980; Douglas, 1981; Quader and Omar, 1982; Islam 1982) are the weighted average quantities of fuels consumed by the population of the respective survey areas. It has been stated earlier that in Bangladesh a great majority of the total population is living below subsistence level. Therefore, the estimated values of weighted average fuel consumption probably included the condition of below subsistence living. For planning purpose it is appropriate to consider the various consumption parameters at least for subsistence living condition. The use of weighted average specific energy consumption data would fail to highlight the actual energy need of the population. Probably due to unavailability of specific energy consumption data for subsistence living condition BEPP study also used the co-efficient estimated by Douglas (1981).

2.1.1 Regional Variation of Biomass Fuel Consumption

Regional variation of biomass fuel consumption estimated by a country wide survey (Douglas 1981) and different village energy surveys (Brisco 1979, Islam 1980, Quader and Omar 1982, Islam 1982) have been shown in Table 2.2. It may be observed from the data of country wide biomass fuel survey that per capita consumption was the lowest (2.95 GJ/year) in Region 2 and was attributed to its location in a poorly forested areas. Considering the methodological variations among the country wide survey (Douglas 1981) and other village energy surveys the variation of estimated per capita consumption between macro and micro surveys are reasonably comparable.

2.1.2 Variation of Biomass Fuels Consumption by Landholding Sizes

Variation of per capita consumption of biomass fuels according to landholding size quoted by Islam (1984) is shown in Table 2.4. It may be seen from the table that per capita consumption of biomass fuels decreases as landholdings increase (5.4 GJ/year for 0.1 acre landholding size to 3.8 GJ/year for landholding size of 7 acres and above). Lower per capita fuel consumption by higher landholding group has been attributed to economy of scale of cooking, variation in type of food cooked by different landholding size, and higher technical heat utilization efficiency of the type of fuel used by higher income group households (Douglas 1981). Moreover this table reveals that per capita consumption of the low-grade biomass fuels (residues, twigs, leaves) decrease with the increase of landholding. Per capita fuel consumption and its composition, however, also depend on specific location.

For a particular village in Rangpur district variation of per capita consumption of biomass fuels according to landholding size estimated by Quader and Omar (1982) is shown in Table 2.4. It may be seen from the table that per capita consumption of total household cooking fuels increases as size of landholding increases (6.91 GJ/year for landless to 16.9 GJ/year for landholdings of 10 acres). Higher per capita fuel consumption by households with larger landholdings may be attributed to higher amount of food cooked and to increased fuel consumed for parboiling and ghur making. It may be noted that per capita consumption of fuel for food cooking for landless

household and household with landholding size of 10 acres varied from 6.64 GJ/year to 10.52 GJ/year respectively. Caloric food intake per person also increases with increase of landholding size from 2.9 GJ/year (1,910 kcal/day) for landless to 5.8 GJ/year (3,800 kcal/day) for landholdings of 10 acres. Higher per capita food consumption by households with larger landholdings may be due to better accessibility as well as to the system of payment to agriculture labours. In Bangladesh, agriculture labours traditionally and predominantely are paid partly cash and partly with food. The number of meals provided with part cash payment may vary from one to three meals a day, depending upon the locale and season. Per capita food consumption has been estimated by dividing the yearly food consumption reported by the household by the number of permanent household members. amount of food consumed by casual labourers may contribute to the higher per capita food consumption estimate for larger landholders who employ them, and lower per capita food in their own households (Islam 1984).

Another factor may contribute to the lower per capita food consumption indicated for landless labourers. At the time of acutely scarce employment within a village, they migrate temporarily to other villages or to an urban area in search of jobs. Yearly food consumption reported by the household would normally include only the amount consumed by them during their stay in the village (Islam, 1980).

2.1.3 Variation of Biomass Fuel Consumption According to Household Members

In four villages of Barisal district variation in per capita consumption of biomass fuels according to household members is shown in Table 2.5 (Islam, Morse and Soesastro, 1984). It may be observed from the table that less fuel per capita is consumed as the number of persons per household increases. This may be due to the benefit of economy of scale for cooking. Normally in poorer families there are less number of people per household and in rich families there are more number of people per household. Therefore, comparatively richer household can harness the benefits of economy of scale.

2.2 Commercial Fuel Consumption in Rural Areas

Similar to the use of non-commercial energy sources (e.g. biomass fuels), different commercial energy sources are also in use in rural areas. However, the proportion of commercial energy used in rural areas is very small in comparison to the use in urban areas.

Major use of commercial energy in rural areas is the use of kerosene for household lighting. In recent years due to expansion of rural electrification programme electricity is also used for lighting in some rural areas. Others uses of commercial energy in rural areas are in irrgation pumps and in small rural industries. Diesel and electricity are used in these cases. However, very small fraction of these energy sources are used in rural areas. Indigenous natural gas is not in use in the rural areas due to non existence of gas pipe net-work (Islam and Mahtab, 1985).

2.2.1 Commercial Energy for Household Lighting

Generally open wick lamps (Kupees) are used in rural households for lighting. It was reported by a rural energy study (Islam 1980) that in the survey area 85% of lighting appliances were open wick lamps (2.46 lamps/household) and 19% huricane lanterns (0.57 Nos/household). In an Indian rural energy study (ASTRA 1978) the estimated percentage of open wick lamps, hurricane lanterns and other lamp types used in the survey village was 76%, 19% and 5% respectively.

The total consumption of energy for lighting depends on the number of households, number of rooms per households and the duration of lighting per night rather than per capita. In the BEPP study, it has been estimated that in rural households kerosene lamps are used on an average for three lamps-hours per night.

Kerosene consumption by different open wick lamps (Kupees) and hurricane Lanterns (climency) available in Bangladesh has been assessed through of BEPP study and the results are shown in Table 2.6. At the rate of 3.0-4.5 lamps-hours per night, monthly kerosene consumption has been estimated as 0.42 gallon/household (0.83 GJ/household/year). It may be noted that with

the same kerosene consumption, the improved Kupee developed by BCSIR may operate for 8-12 lamp-hours per night. The introduction of this kupee has the prospect of either saving kerosene or else enabling light to be used longer for the same amount of fuel. No information was available to correlate the luminosity and kerosene consumption by traditional kupees and the BCSIR improved kupee. Users acceptance of the improved kupee will depend on kerosene consumption, luminosity and convenience of handling this device compared to the traditional devices (GOB 1985a).

In 1981, out of a total of 12,739 thousand rural households, only 2 thousand had electricity connections for lighting while the remainder used kerosene for lighting. On the basis of 0.42 gallon/households/year (0.83 GJ/household/year), the total consumption of kerosene for rural domestic lighting was estimated as 229 thousand tonnes (GOB 1985a).

According to BEPP, of the total fuel consumed in rural households 97.3% was supplied by biomass fuels and used for cooking and food processing. The remaining 2.7% was supplied by commercial fuels and was used for household lighting. In a rural energy study in Barisal district Islam (1980) estimated that 92.7% of total energy consumed was supplied by biomass fuels and 7.3% was supplied by kerosene.

2.2.2 Commercial Energy for Irrigation and Industries

Energy is needed in rural industries in the form of high and medium temperature heat, shaft power and light. Both locally available biomass fuels and commercial fuels are used for heating purposes. Shaft power is obtained from human and animal muscle power, steam engines using biomass fuels, diesel engines and electric motors.

The major problem in estimating energy consumption is the lack of systematic data on energy use in rural industries. Moreover, there is also a problem with the definition of rural industries. Generally they are assumed to be small cottage industries although similar industries are also located in urban areas (e.g. bakery). On the other hand there are large industries located in rural areas consuming biomass fuels as the major source of energy, particularly the agro-processing industries (e.g. sugar mills). In certain rural industries biomass fuel is supplemented or substituted by a commercial fuel (such as furnace oil) to meet shaft power.

In agricultural sector commercial energies have two type of use direct use and indirect use. In one hand commercial energies (such as electricity and diesel) are directly used for irrigation to increase agricultural production. On the other hand commercial energies (such as gas and electricity are indirectly used for agricultural production through chemical fertilizer and pesticides.

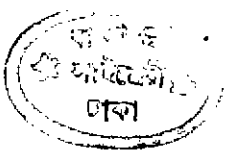
2.3 Rural Energy Consumption

The summary of various types of energy sources consumed in rural areas of Banglaeesh in 1981 as estimated by BEPP is shown in Table 2.7. The following observation may be made with reference to the data presented in the table.

i) 73% of the total energy was consumed for subsistence purposes.

ii) Only 27% of the total energy was used for productive purposes of split 10% and 17% respectively between agriculture and industries.

iii) Of the total energy within the village area consumed 88% was met from local sources and 12% was supplied from outside. The latter comprising kerosene, diesel, electricity and fertilizer which are vital for increasing agricultural production as well as to provide biomass fuels.



3.0 RESEARCH PROGRAMME

3.1 Concept of the Present Study

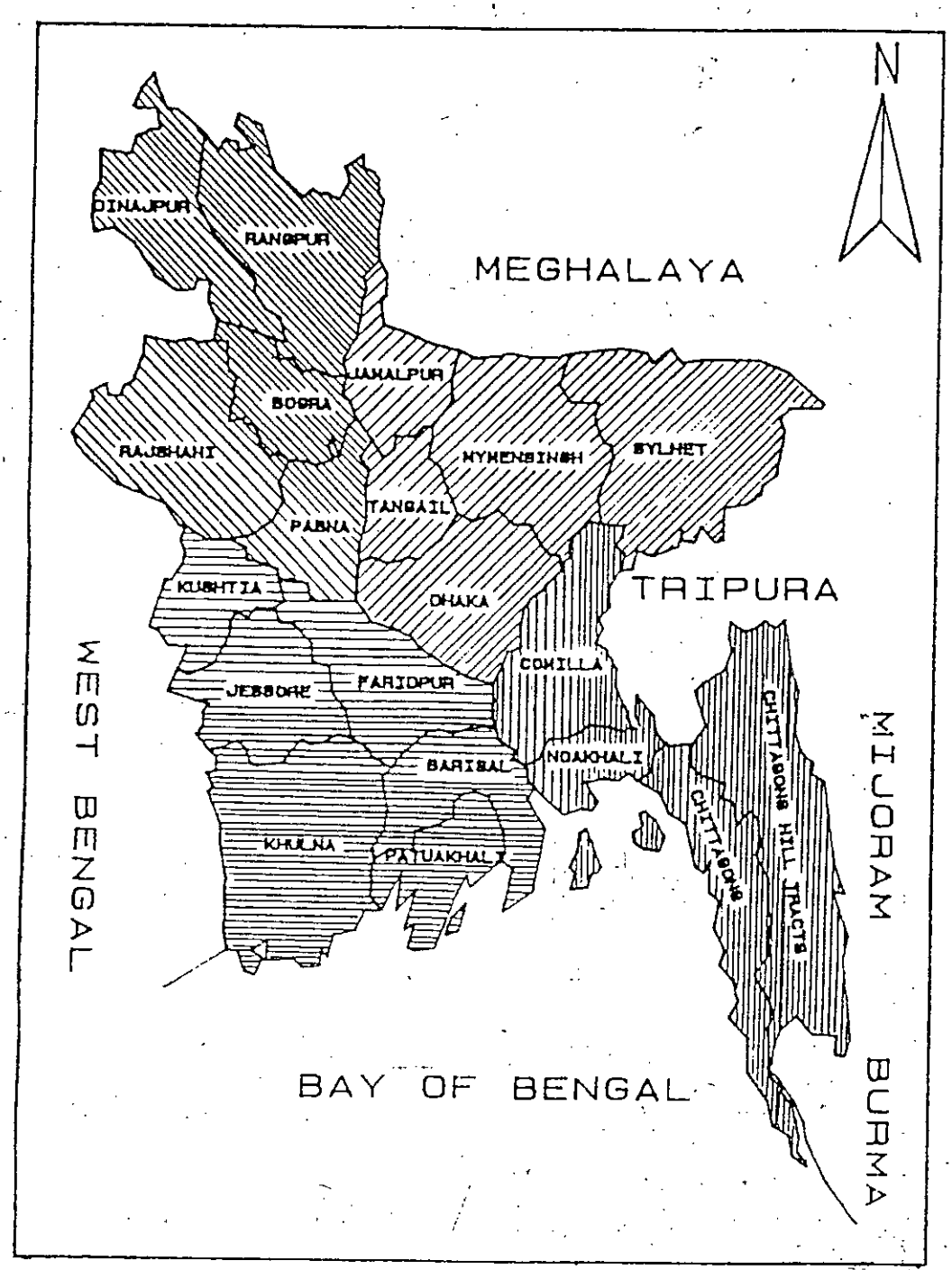
It has been discussed earlier that supply and demand of biomass fuels and other sources of energy in rural areas are dependend on locations. In BEPP study for systematic assessment of biomass fuels the country has been divided into four regions (Fig. 3.1.1) on the basis of agro-climatic and hydrological parameters. The regions are south-east, south-west, north-east, north-west. Although in BEPP study the supply of biomass fuels has been estimated according to regions and districts, due to the absence of reliable location specific data demand of biomass fuels has not been disaggregated at the regions and district level. It may be observed from Table 3.A that except the north-east region some village energy surveys have been carried out in the other three regions.

With a view to meet the data gap it was decided to undertake a village energy study in the north-east region.

Although rural electrification has been considered as a national programme for the delivery of commercial energy in rural areas; no previous village energy study has considered this aspect. It was therefore decided to extent the scope of present study to include an electrified village.

Due to the availability of limited resources and time it was decided to conduct the study in two closely located villages of the north-east regions; one electrified village and one non-electrified village.

FIGURE 3.1.1 DISTRICTS AND REGIONS OF BANGLADESH



Source: BEPP (GOB 1985).

Table: 3.A

Summary of Village Energy Survey Locations

Reference	REGION OF BANGLADESH			
	South-east	South-west	North-east	North-west
Briscoe 1979	Comilla			
Islam 1980		Barisal		
Quader-Omar 1982				Rangpur
Islam 1984		Khulna		
*Present Study 1986			Mymensingh	

Note:

South east: Comilla, Noakhali, Chittagong, Chittagong Hill Tracts.

South west: Kushtia, Jessore, Faridpur, Barisal, Patuakhali.

*North east: Jamalpur, Mymensingh, Sylhet, Tangail, Dhaka.

North west: Dinajpur, Rangpur, Bogra, Rajshahi, Pabna.

3.2 Objectives

With a view to implement the concepts discussed in the previous section, the present study has been undertaken to achieve the following objectives.

(a) To make a comparative assessment of energy situation (i.e. traditional and commercial sources) in an electrified and a non-lectrified village of the north-east region.

(b) To compare the findings of the present study with that of previous rural energy studies carried out in Bangladesh.

(c) To generate data for rural energy planning.

(d) To identify policies and strategies for planning and development of energy resources for rural areas.

3.3 Research Methodology

The present study follows a methodology based on quantitative and qualitative approach. The following steps have been followed to carry out the present research work.

(a) Literature survey

(b) Reconnaissance visit

(c) Preparation of questionnaires

(d) Field survey

(e) Processing and analysis of data.

3.3.1 Literature Survey

A critical assessment of the available literature on rural energy studies carried out in Bangladesh has been presented in Chapter 2 with a view to have a better understanding on the subject and to make the comparative assessment with the findings of the present study.

3.3.2 Reconnaissance Visit

For any village level survey familiarity with the survey area and knowledge about the socio-cultural practices of the survey population are considered added advantages to collect reliable data.

Because of author's familiarity in Mymensingh district a reconnaissence visit was undertaken in this district and ultimately two villages (Baruka and Chaknaju in Fulbaria and Mymensingh Sadar Upazilas respectively) were selected for the purpose of the study. The locations of the study areas are shown in Figure 3.1.2. Simultaneously contacts were established with the local government officials, REB officials and rural elites of the selected locations for secondary data and to solicit their co-operation and support in conducting the study.

3.3.3 Preparation of Questionnaires

The following four sets of questionnaires were developed for gathering data.

i) Household questionnaire

ii) Rural Industry questionnaire

iii) Mechanized Irrigation questionnaire

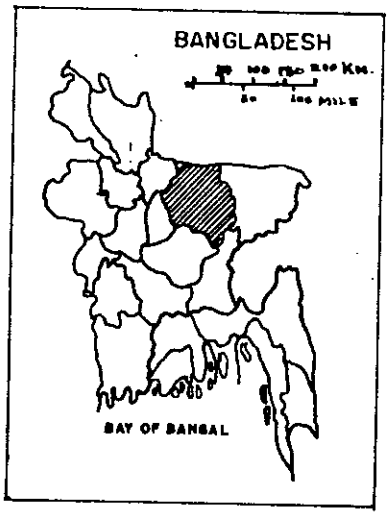
iv) Traditional Irrigation questionnaire

The questionnaires were developed in computer coded format for rapid processing and analysis of data.

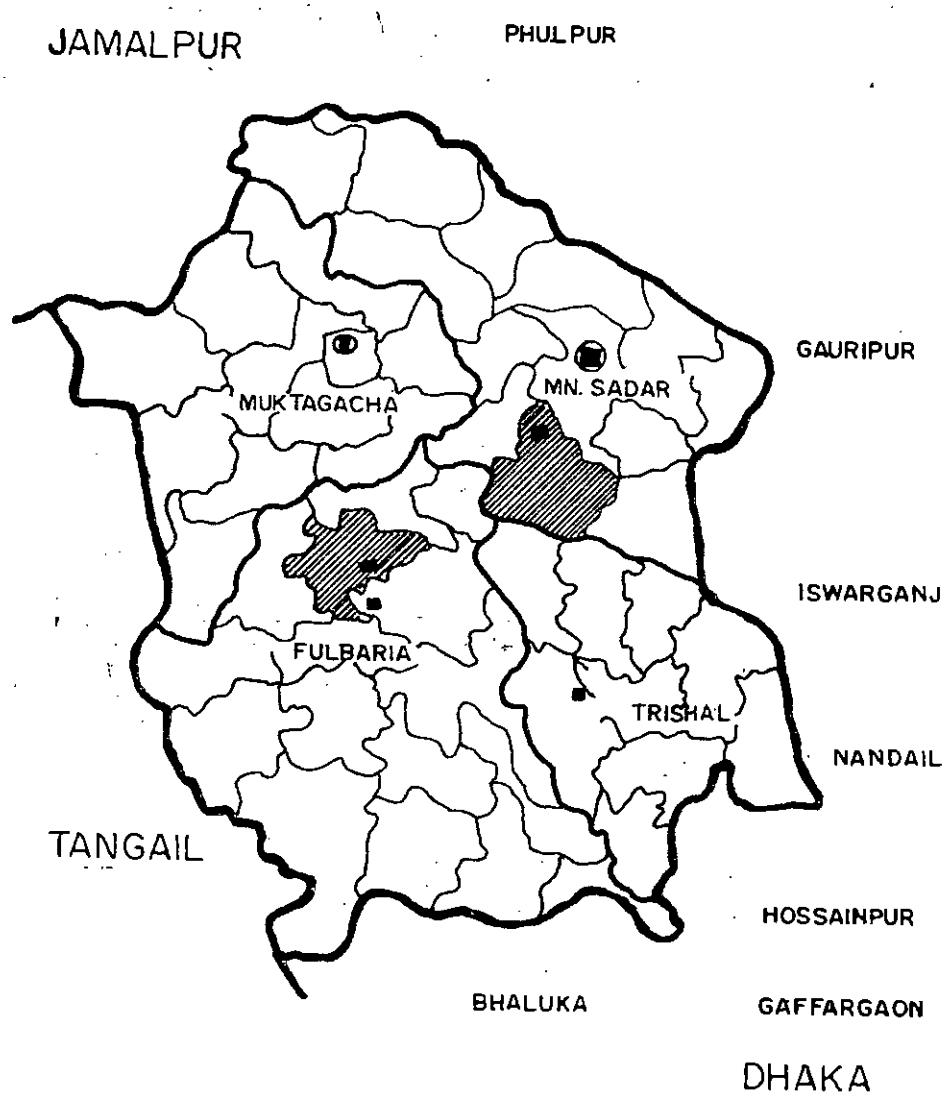
Draft questionnaire of each category was pre-tested in both the selected villages. The author and the filed investigators were involved in pre-testing the questionnaires. Then the final questionnaires were developed on the basis of experience of pre-testing.

A brief description of each type of questionnaire is presented in the following paragraphs. As most of the informations were gathered through household questionnaire a copy (english translation) of which is presented in Appendix-A.

FIGURE: 3.1.2 LOCATION OF THE STUDY AREAS



MYMENSINGH DISTRICT



LEGEND

- DISTRICT BOUNDARY
- UPAZILA BOUNDARY
- UNION BOUNDARY
- UPAZILA HEADQUARTER
- POURSHAVA HEADQUARTER
- STUDY VILLAGES

3.3.3.1 Household questionnaire

Various information gathered through the household questionnaires were as follows: socio-economic aspects, ownership of resources and their uses, sources of energy, types of energy, consumption pattern of energy, cost of energy, end uses of energy & food consumption.

3.3.3.2 Rural industry questionnaire

Information gathered through the rural industry questionnaires were as follows: name of the owner of industry, type of industry, primary and secondary sources of income, number of labour employed in the industry, operating hours - seasonal and daily, financial sources for industry, type of raw materials used, sources of raw materials, type of fuel used, total production of goods and, market price of the produced goods.

3.3.3.3 Traditional irrigation questionnaire

The following information were collected through the traditional irrigation questionnaire: type of irrigation implements, number of implements used, costs method of fabrication, ownership of the device, operating hours per year, command area covered for irrigation, types of crops irrigated, costs of irrigation.

3.3.3.4 Mechanized irrigation questionnaire

Various information gathered through the mechanized irrigation questionnaire were as follows: type of irrigation device, number of device used, costs, ownership of the device, operating hours per year, command area covered for irrigation, frequency of irrigation, type of irrigation unit used, type of fuel used, sources of power and, cost of irrigation incurred.

3.3.4 Field Survey

Some of the important factors considered in implementing the field survey are listed as follows:

(a) In order to facilitate data gathering on irrigation, field survey was scheduled in dry season (January-February).

(b) The author was directly involved in the survey operation and was assisted by investivators 8 in Baruka and 6 in Chaknaju village.

(c) The supply and demand of energy resources are related to socio-economic parameters. With a view to identify their effect, it was decided to conduct a total census survey of all the consumption units (e.g. households, industries, irrigation units etc.) rather than a representative sample population of each category.

(d) It may also be mentioned that for two villages man-day required for total census survey and preliminary survey followed by sampling and actual survey probably would have been same. But the former method that is followed in the present study provided much detail information than the latter.

(e) Available time to carry out the field survey was considered inadequate to include direct measurement of energy consumption parameters. The information were gathered on the basis of memory recall of the respondent.

3.3.4.1 Data collection from primary sources

Each head of households was approached with the household questionnaire to collect necessary information. With repeated efforts it was not possible to gather information from all the households listed in Union Parishad Office. The total number of household questionnaires filled in were 742 (74.8%) and 259 (80.2) in village Baruka and Chaknaju, respectively.

The owners of rural industries consuming fuel energy were approached for gathering information in industry questionnaire. Total number of respondents in the village Baruka were 9. There was no industry in village Chaknaju.

Data for mechanized irrigation questionnaire were gathered from the managers of the respective irrigation device. Total number of filled in questionnaire were 6, in the village Baruka. There was no mechanized irrigation device in village Chaknaju.

The user of traditional irrigation implements (e.g. swing-basket, doon) were approached to fill traditional irrigation questionnaires. Total number of filled in questionnaire were 254 and 96 in the village Baruka and Chaknaju respectively.

3.3.4.2 Data collection from secondary sources

With the progress of field survey in the selected villages the author also gathered information related to the present study from the local Union Council and the office of the General Manager of Palli Biddut Unnayan Samittee (PBS)-1, MymensingH.

3.3.5 Participatory Observation

In addition of various information gathered through different questionnaires and local secondary sources the author also held discussions with landless labourers, rural leaders, union council members, chairman and selected respondents about the various issues related to rural energy. The experience of these exercise have been cited in appropriate place in interpreting the survey results.

3.3.6 Processing and Data Analysis

For the purpose of computer analysis data from filled in questionnaire were tabulated in computer coded form. The data from the coding sheets were punched into diskettes and then verified by the author. A computer programme based on SPSS had been developed by the author for processing and analysis of data. There were 314 variables in the household questionnaire. The variable name has been coded and presented in the programme under the control card "DATA LIST". These variables that were not coded during the field survey were coded and some of the pre-coded variables were recoded for the purposes. The programme is presented in Appendix-B. This programme was then run on computer model IBM-370 for necessary analysis. According to the requirement for the present study different frequency tables of the variables and cross tabulation tables were developed through the computer programme. The result of these analysis have been presented in Chapter 4.

4.0 STUDY FINDINGS

4.1 Introduction

Before presenting the data on survey findings, a brief description about the survey areas has been presented in this section on the basis of secondary information. Hierarchical position of survey villages corresponding to different administrative units of the country is shown in Fig. 4.1.1.

The survey village Baruka (electrified) is one of the village of Fulbaria Upazila. It is at a distance of 21 kilometres from District head quarter and 3 kilometres from Fulbaria Upazila head quarter.

The survey village Chaknaju (non-electrified) is one of the village of Mymensingh Sadar Upazila. The distance of this village from the District head quarter (and also from Upazila headquarter) is about 10 kilometres.

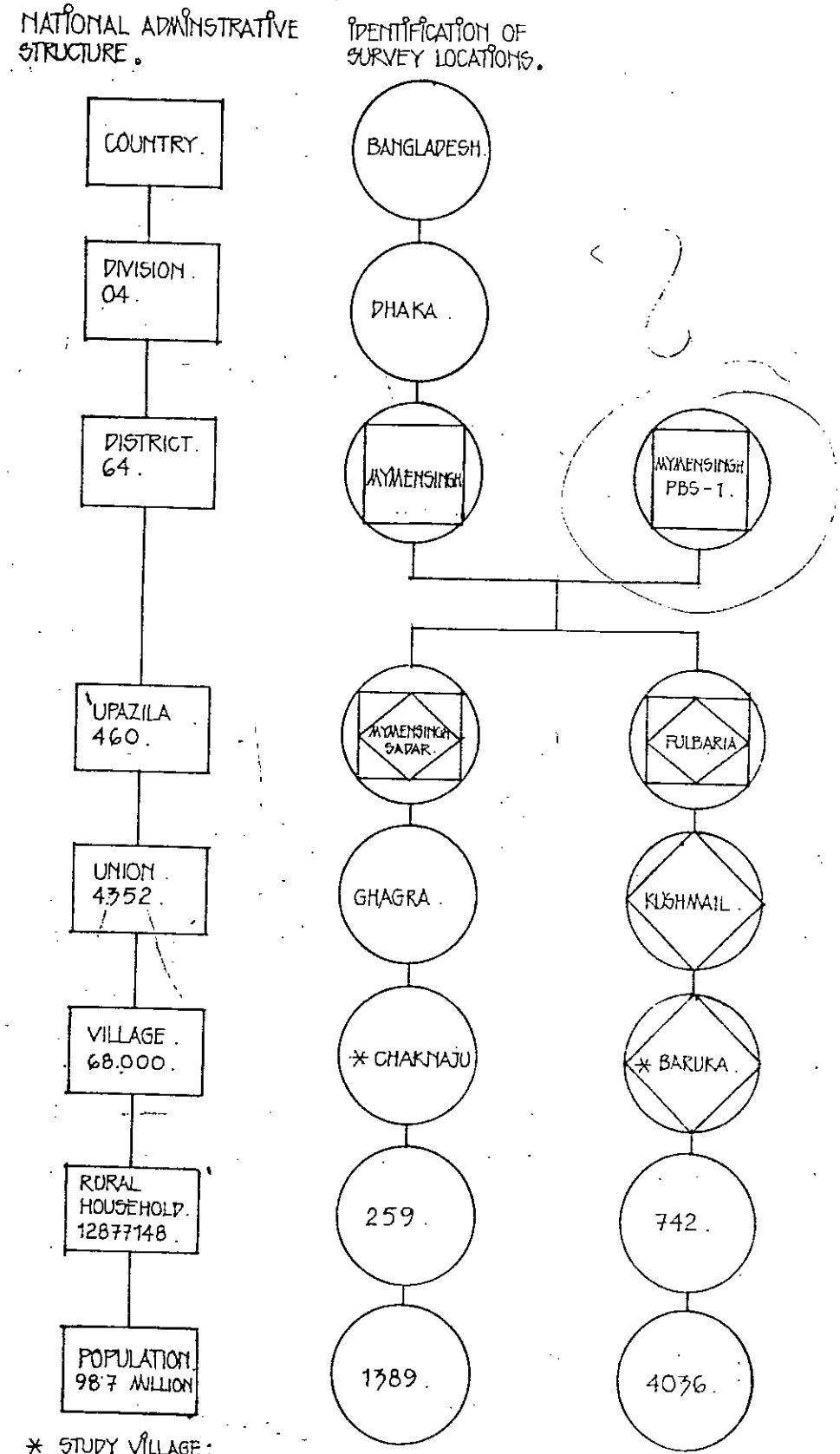
The two survey villages are located at a distance of about 16 kilometres apart from each other. Under the present concept of decentralized development, Upazila is considered as the planning unit for development. Comparative profiles of Fulbaria and Mymensingh Sadar Upazilas have been presented in Table 4.1.1 to provide a general idea about the survey locations. Summary of observations about the two upazilas are as follows:

(a) Mymensingh Sadar Upazila is more urbanized than Fulbaria upazila as it is located in the district head quarter.

(b) Literacy rate is higher in Mymensingh Sadar upazila as large number of educational insitutions are located there.

Demographic and other socio-economic characteristics of the study areas and their respective unions and upazilas have been presented in Table 4.1.2 to Table 4.1.4 to provide a general idea about the survey locations. It may be observed from the tables that there are no marked differences between the data of the two survey villages except that in Baruka village 34.79% of the total population reported not working in comparison to 7.93% in Chaknaju village (Table 4.1.4). This may be due to the variation of urbanization pattern of Fulbaria and Mymensingh sadar upazilas respectively. In latter case landless population might have better employment opportunity in the district headquarter.

FIGURE 4.1.1. HIERARCHICAL POSITION OF SURVEY VILLAGES CORRESPONDING TO DIFFERENT ADMINSTRATIVE UNITS OF BANGLADESH.



NOTE: * STUDY VILLAGE;
◇ INDICATES ELECTRIFIED.

Detail tabulated data on survey findings have been presented in Appendix-I reference to each subsection. For the same type of information data on village Baruka (electrified) and Chaknaju (non-electrified) have been indicated by (b) and (c) respectively on the data tables. Summary of information showing the comparative data of the two sutdy villages have been presented in the text.

4.2 Demographic Information

Distribution of population according to age group is shown in Table 4.2.A (summerised from Table 4.2.1). It may be noted from the table that in both the villages more than fifty percent of total population was in the age group of 0-19 years. Data on distribution of family size according to landholding size are shown in Table 4.2.2 and the summary is presented in Table 4.2.B. Percent distributions of households in both the villages are similar to that of the data obtained for Mymensingh District by Housing Census, 1973 (GOB 1982).

4.3 Socio-Economic Conditions

In the present study rural households have been classified into three categories namely: nucleus family; extended family and combined family. A nucleus family consists of husband, wife and children. An extended family consists of the members included in nucleus family and the parents of husband. In a combined family, members include husband-wife; children; parents, brother and sisters of husband. Data presented in Table 4.3.A (summarized from Table 4.3.1) indicate that majority of the households in both the villages was nucleus family.

Distribution of households according to the size of cultivated land is shown in Table 4.3.2 and the summary informations about the two villages are shown in Table 4.3.B. It may be observed from Table 4.3.B that percent of landless households was less in Baruka Village (23.5%) in comparison to Chaknaju (39.0%). However, it has been discussed earlier (section 4.1) that 34.79% and 7.93% population of the respective villages reported as non working.

Table 4.2.A

Population Distribution by Age Group

Village	Age in Years 0-9	10-19	20-29	30-39	40-49	50+
	(Percent)					
Baruka	31.7	19.3	17.6	11.8	9.8	9.8
Chaknaju	31.5	20.2	18.6	11.8	9.6	8.3

Detail data are in Table 4.2.1 (Appendix-I)

Table 4.2.B

Distribution of Family Size

Village	Number of Person Household 1	2	3	4	5	6	7	8	9	10+
	(Percent)									
Baruka	0.9	9.3	15.1	14.8	17.4	12.7	11.9	5.9	5.4	6.6
Chaknaju	0.8	10.4	14.7	18.5	16.6	15.1	5.4	4.6	6.9	6.9

Detail data are in Table 4.2.2 (Appendix-I)

Table 4.3.A

Type of Families

Village	Type of Family in Percent		
	Nucleus*	Extended	Combined
Baruka	85.3	12.5	2.2
Chaknaju	87.3	10.4	2.3

Detail data are in Table 4.3.1 (Appendix-I)

Table 4.3.B

Distribution of Households According to the Size of Cultivated Land

Village	Size of Cultivated Land (acre)						
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+
	Percent Household						
Baruka	23.5	53.8	14.8	3.4	0.9	0.5	3.1
Chaknaju	39.0	38.6	13.5	4.6	0.4	0.4	3.5

Detail data are in Table 4.3.2 (Appendix-I)

Data presented in Table 4.3.B and Table 4.3.C do not indicate any significant difference in the destribution of households according to the size of cultivated and own land respectively.

Distribution of households according to annual income and the size of cultivated land is shown in Table 4.3.3 and summary data on household income are shown in Table 4.3.D. Data presented in Table 4.3.D do not indicate any significant difference between the villages in the distribution of households according to annual income. In both the villages majority of the households (55%) was in the income group of Tk. 6000-17,999.

Distribution of family size, cultivated land and homestead land is shown in Table 4.3.E. It may be observed that in both the villages family size increased with the increase in landholding size upto 7.5 acres then decrease at landholding size greater than 7.5 acres. It may be that at higher landholding size part of the family members live in nearby urban areas.

Land is the basic means of production in rural areas providing food, fodder, fuel, building materials, industrial raw materials etc. Most of the productive activities are land based and carried out for subsistence living and there is very limited cash transactions of consumeable items. Because of these reasons land is considered as a better socio-economic indicator than reported income (which is less reliable) for analysis of data.

Because of the existence of share cropping and leasing system size of own land fail to reflect the dynamics of land based productive system related to supply and demand of energy sources. In this background operational landholding (cultivated land = own land $\pm$ sharecropping or leasing) has been considered for further analysis of data.

It may be observed from Table 4.3.F that distribution of households according to primary and secondary occupation are similar in both the villages. Percentage of population having primary occupation as labourer in Baruka and Chaknaju villages are 24% and 33.2% respectively; which are similar to that of the percentage of landless population in those two villages (23.5% and 39% respectively) as shown in Table 4.3.B.

Table 4.3.C

Distribution of Households According to the Size of Own Land

Village	Size of Own Land						
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+
	Percent Households						
Baruka	24.7	54.9	11.5	4.3	1.1	0.7	3.0
Chaknaju	42.9	35.9	12.0	3.9	1.2	0.8	3.5

Detail data are in Table 4.3.2 (Appendix-I)

Table 4.3.D

Distribution of Households According Annual Income

Village	Annual Income in Taka				
	0-5999	6000-17999	18000-29,999	30,000-59,000	60,000+
	Percent Households				
Baruka	10.1	55.1	21.4	11.5	1.9
Chaknaju	17.8	55.2	15.4	10.4	1.2

Detail data are in Table 4.3.3 (Appendix-I)

Table: 4.3.E

Distribution of Family Size, Cultivated and Homestead Land.

Village: Baruka

Description	Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
Number of household	174	399	110	25	7	4	23	742
Number of Person	776	2024	816	217	73	40	90	4036
Family Size (Person/household)	4.45	5.07	7.41	8.68	10.42	10.0	3.91	5.44
Cultivated land (acres)	0	78.07	76.24	29.98	11.78	13.79	174.8	384.66
Homestead Land (acres	4.38	13.73	5.74	1.5	0.56	0.2	3.43	29.55

Village: Chaknaju

Description	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
Number of households	101	100	35	12	1	1	9	259
Number of Persons	452	501	268	119	6	10	33	1389
Family Size (Person/household)	4.47	5.01	7.65	9.91	6.0	10.0	3.66	5.36
Cultivated Land (acres)	0	18.68	25.77	14.57	1.58	4.13	68.4	133.13
Homestead Land (acres)	2.43	2.91	1.81	0.90	0.13	0.07	1.47	9.72

Table: 4.3.F

Distribution of Population According to Primary and Secondary Occupations

Occupation	Village Baruka				Village Chaknaju			
	Primary		Secondary		Primary		Secondary	
	Number	%	Number	%	Number	%	Number	%
Agriculture	426	57.4	71	9.6	109	42.1	23	8.9
Business	42	7.0	150	20.2	30	11.6	34	13.1
Service	42	5.7	28	3.8	11	4.2	3	1.2
Farm Labour	150	20.2	68	9.2	69	26.6	33	12.7
Other Labour	28	3.8	105	14.2	17	6.6	8	3.1
All crafts	36	4.9	20	2.7	20	7.7	2	0.8
Active Unemployment	3	0.4	3	0.4	20	0.4	8	3.1
Inactive	5	0.7	4	0.5	2	0.8	0	0
Total	742	100	449	60.5	259	100	111	42.9

4.4 Housing Condition

Distribution of households according to number of dwelling units and landholding size is shown in Table 4.4.1. It may be observed from summary Table 4.4.A that in both the villages majority of the households had one dwelling unit.

It was observed during preliminary survey that some of the dwelling units had more than one room. The use of illuminating devices are related to number of rooms rather than dwelling units. Distribution of households according to number of living rooms and landholding size is shown Table 4.4.2. It may be observed from Table 4.4.B that majority of households in both the villages live in single room accommodation. Proportion of single room households in Mymensingh district estimated by the Housing Census of 1973 was 43% and the data for single room households obtained in the survey villages are much higher (66% in Baruka and 79.5% in Chaknaju) than the housing census.

Distribution of households by the type of roofing materials and landholding size is shown in Table 4.4.2 and data for the two villages are summarised in Table 4.4.C. It may be observed from Table 4.4.C that majority of households (54.4% in Baruka and 56% in Chaknaju) in both the villages are having roof made of straw and leaves. Accroding to Housing Census of 1973, in Mymensingh district proportion of households having straw and C.I. sheet roofing materials were estimated as 61% and 37% respectively. It may be noted that in Bangladesh lot of biomass materials are used as building materials; which at the time of replacement are used as fuel.

Distribution of households according to sources of drinking water is shown in Table 4.4.3. It may be observed from the summary Table 4.4.D that majority of the households (88% in Baruka and 77.6% in Chaknaju) use drinking water from hand tubewell. Percent of household having potable water in Baruka and Chaknaju were reported as 59.6% and 50.8% respectively (Table 4.1.3).

Distribution of households according to the number of separate kitchen other than the dwelling unit is shown in Table 4.4.E. These data may be useful in deciding strategy for the introduction of improved stoves.

Table: 4.4.A

Number of Dwelling Unit.

Village	Number of Dwelling Units						
	0	1	2	3	4	5	9
	(percent households)						
Baruka	0.5	84.5	13.1	1.3	0.4	0.1	-
Chaknaju	0.8	76.4	15.1	6.2	0.8	0.4	0.4

Detail data are in Table 4.4.1 (Appendix-I)

Table: 4.4.B

Distribution of Households According to the Number of Living Rooms

Village	Number of Living Rooms				
	1	2	3	4	5+
	(Percent Households)				
Baruka	66.1	28.4	4.4	0.5	0.7
Chaknaju	79.5	13.5	3.5	1.9	1.9

Detail data are in Table 4.4.2 (Appendix-I)

Table: 4.4.C

Type of Roofing Materials Used in Dwelling Units

Village	Type of Roofing Materials		
	Straw and Leaves	Corrogated Iron Sheet	Others
	(Percent Households)		
Baruka	54.4	45.3	0.3
Chaknaju	56.0	43.2	0.8

Detail data are in Table 4.4.3 (Appendix-I)

Table: 4.4.D

Sources of Drinking Water Used in the Villages

Village	Source of Drinking Water				
	Pond or River	Mud Well	Pucca Well	Hand Tubewell	Deep Tubewell
Baruka	2.3	7.7	1.3	88.0	0.7
Chaknaju	17.8	2.3	2.3	77.6	0.0

Detail data are in Table 4.4.4 (Appendix-I)

Table: 4.4.E

Distribution of Kitchens

Village	Number of Separate Kitchen		
	0	1	2
	(Percent Household)		
Baruka	11.7	87.6	0.7
Chaknaju	25.5	73.4	1.2

4.5 Tree Resources

It has been discussed in Chapter 2 that tree resources grown in rural areas play an important role in providing biomass fuels. Various information related to tree resources of the study villages have been presented in this section.

In rural areas traditionally multipurpose trees are grown in privately owned homestead areas. Distribution of tree resources according to size of homestead land is shown in Table 4.5.1. Maximum size of the homestead land is 0.5 acres and number of trees per households increases with the increase in size of homestead areas. The present estimate provides an approximate idea about the number of trees but it does not indicate about the size of trees.

In both the villages, Baruka and Chaknaju, majority of the trees were fruit trees (61.3% and 71.4%)respectively. The total number of trees per household in the study villages (10.1 and 13.4 in Baruka and Chaknaju) are less than that estimated by Brisco (1979) in Comilla district (40 trees per household) and by Islam (1980) in Barisal district (51 trees per household). In the latter study higher number of trees were due to the existence of guava orchard in the survey area.

It may be noted from Table 4.5.1 that in Baruka village 93% households were in homestead land area category of 0.005 - 0.1 acre and owned 91% of the tree resources. In Chaknaju village under the same landholding category 93% households owned 93% trees. It is interesting to note that the tree resources are uniformly distributed among different households. It confirms the cultural practice of growing trees by all rural households observed by the author during the field survey.

In the absence of data on homestead land area and in consideration to the practice of growing some trees around farm land distribution of tree resources is also considered according to the size of cultivated land. For the present study these data are shown in Table 4.5.2. It may be noted from the table that in both the villages the proportions of tree resources owned by landless households were more than their proportion among the total households. In Baruka villages upto the landholding size of 2.5 acres, 96.7% households

Table: 4.5.A

Type of Trees in Study Villages

Villages	Type of Trees			
	Fruit	Fuelwood	Timber	Total
	(Number of Trees/households)			
Baruka	6.19	3.90	0.004	10.09
Chaknaju	9.60	3.74	0.10	13.44

Detail data are in Table 4.5.1 (Appendix-I)

Table: 4.5.B

Distribution of Tree Co-efficients According to the Size of Cultivated Land

Description		Farm Size (Acres of Cultivated Land)							
		Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
Tree/acre of homestead area	B	277.98	280.49	278.21	393.31	169.64	638.50	3.21	
	C	316.07	483.86	475.08	453.54	250.0	181.82	6.13	
Tree/Person	B	1.57	1.90	1.96	2.71	1.30	3.4	0.12	
	C	1.70	2.81	3.20	3.45	5.5	1.2	0.27	
Tree/Household	B	6.99	9.64	14.55	23.53	13.57	34.0	0.68	
	C	7.60	14.09	24.5	34.16	33.0	12.0	0.99	

B- Baruka , C- Chaknaju

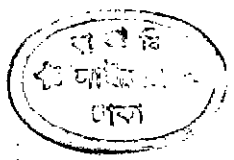
owned 97.5% trees. In Chaknaju village upto the same landholding group (2.5 acres) 99.44% households owned 96.1% trees. The uniform distribution of trees resources observed in the study villages is contrary to the findings of Brisco (1979) in Comilla district where it was reported that 16% households owned 80% of trees.

Distribution of different co-efficient of tree resources with respect to homestead area, number of persons, number of households according to the size of cultivated land is shown in Table 4.5.B. These data may be used for planning and development of tree resources in rural areas.

4.6 Land and Crops

Distribution of cropped areas according to the size of cultivated land is shown in Table 4.6.1. It may be observed from the table that in both the villages major portion of reported cropped land was used for growing food crops.

Distribution of different type of crops and crop residues as reported by the respondents is shown in Table 4.6.2 and 4.6.3 respectively. It may be noted that the data presented in the tables indicate the quantity of product by different category of households. Due to insufficient information about the ownership of resources and crop sharing arrangement it was not possible to ascertain the quantity of products actually available to the respective group of households. On total household basis the quantity of food grain produced in Baruka and Chaknaju villages were 1152 kg/household/year (212kg/person/year) and 674 kg/household/year (126 kg/person/year) respectively.



4.7 Livestock Resources

In rural areas of Bangladesh cattle population play very important role in providing draft power needed for land preparation, crop threshing, and transport. Dung available from livestock resources is used as manure and fuel. Information about the livestock resources are presented in this section.

Distribution of total livestock resources and adult cattle (bullock + cow) are shown in Table 4.7.1 and Table 4.7.2 respectively. Availability of bullock and adult cattle per acre of cultivated land is shown in Table 4.7.A.

Household distribution of different types of livestock resources is shown in Table 4.7.3 and is summarised in Table 4.7.B.

Distribution of the size of the adult bullock by landholding size is shown in Table 4.7.4 and is summarised in Table 4.7.C. Data on distribution of adult cow are shown in Table 4.7.D.

Distribution of usage of own draft animal and hired draft power are shown in Table 4.7.5 and Table 4.7.6 respectively. Summary informations are shown in Table 4.7.E and 4.7.F respectively.

Seasonal distribution of shortage of draft power is shown in Table 4.7.7. It may be observed from the table that in both the study villages most of the households (80%) in the landholding category upto 0.5 acres reported the shortage of draft power in both the seasons. It indicates that the resources available to this category of household is insufficient to maintain animal for draft power.

Individual households practiced different strategies in meeting seasonal draft power shortage were: hire (cost of bullock power in terms of days is paid in cash), exchange (receiver pay back the cost of bullock power by allowing to use his own bullock power at another time), purchase (purchase of new bullocks permanently or for a particular season), lending (borrowing of bullock power, cost may be paid in kind).

Table: 4.7.A

Availability of Draft Power

Village	Number of adult animals per acre of land		
	Bullock	Cow	Cattle (Bullock + Cow)
Baruka	0.52	1.2	1.72
Chaknaju	0.75	0.83	1.58

Detail data are in Table 4.7.2 (Appendix-I)

Table 4.7.B

Household Distribution of Livestock Resources

Village	Number of animals per household			
	Adult Bullock	Adult Cow	Adult Cattle	Goat and Sheep
Baruka	0.27	0.62	1.18	0.69
Chaknaju	0.39	0.43	1.10	0.27

Detail data are in Table 4.7.3 (Appendix-I)

Table: 4.7.C

Distribution of Size of Adult Bullocks

Village	Number of Adult Bullocks								
	0	1	2	3	4	5	6	7	8
	(Percent household)								
Baruka	83.7	7.5	7.5	-	1.2	-	-	-	-
Chaknaju	75.3	13.9	9.7	0.8	-	-	-	-	0.4

Detail data are in Table 4.7.4 (Appendix-I)

Table: 4.7.D

Distribution of Size of Adult Cow

Village	Number of Adult Cows								
	0	1	2	3	4	5	6	7	8
	(Percent household)								
Baruka	57.7	25.9	14.0	1.6	0.4	0.3	0.1	-	-
Chaknaju	70.7	18.1	9.7	0.8	0.8	-	-	-	-

Table: 4.7.E

Usage of Own Draft Animals

Village	Usage of Own Draft Animals (No/household)		
	Land Preparation	Paddy Threshing	Transport
Baruka	0.85	0.80	0.003
Chaknaju	0.69	0.39	0

Detail data are in Table 4.7.5 (Appendix-I)

Table 4.7.F

Usage of Hired Draft Power

	Usage of Hired Draft Power Bullock days/household/year		
	Land Preparation	Paddy Thershing	Transport
Baruka	10.31	5.86	0.01
Chaknaju	6.62	2.05	0

Detail data are in Table 4.7.6 (Appendix-I)

Distribution of strategies in meeting draft power shortage by landholding size is shown in Table 4.7.8 and is summarised in Table 4.7.G. As capital investment was necessary to purchase new bullocks, a very small number households practiced purchase of bullock to meet the shortage.

Distribution of the size of cattle heads by landholding size is shown in Table 4.7.9 and is summarised in Table 4.7.H. Dung available from four or more heads of cattle is necessary to operate a family size biomass plant. It may be noted that only 6.7% of total households in both the villages had more than four heads of cattle.

4.8 Consumption of Biomass Fuels

Consumption of different type of biomass fuels for household cooking in dry and wet seasons according to the size of cultivated land is shown in Table 4.8.1 and summerised in Table 4.8.A and Table 4.8.B.

Percapita consumption of biomass fuels in Baruka (7.79 GJ/year) and Chaknaju village (7.51 GJ/year) were higher than the previous value estimated in Table 2.2 (Islam 1984) for Mymensingh region (4.49 GJ/year). Such variation may be due to location specific nature of the present study.

It may be noted from Table 4.8.B that percapita consumption of biomass fuel increases as the size of landholding increases. However, percapita consumption of biomass fuels in study villages by different landholding groups was less than that estimated in Shakua village of Rangpur district. In Shakoa village consumption for landless and household with landholding size of 5-10 acres were 6.91 GJ/year and 13.59 GJ/year respectively (Quader and Omar 1982).

In Baruka village percapita consumption of biomass fuels in landless household (5.76 GJ/year) was 74% to that of the weighted average consumption (7.79 GJ/year) estimated on the basis of total population. In Chaknaju village consumption rating in landless households was 80% to that of the average value (7.51 GJ/year).

Table: 4.7.G

Methods for Meeting Draft Power Shortage

Village	Method Followed to Meet Draft Power Shortage (Percent of Household)			
	Hired	Exchange	Purchase	Lending
Baruka	32.2	20.7	0.8	11.6
Chaknaju	10.0	10.4	0.8	26.6

Detail data are in Table 4.7.8 (Appendix-I)

Table: 4.7.H

Size of Total Cattleheads

Village	Number of Total Cattle (Percent household)							
	0	1	2	3	4	5	6-8	8+
Baruka	49.2	15.6	20.4	8.0	3.1	1.6	1.3	0.7
Chaknaju	55.6	14.3	15.1	8.5	2.7	1.2	2.0	0.8

Detail data are in Table 4.7.9 (Appendix-I)

Table: 4.8.A

Type of Biomass Fuels

Village	Type of Biomass Fuels						Total weighted average
	Fuelwood	Twigs & Leaves	Straw	Husk	Jute Stick	Others Residues	
	(GJ/person/year)						
Baruka	2.52	2.0	1.19	1.16	0.9	0.02	7.79
(Percent)	(32.3)	(25.7)	(15.3)	(14.9)	(11.6)	(0.2)	(100.0)
Chaknaju	1.46	3.58	0.83	0.68	0.92	0.03	7.51
(Percent)	(19.4)	47.7)	(11.1)	(9.1)	(12.3)	(0.4)	(100.0)

Detail data are in Table 4.8.1 (Appendix-I)

Table: 4.8.B

Use of Biomass Fuels by Landholding Size

Village	Farm size (Acres of Cultivated Land)							Total weighted average
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	
	(GJ/person/year)							
Baruka	5.76	8.53	8.4	8.41	6.77	9.54	8.7	7.79
Chaknaju	5.99	8.61	9.19	7.57	6.09	6.47	6.01	7.51

Detail data are in Table 4.8.1 (Appendix-I)

Distribution of biomass fuels according to supply sources (own, gathered, purchased) and the size of cultivated land is shown in Table 4.8.2 and the summary of the proportion of fuel purchased in two villages is shown in Table 4.8.C. Generally it is believed that in rural areas biomass fuels are non-commercial commodity. Data in Table 4.8.C indicate that landless households with their meagre income are to purchase higher proportion of their fuels in comparison to higher landholding group.

Distribution of biomass fuels according to usages (food cooking, parboiling, other usages) is shown in Table 4.8.3. Percent of fuels used for food cooking is shown in Table 4.8.D. It may be observed that in comparison to higher landholding group, landless population consume higher proportion of biomass fuels for food cooking. In higher landholding group in addition to food cooking biomass fuels are also used for parboiling paddy, making Ghur, preparation of animal feed and to make hot water for washing clothes.

It has been reported in previous study (Islam, Morse and Soesastro 1984) that due to the benefit of economy of scale of cooking the per capita consumption of biomass fuels decreases with the increase of the number of household members (Table 2.5). The finding of the present study shown in Table 4.8.E.are also similar in nature. Data presented in the table also indicate the variation in per capita consumption of biomass fuels according to the increase of cultivated land (see also Table 2.3 and Table 2.4).

4.9 Consumption of Kerosene and Electricity

Distribution of kerosene consumption for cooking and lighting is shown in Table 4.9.1 and summary of kerosene consumption of the study village by landholding and by usage are shown in Table 4.9.A and Table 4.9.B respectively. It may be observed from Table 4.9.A that in both the villages consumption of kerosene per household increase with the increase in landholding size. Average consumption of kerosene per household in Baruka and Chaknaju village were estimated as 23.31 kg/year (1.07 GJ/year) and 38.62 kg/year (1.78 GJ/year) respectively. Estimated consumption of kerosene in the present study is higher than the estimate made by BEPP study (0.83 GJ/year) and lower than the estimate by Islam (1980) in a rural area of Barisal district (2.2 GJ/household). In both the villages kerosene was mainly used for lighting (Table 4.9.B).

Table: 4.8.C

Proportion of Biomass Fuels Purchased

Village	Farm Size						
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+
	(Percent of total biomass fuels purchased)						
Baruka	27.19	10.31	6.60	6.06	3.10	5.00	11.15
Chaknaju	23.10	13.22	10.85	7.07	0.00	15.00	14.11

Detail data are in Table 4.8.2 (Appendix-I)

Table: 4.8.D

Biomass Fuels Used for Food Cooking

Village	Farm Size (Acres of Cultivated Land)						
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+
	(Percent of biomass fuels used for food cooking)						
Baruka	80.0	67.0	66.0	67.0	68.0		92.0
Chaknaju	92.0	68.0	63.0	60.0	77.0	69.0	80.0

Detail data are in Table 4.8.3 (Appendix-I)

Table: 4.8.E

Consumption of Biomass Fuels According to Family Size and Size of Cultivated Land

Family Size	Farm size (Acres of Cultivated Land)													
	Landless		0-0.5		0.5-1		1-1.5		1.5-2.5		2.5-7.5		7.5+	
Number of household members	(GJ/person/years)													
	b	c	b	c	b	c	b	c	b	c	b	c	b	c
1	20.06	9.76	12.49	-	-	-	-	-	-	-	-	-	10.26	-
2	9.50	9.70	13.99	14.20	11.89	45.6	-	-	-	-	-	-	13.06	9.21
3	7.29	6.95	11.72	11.11	15.55	-	10.63	-	-	-	-	-	9.21	4.59
4	6.13	5.59	8.64	8.23	14.60	9.45	15.3	-	-	-	21.03	-	4.7	4.23
5	5.26	5.13	7.67	8.15	9.95	11.18	-	-	6.96	-	-	-	4.36	10.7
6	4.62	4.49	7.55	7.14	9.01	8.53	9.95	7.82	-	6.10	-	-3.03	3.03	3.46
7	4.69	4.15	5.26	5.69	7.36	6.79	13.42	-	6.39	-	-	-	4.27	-
8	2.85	2.89	5.42	7.0	6.86	8.25	7.30	16.78	-	-	-	-	4.51	-
9	4.43	2.39	4.95	8.54	6.70	9.01	8.57	6.18	9.76	-	-	-	-	-
10+	2.72	2.81	5.23	3.99	5.81	6.13	6.39	4.47	5.43	-	8.56	6.47	-	-
Weighted Average	5.76	5.97	8.53	8.61	8.4	9.19	9.41	7.57	6.77	6.09	9.54	6.47	8.70	6.01

For Village Baruka (b) Weighted Average Consumption = 7.79 GJ/person/year.

For Village Chaknaju (c) Weighted Average Consumption = 7.51 GJ/person/year.

Table: 4.9.A

Household Kerosene Consumption by Landholding Size

Village	Farm Size (Acres of Cultivated Land)							Total weighted average
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	
	(kg/household/year)							
Baruka	19.14	23.09	32.46	26.19	27.19	32.18	15.58	23.31
Chaknaju	31.65	37.17	52.93	67.18	55.98	61.98	23.64	38.62

Detail data are in Table 4.9.1 (Appendix-I)

Table: 4.9.B

Household Kerosene Consumption by Usage

Village	Usage kg/household/yr (%)		
	Cooking	Lighting	Total
Baruka	0.14 (1%)	23.17 (99%)	23.31 (100%)
Chaknaju	1.53 (4%)	37.09 (96%)	38.62 (100%)

Detail data are in Table 4.9.1 (Appendix-I)

For the electrified village (Baruka) domestic use of electricity for cooking and lighting is shown Table 4.9.2. Distribution of households according to the type of fuel use for lighting is shown in Table 4.9.3 and the summary is shown in Table 4.9.C. It may be noted from Table 4.9.C that in the electrified village 28% of households used electricity for lighting. But probably due to uncertainity in supply of electricity all most all the households also reported the use of kerosene for lighting. Because of partial substitution of kerosene in some households, average percapita consumption of kerosene in electrified village was less than that of non electrified village (Table 4.9.B).

Distribution of households according to type of fuel used for cooking is shown in Table 4.9.4 and summarised in Table 4.9.D. It may be noted that biomass fuels were the main cooking fuel for all the households. In Baruka and Chaknaju 1.3% and 12% households respectively also reported the use of kerosene for cooking. In Baruka 2% household used electricity for cooking.

4.9.1 Pattern of Electricity Use in Mymensingh PBS-1

It has been mentioned earlier that the study village Baruka is located within Mymensingh PBS-1. Available informations from local office of the Palli Biddhut Unnayan Samity about the pattern of electricity consumption in Mymensingh PBS-1 and in the study village (Baruka) have been presented in this section. Electrical distribution network of Rural Electrification Board in Baruka village is shown in Figure 4.9.1.

The Mymensingh PBS-1 was energised in March 1983. The pattern of electricity use in Mymensingh PBS-1 has been reported as in Table 4.9.E.

The pattern of electricity consumer connections in Baruka village in 1984, 1985, 1986 have been reported as 166, 19,2 respectively. The distribution of total 187 consumers in the electrified village has been reported as follows: Industry - 1 (0.5%), Agriculture - 3 (1.6%), Commercial - 12 (6.4%) and Domestic - 171 (91.4%). It may be noted that majority of the consumer had been in the domestic category. The number of households having electricity connections estimated by the field survey was 202. It means that more than one household was connected under one metre.

FIGURE : 4.9.1

ELECTRICAL DISTRIBUTION NET WORK OF REB IN BARUKA VILLAGE.

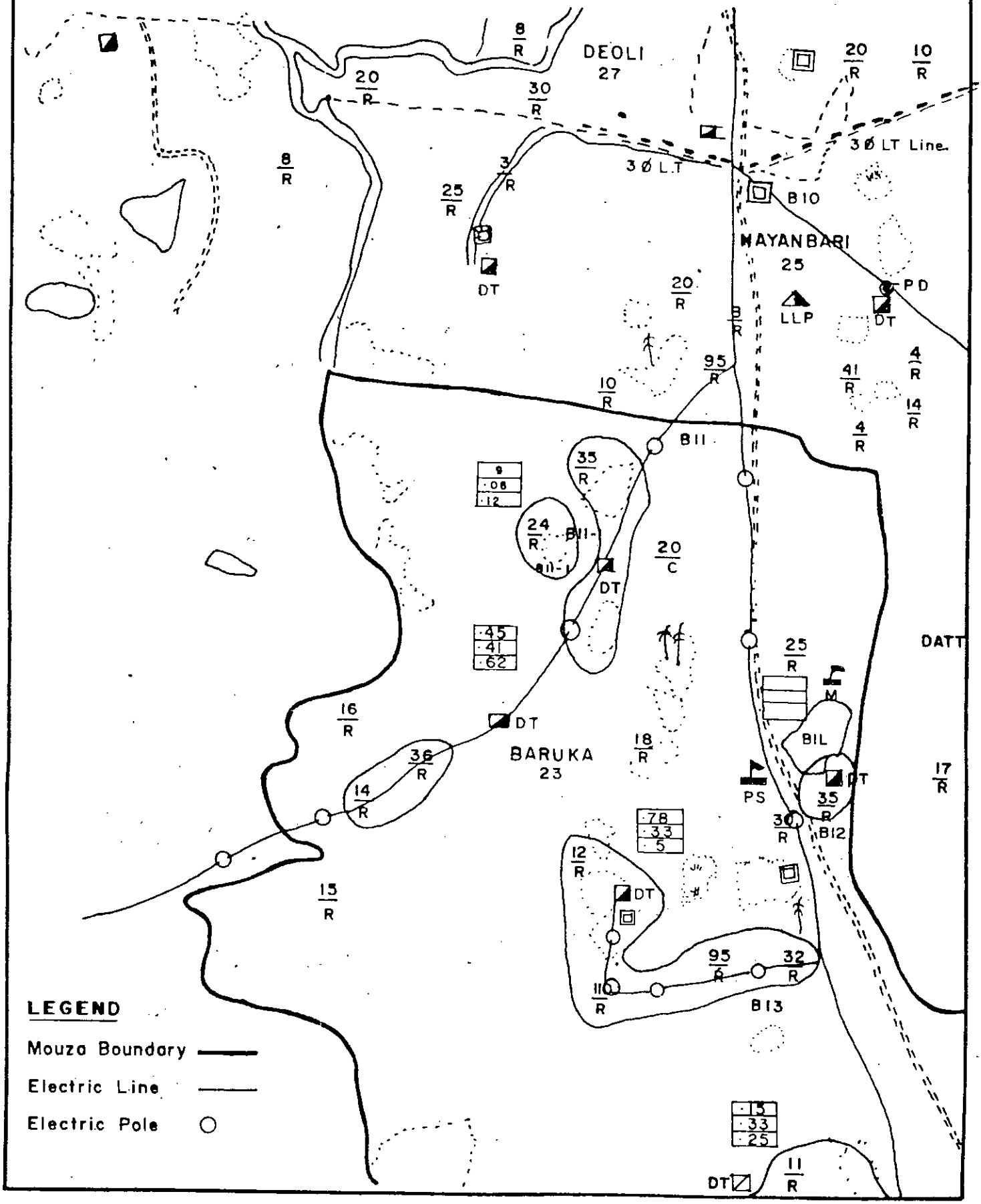


Table: 4.9.C

Distribution of Households by Type of Fuel Used for Lighting.

Village	Type of Fuel Used by Number of Household	
	Kerosene	Electricity
Baruka	736 (99%)	210 (28%)
Chaknaju	259 (100%)	

Detail data are in Table 4.9.3 (Appendix-I)

Table: 4.9.D

Household Distribution According to Type of Cooking Fuels

Village	Type of Fuel Used by Number of Household		
	Biomass	Kerosene	Electricity
Baruka	742 (100%)	10 (1.3%)	13 (2%)
Chaknaju	259 (100%)	30 (12%)	0

Detail data are in Table 4.9.4 (Appendix-I)

Table: 4.9.E

Pattern of Electricity Use in Mymensingh PBS-1

Type of Consumers	Percent of Electricity	Consumption
	1984	1985
Industry	3	23
Agriculture	10.80	25.36
Commercial	4.0	10.28
Domestic	82.20	41.36

4.10 Fuel Consuming Appliances

It has been discussed in previous section that in rural areas most of the energy is consumed in household sector for cooking and lighting. This section deals with information on fuel consuming appliances.

It may be seen from the Table 4.10.1 that four different types of cooking stoves and burners (one-mouth, two-mouth, movable, kerosene cooker) were used for cooking purposes. In dry season total number of stoves used in Baruka village was 1147 out of which 971 (84.7%) were of one-mouth type and 143 (12.5%) were of two-mouth type and the balance were of other types. In Chaknaju village distribution of one-mouth and two-mouth stoves were 93% and 4% respectively.

Distribution of cooking stoves used in wet seasons is shown in Table 4.10.2. In Baruka and Chaknaju village distribution of one mouth stove were 87% and 95% of total stoves used in the respective village.

Seasonal use of cooking stoves by landholding and type is shown in Table 4.10.A and Table 4.10.B respectively. In Baruka village number of stoves used per household in dry season and wet season were estimated as 1.55 and 1.33 respectively. Number of stove used per household in Chaknaju village were 1.34 and 1.25 in dry and wet season respectively. In a rural energy study (Islam 1980) in Barisal district the number of stove used per household in dry and wet seasons were estimated as 1.9 and 1.42 respectively. It may be observed from Table 4.10.B that some of the household used more than one stoves for cooking.

Distribution of cooking hours according to landholding size is shown in Table 4.10.3 and data are summarised in Table 4.10.C. The daily average operating hours of cooking stoves in Baruka and Chaknaju were estimated as 4.8 hours and 4.6 hours respectively.

Table: 4.10.A

Seasonal Use of Cooking Stoves by Landholding Size

Description	Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-25	2.5-7.5	7.5+	Total
Village: Baruka								
Total households	174	399	110	25	7	4	23	742
Total stoves used in dry season	189	626	224	60	14	10	24	1147
Total stoves in wet season	181	533	185	47	11	10	23	990
Village: Chaknaju								
Total households	101	100	35	12	1	1	9	259
Total stoves used in dry season	119	125	65	24	1	4	9	347
Total stoves use in in wet season	116	118	56	20	1	3	9	323

Detail data are in Table 4.10.1 and Table 4.10.2 (Appendix-I)

Table: 4.10.B

Seasonal Use of Cooking Stoves by Types

Description	Type of Stoves					
	One mouth	Two mouth	Movable	Kerosene cooker	Others	Total
Village: Baruka						
Number used in dry season	971	143	32	1	0	1174
Number of stoves as % of households+	130.86	19.27	4.31	0.13	0	
Number used in wet season	862	100	25	1	2	990
Number of stoves as % of households	116.17	13.48	3.37	0.13	0.27	
Village: Chaknaju						
Number used in dry season	323	14	5	2	3	347
Number of stoves as % of households*	124.7	5.41	1.93	0.77	1.16	
Number use in wet season	308	10	3	1	1	323
Number of stoves as % of households	118.9	3.86	1.16	0.39	0.39	

+ Total households = 742

* Total households = 259

Detail data are in Table 4.10.1 and Table 4.10.2 (Appendix-I)

Table: 4.10.C

Household Cooking Hours Per Day

Description	Cooking hours per day					
	Upto 2.5	3-3.5	4-4.5	5-5.5	6	6.5+
Village: Baruka						
No. of Households*	49	83	154	260	148	48
Percent of Household	6.6	11.2	20.8	35.1	19.9	6.4
Village: Chaknaju						
No. of Households♀	10	33	96	75	42	3
Percent of Household	3.9	12.7	37.0	29.0	16.2	1.2

* Total households = 742, Average operating hours of stoves = 4.8

♀ Total households = 259, Average operating hours of stoves = 4.6

Detail data are in Table 4.10.3 (Appendix-I)

Distribution of illuminating devices and other appliances used at household level is shown in Table 4.10.4 and the data of illuminating devices are summarised in Table 4.10.D. The total number of households in Baruka (742) used 736 (77%) kupi and 214 (23%) hurricane. There were 1.28 lighting devices per household. The total number of households in Chaknaju (259) used 258 (81%) kupi and 60 (19%) hurricane. The number of lighting devices per household in Chaknaju village was 1.23. Islam (1980) reported the use of 2.46 lighting devices per household in a rural area of Barisal. The distribution of the number of kupi and hurricane in that area were 81% and 19% respectively.

Distribution of operating time of kupis and hurricane lanterns are shown in Table 4.10.5 and Table 4.10.6 and data are summarised in Table 4.10.E and Table 4.10.F respectively. It may be noted that in Baruka village majority of lighting devices were operated for 2-3 hours and in Chaknaju village for 3-4 hours (Table 4.10.E).

In Baruka village average operating hours of kupi and hurricane per night have been estimated as 2.59 hours and 0.68 hours respectively. On the basis of the number of respective appliance average appliance hours per household have been estimated as 2.57 and 0.2 respectively.

In Chaknaju village average operating hours of kupi and hurricane per night have been estimated as 3.30 hours and 0.82 hours respectively. Average appliance hours per household may then be estimated as 3.3 and 0.2 respectively.

It may be noted (Section 2.2.1) that in BEPP study (GOB 1985 a) **kerosene** consumption for lighting was estimated on the basis of assumption of 3-4.5 lamp-hours per night.

It has been mentioned earlier (Section 4.4) that number of lighting devices used in a household is related to number of rooms. In Baruka number kerosene lamps (kupi and hurricane) and total rooms were estimated as 950 and 1054 respectively. In Chaknaju number of kerosene lamps and total rooms were estimated as 318 and 346 respectively. In both the villages number of lamps per rooms was 0.9.

Table: 4.10.D

Use of Illuminating Devices

Description	Farm Size (Acres of Cultivated Land)						
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
Village: Baruka								
Total households	174	399	110	25	7	4	23	742
Total number of illuminating devices	201	495	169	37	12	7	29	950
Village: Chaknaju								
Total households	101	100	35	12	1	1	9	259
Total number of illuminating devices	109	120	54	17	2	2	14	318

Detail data are in Table 4.10.4 (Appendix-I)

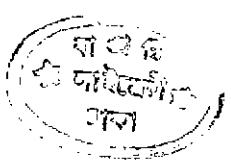


Table: 4.10.E

Operating Hours of Kupis

Village	Operating Hours								
	0	1	2	3	4	5	6	7	8+
	(Percent household)								
Baruka	0.8	14.8	39.4	26.7	10.0	5.0	3.2	-	0.1
Chaknaju	0.4	1.2	22.8	35.5	30.1	4.6	5.0	0.4	-

Detail data are in Table 4.10.5 (Appendix-I)

Table: 4.10.F

Operating Hours of Hurricane Lantern

Village	Operating Hours								
	0	1	2	3	4	5	6	7	8+
	(Percent household)								
Baruka	72.4	7.3	7.0	8.2	3.9	1.2	-	-	-
Chaknaju	79.2	3.1	2.7	3.9	4.2	2.3	2.3	0.8	1.5

Detail data are in Table 4.10.6 (Appendix-I)

4.11 Consumption of Food

Distribution of consumption of cereals by landholding size is shown in Table 4.11.1 and the data are summarised in Table 4.11.A. It may be observed from Table 4.11.1 that in Baruka village per capita calorie intake increased from 2.82 GJ per year for landless to 4.95 GJ per year for landholding size of 2.5-7.5 acres. Per capita calorie intake for the landholding size of more than 7.5 acres was estimated as 2.85 GJ/year. However when the data on calorie intake are analysed on household basis, calorie intake per household increased with the increase in landholding size for all the categories of households. Similarly calorie intake per household increased also in Chaknaju village.

It may be observed from Table 4.11.A that per capita calore intake in Baruka village was (3.02 GJ/year) 94% to that of daily calorie requirement of 3.21 GJ/year. In Chaknaju village population had better food availability (3.20 GJ/year) than the population of Baruka. This is probably due to better job opportunity for Chaknaju population because of nearness to district headquarters.

Distribution of consumption of food and biomass fuels is shown in Table 4.11.2 and is summarised in Table 4.11.B. The ratio of biomass fuels used to cook food to that of calorie intake of food in Baruka and Chaknaju village were estimated as 1.83 and 1.75 respectively (Table 4.11.B). In a laboratory experiment of cooking rice (an average meat, 1.4 kg) with fuelwood Islam (1980) estimated the ratio as 1.7. The ratio of total biomass fuels to that of calorie intake of food were estimated as 2.58 and 2.34 for Baruka and Chaknaju respectively.

4.12 Energy Use in Irrigation

Type of manually operated irrigating devices used in the study villages and the area irrigated by them are shown in Table 4.12.1. It may be noted that because of easy availability of open water sources swing basket was used for manual irrigation.

Four diesel operated deep tubewells and two electricity operated deep tubewells were reported to be in use in Baruka village (electrified village). The related information is shown in Table 4.12.2

Table: 4.11.A

Consumption of Cereals

	Rice	Ata	Pulse	Total Cereals	Caloric intake per year	
	(kg/person/year)				GJ/ person	GJ/ household
Baruka	177.06	22.26	8.89	208.21	3.02	16.4
Chaknaju	184.87	23.63	12.32	220.82	3.20	17.15

Detail data are in Table 4.11.1 (Appendix-I)

Table: 4.11.B

Consumption of Food and Biomass Fuels

	Consumption in GJ/person/year				
	Creals (A)	Biomass fuels for cooking food (B)	Biomass fuels for household cooking (C)	(B/A)	(C/A)
Baruka	3.02	5.53	7.79	1.83	2.58
Chaknaju	3.20	5.61	7.51	1.75	2.34

Detail data are in Table 4.11.2 (Appendix-I)

Of the total cultivated area of 384.66 acres in Baruka village 192 acres (50% of cultivated land) was irrigated. The area irrigated by mechanical devices was 94% of total irrigated area in the village.

Yearly use of diesel for irrigation may be estimated as 87.8 kg/acre (3.93 GJ/acre) and 16.72 kg/household (0.75 GJ/household). Use of electricity for irrigation may be estimated as 307 kWh/acre and (15.9 kWh/household).

There was no mechanical irrigation devices in the non electrified village (Chaknaju). Of the total cultivated area of 133 acres only 9.58 acres (7.2%) of cultivated land was irrigated by manual device.

4.13 Energy Use in Industries

There was very little industrialisation in the study villages. In village Baruka (electrified village) there were nine handloom units, employing 55000 man-days (6.6% of adult labour force). In total 5.60 tonnes of fuelwood (84.56 GJ) was used in the handloom industries to produce 9430 units (e.g. lungies, sharees etc.) of clothes. The cost of energy was 1% of the total cost of finished handloom products. Energy (Fuelwood) consumption in handloom industry for dying is estimated as 0.11 GJ/household/year (0.02 GJ/person/year).

There are two paddy husking units in Baruka village. Yearly consumption of electricity for paddy husking was reported as 15420 kWh and processed 521 tonnes of paddy. Energy consumption in paddy processing may be estimated as 20.8 kWh/household/year (3.82 kWh/person/year).

There was no industry in village Chaknaju.

4.14 Summary of Energy Survey in Two villages

Detail data on energy survey in Baruka and Chaknaju villages have been presented in previous sections of this chapter. For various end uses annual consumptions of different types of fuel energy sources are shown in Table 4.14.A.

4.14.1 Total Fuel Energy Consumption in Baruka Village

In Baruka village percent distribution of various types of energy sources in supplying total energy demand were as follows.

Biomass fuel	Kerosene	Diesel	Electricity	Total
	GJ/household/year (Percent)			
42.49	1.076	0.75	0.369	44.67
(95.1)	(2.4)	(1.68)	(0.82)	(100.0)

Of the total energy consumed, percent distribution for various end uses were as follows.

Household Cooking	Household Lighting	Irrigation	Industry	Total
	GJ/household/year (Percent)			
42.38	1.30	0.807	0.185	44.67
(94.87)	(2.91)	(1.81)	(0.41)	(100.0)

Table: 4.14.A

Total Energy Consumption in the Study Villages

Village: Baruka (b)

End Uses	GJ/household/year Total Biomass Fuels	Kerosene	Diesel	Electricity	Total Commercial	Total	Percent
Food Cooking	30.08	0.006		0.007	0.013	30.093	67.36
Parboiling	12.02					12.02	26.90
Other Uses	0.28					0.28	0.61
Sub-Total Cooking	42.38	0.006		0.007	0.013	42.38	94.87
Lighting		1.07		0.23	1.30	1.30	2.91
Sub-Total Households	42.38	1.076		0.237	1.313	43.68	97.78
Irrigation			0.75	0.057	0.807	0.807	1.81
Industry	0.11			0.075	0.075	0.185	0.41
Total	42.49	1.076	0.75	0.369	2.195	44.67	100.0
Percent	95.1	2.40	1.68	0.82	4.90	100.0	

Village: Chaknaju (c)

End Uses	Total Biomass Fuels	Kerosene	Diesel	Electricity	Total Commercial	Total	Percent
Food Cooking	30.06	0.07			0.07	30.13	71.68
Parboiling	9.33					9.33	22.19
Other Uses	0.86					0.86	2.04
Sub-Total Cooking	40.25	0.07			0.07	40.32	95.94
Lighting		1.71			1.71	1.71	4.06
Sub-Total Household	40.25	1.78			1.78	42.03	100.0
Irrigation						0	0
Industry						0	0
Total	40.25	1.78			1.78	42.03	100
Percent	95.76	4.23			4.23	100.0	

Of the total biomass fuels 99.74% was consumed for household cooking and the balance was in rural industries. 99.44% of kerosene was consumed for household lighting and the balance 0.56% was consumed for cooking. Total (100%) diesel was consumed for irrigation. Of the total electricity consumption 64.23% was in household sector and the share in irrigation and industry was 15.45% and 20.32% respectively.

4.14.2 Total Fuel Energy Consumption in Chaknaju Village

Percent distribution of different type of energy sources in supplying total energy demand of Chaknaju village was as follows.

Biomass fuels	Kerosene	Diesel	Electricity	T Total
GJ/household/year (Percent)				
40.25 (95.76)	1.78 (4.23)	0	0	42.03 (100.0)

Of the total energy consumed in the village percent distribution of various enduses were as follows.

Household Cooking	Household Lighting	Irrigation	Industry	Total
GJ/household/year (Percent)				
40.32 (95.94)	1.71 (4.06)	Nil	Nil	42.03 (100.0)

In Chaknaju village the total biomass fuels (100%) was consumed for household cooking. Of the total kerosene 96.07% was consumed for household lighting and the balance 3.93% was consumed for cooking. There were no consumption of diesel and electricity in this village.

4.14.3 Comparison of Energy Survey Data of the Two Villages

It may be noted that the energy consumption data presented in Table 4.14.A depend on may factors. For the purpose of comparison comprehensive summary of these interrelated data are presented in Table 4.14.B.

It may be observed that as both the villages are located in similar agro-climatic location there was no difference in consumption of biomass fuels.

Variations in commercial energy consumption observed in Baruka village due to the availability of electricity are described as follows.

Per household consumption kerosene for lighting was less in Baruka (1.07 GJ/household/year) than in Chaknaju (1.71 GJ/household/year).

It may be observed from Table 4.9.E that in 1985 major portion of electrical energy was used in domestic sector (41.4%) than in comparison to agriculture (25.3%), industry (23.0%), and commercial (10.3%). However, the comparison of consumption pattern between 1984 and 1985 indicate a shift towards productive use of electricity from domestic sector.

The distribution of electricity using households (201 Nos) by landholding size was as follows.

	Acres of Cultivated Land						
Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
	Percent of total electricity using households						
9.90	48.51	28.21	8.41	1.98	1.98	1.00	99.99

Electricity users as percent of total households in this respective land-holding group were as follows.

Landless	Acres of Cultivated Land						
Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
	Percent of household in each group with electricity						
11.49	24.56	51.82	68.0	57.14	100.0	8.7	27.22

Table: 4.14.B

Summary of Energy Survey in Two Villages (Baruka and Chaknaju) of Mymensingh District.

Description	Survey Baruka (Electrified)	Village Chaknaju (Non-Electrified)
1. Demographic Information		
Household	742	259
Population	4036	1389
Family Size (person/household)	5.44	5.36
Male (percent	51.55	51.95
Female (percent)	48.45	48.05
2. Socio-Economic		
Landless households (%)	23.5	39.0
Agriculture as primary occupation for household (%)	57.4	42.1
Labourer as primary occupation for household (%)	24.0	33.2
3. Housing and Services		
Dwelling unit per household	1.17	1.34
Kitchen unit per household	0.89	0.76
Roofing materials (straw, leaves) of household (%)	54.4	56.0
Roofing materials (CI sheet) of household (%)	45.3	43.2
Roofing materials (others) of household (%)	0.3	0.8
Use of hand tubewell water for drinking by household (%)	88.0	77.6
4. Tree Resources		
Fruit tree/household	6.19	9.60
Fuelwood tree/household	3.90	3.74
Timber tree/household	0.004	0.10
Trees/household	10.094	13.44
Trees/person	1.86	2.51
Trees/acre of homestead area	253.33	358.02

Table: 4.14.B (Continued)

Summary of Energy Survey in Two Villages (Baruka and Chaknaju) of Mymensingh District.

Description	Survey Village Baruka (Electrified)	Chaknaju (Non-Electrified)
5. Livestock Resources		
Adult bullock/acre of cultivated land	0.52	0.76
Adult cattle/acre of cultivated land	2.28	2.14
Adult bullock/household	0.27	0.39
Adult cattle/household	1.18	1.10
Goats and sheep/household	0.69	0.27
Percent household with no cattle	49.2	55.6
Percent household with 4 or more cattle	6.7	6.7
6. Average Annual Fuel Consumption (per household)		
Biomass fuel for food cooking (GJ/year)	30.08 ?	30.06 ?
Biomass fuel for household cooking (GJ/year)	42.38	40.25
Kerosene for cooking (GJ/year)	0.006	0.07
Kerosene for lighting (GJ/year)	1.07	1.71
Total Kerosene (GJ/year)	1.076	1.78
Electricity for cooking (kWh/year)	1.91 ? ?	0
Electricity for lighting (kWh/year)	63.23	0
Total electricity (kWh/year)	65.14	0
Diesel for Irrigation (GJ/year)	0.75	0
Electricity for Irrigation (GJ/year)	15.9	0
Biomass fuel for industry (GJ/year)	0.11	0
Electricity for industry (kWh/year)	20.8	0

Table: 4.14.B (Continued)

Summary of Energy Survey in Two Villages (Baruka and Chaknaju) of Mymensingh District.

Description	Survey Village Baruka (Electrified)	Chaknaju (Non-Electrified)
7. Cooking Fuel Consumed per person in Dry Season (GJ/Six months)		
Woodfuels	1.27	0.57
Twigs and Leaves	1.08	2.02
Agricultural residues	1.64	1.23
Total biomass fuels	3.99	3.82
8. Cooking Fuel Consumed per person in Wet Season (GJ/Six months)		
Woodfuels	1.25	0.89
Twigs and leaves	0.92	1.56
Agricultural residues	1.63	1.24
Total biomass fuels	3.80	3.69
9. Annual average consumption of biomass fuels per person (GJ/year)	7.79	7.51
10. Type of Stove Used in Dry Season (Stoves per household)		
One-mouth	1.31	1.25
Two-mouth	0.19	0.05
Others	0	0.01
Total	1.50	1.31
11. Type of Stove used in Wet Season (Stoves per household)		
One-mouth	1.16	1.19
Two-mouth	0.13	0.04
Others	0.003	0.004
Total	1.29	1.23

Table: 4.14.B (Continued)

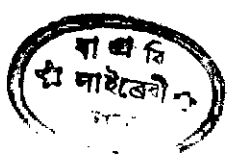
Summary of Energy Survey in Two Villages (Baruka and Chaknaju) of Mymensingh District.

Description	Survey Village Baruka (Electrified)	Chaknaju (Non-Electrified)
12. Illuminating devices (per household)		
Open wick lamp	1.01 ?	1.0 ?
Hurricane lantern	0.29	0.23
Electric bulb	0.28	0.0
13. Illuminating devices (per living room)		
Open wick lamp	0.70	0.75
Hurricane lantern	0.20	0.17
Total illuminating devices	0.90	0.92
14. Food Production and Consumption (per person)		
Production of rice (kg/year)	211.75	125.71
Consumption of rice (kg/year)	177.06	184.87
Consumption of cereals (rice, wheat, dal) kg/year	208.21	220.82
Caloric intake by cereals (GJ/year)	3.02	3.20
Ratio of food cooking fuels to calorie intake	1.83	1.75
Ratio of household cooking fuels to calorie intake	2.58	2.35
15. Zonal Information		
District	Mymensingh	Mymensingh
Upazila	Mymensingh Sadar	Fulbaria
Distance from Upazila head quarter	3 km	10 km
Population density of the Upazila (person/km^2)	679	1198

It may be observed that some landless households were also among the users of electricity.

It was observed during field survey that electricity supply was not very regular. Due to that owners of 4 deep tubewell using diesel engines did not substitute with electricity (motor). It may also be noted from Table 4.9.3 that although 202 households (27.22% of total) had electricity for lighting even then 736 households (99% of total) reported the use of kerosene for lighting.

Therefore, reliable supply of electricity is a necessity for its effective use to improve the quality of life (lighting) as well as to increase production (irrigation, industry, commercial).



5.0 DISCUSSIONS

5.1 Introduction

The first objective of the present study was to make a comperative assessment of energy situation (i.e. traditional and commercial sources) in an electrified and a non-electrified village of the north-east region (Section 3.2a). The findings of energy survey in two villages Baruka (electrified) and Chaknaju (non-electrified) of Mymensingh District have been presented in Chapter 4 along with specific observations.

The second objective was to compare the findings of the present study with that of previous rural energy studies carried out in Bangladesh (Section 3.2b). During presentation of survey results in Chapter 4 comparison have been made with previous rural energy studies where data were available. In addition to energy related data other socio-economic data were also compared with published national statistics wherever it was possible.

The third objective of the present study was to generate data for rural energy planning (Section 3.2c). Data presented in Chapter 4 fulfill this objective. Some of the important findings of the present study that may be used for planning and development of rural energy system have been summerised in Table 4.14.B.

5.2 Energy Planning for Rural Areas Policies and Strategies

The fourth objective of the present study was to identify policies and strategies for planning and development of energy resources for rural areas (Section 3.2d). On the basis of experience of the present study this particular issue has been discussed in the following paragraphs.

5.2.1 Biomass Fuels Development

It has been discussed in previous chapter that 96% of total energy consumed in study villages was supplied by biomass fuels and was mainly used for household cooking (meeting subsistence need). Very little consumption of biomass fuels was found in the study areas for productive uses. In Baruka village small amount of woodfuels was used in handloom industry in dying operation.

In the rural areas biomass fuels are obtained as the by products of agricultural crops, trees and livestock resources. It is not possible to undertake planning and development of by-products without consideration of main products. Because of this reason planning and development of biomass fuels are to be considered as an integral parts of agriculture, forestry, and livestock sectors.

Biomass fuels are grown in rural areas in privately owned land. Therefore, active participation of people is a necessity for successful implementation of biomass fuels development programme.

In rural areas of Bangladesh planning and development of agriculture sector (involving boosting of production in private land) is better organized than forestry and livestock sectors. Development activities in agriculture sector are mainly concentrated to the delivery of inputs (e.g. seed, fertilizer, particle, irrigation equipment) provision of technical assistance, credit and price support. Similar approach may also be considered for the development of **community forestry and livestock sectors.**

In the rural areas there is very limited common or public land to plant trees. Therefore, under rural forestry, planting trees (e.g. selection of species, time, location etc) are to be considered as a part of individual farmer's land use plan and production system involving both cropped and homestead land.

In addition to the supply option discussed in previous paragraphs demand management of biomass fuel resources should also be considered under biomass fuels development programme.

Introduction of improved stoves for household cooking has prospect in saving biomass fuels. Data gathered by the present study about the type and number of traditional stoves used in the survey locations have been presented in Table 4.10.1 - Table 4.10.3. These data may be used in development of improved stove programme.

Due to unavailability of adequate number of cattle per household there is limitted scope for the introduction of biogas technology to improve rural energy supply. It has been mentioned earlier (Section 4.7) that only 6.7% of total households in both the villages had more than 4 heads of cattle required to operate (dung from four cattle) a family size biogas plant.

It has been discussed in Section 4.7 that there was shortage of draft power in the study villages and draft power was used mainly for land preparation and paddy threshing. Introduction of manually operated paddy threshers may release the draft power used for threshing. This option may then improve the supply of draft power for land preparation.

Various issues and options discussed in previous paragraphs for planning and development of biomass fuels are location, season and user specific in nature. Therefore, planning and development of biomass fuel resources may be considered under decentralised development plan (local level plan) with the concept of energy and development. It means that development of biomass energy resources is the resultant effect of other development programmes but not the driving force for them. Similar to Palli Biddut Unnayan Samity (PBS) some local institution may be established at Upazila level to undertake planning development and management of biomass fuel resources as a part of overall Upazila development programme.

5.2.2 Planning for the Delivery of Commercial Energy Sources

It has been discussed in previous Chapter (Section 4.4) that about 4% of total energy consumed in survey villages was supplied by commercial energy sources. The following observations have been made on the basis of experiences in the two villages.

5.2.2.1 Experience of the electrified village

In the electrified village of the total commercial energy consumed 59.8% was for meeting subsistence requirement (cooking 0.6%, lighting 59.2%) and 40.2% was for productive use (irrigation 36.8%, industry 3.4%). On the basis of total energy consuption (Table 4.14A) the contribution of commercial energy for productive purposes was only 1.9% (irrigation 1.81%, industry 0.17%).

In the context of energy planning for rural areas an important point to note that the small amount of commercial energy consumed for productive purposes is vital to increase agricultural production and employment generation. In comparison to the consumption of biomass fuels, the consumption of commercial energy for productive purposes may be very small but the quantity should not undermine its importance in the planning process.

In Baruka village, of the total commercial energy used for productive purposes (irrigation and industry) 85% was supplied by diesel and 15% was supplied by electricity. Even with the availability of electricity (supply is irregular) in the village the use of diesel was continued to maintain uninterrupted operation of irrigation pumps during critical period (irrigation season). Regularity and timely supply of commercial energy sources are important points to consider in energy planning for rural areas.

Of the total electricity use (Table 4.14A) 64.2% was consumed in household sector (lighting: 62.3%, cooking: 0.9%), 15.4% in irrigation and 20.3% in industry. There is a general trend in shifting towards productive use of electricity. However, it should be noted that to increase the productive use of electricity for development there is a need for policy intervention in other sectors (agriculture, industry) for creating effective demand for electricity. Provision of electricity alone in the rural areas may not automatically create effective demand.

5.2.2.2 Experience of the non-electrified village

Kerosene was the only source of commercial energy consumed in the non-electrified village (Chaknaju) and was used to meet subsistence need (lighting: 96%, cooking 4%). No commercial energy was used for productive pruposes. In the absence of electricity there was potential to use diesel for increasing agricultural production and to initiate industrial activities but it did not take place. It indicates that provision of infrastructural facilities and organisational support is a pre-requisite to create effective demand for commercial energy sources, which in term would contribute in rural development (i.e. increase in agricultural production, employment generation etc.).

5.2.2.3 Comments

Considering the potential role of commercial energy in rural development, planning for the delivery of these resources should be considered under the concept of energy for development. It means that the availability of reliable supply of commercial energy would support development efforts provided there is simultaneous action to create effective demand for energy consumption.

Considering the requirement of technical knowhow and capital for planning and development of rural electrification programme, it is appropriate to organise the national programme by Rural Electrification Board (REB). Palli Biddut Unnayan Samity (PBS) operating at above Upazila level (area of a PBS extend over the area of 2 to 3 upazilas) seems to be a viable institution for operation and management of rural electrification programme.

6.0 SUMMARY AND CONCLUSIONS

6.1 Summary

The present study was undertaken to make comparative assessment of energy situation in an electrified and a non-electrified village of Mymensingh district. It is envisaged that the findings of the present study would be useful in energy planning for rural Bangladesh.

The study was carried out in Baruka (electrified village) of Fulbaria upazila and Chaknaju (non-electrified village) of Mymensingh Sadar upazila. The latter upazila in more urbanised than Fulbaria.

The findings of the present study with respect to socio-economic dondition and energy situation are presented in this section.

(i) In both the villages majority of the households (Baruka: 85.3%, Chaknaju 87.3%) was nucleus family. In Baruka village 23.5% of the household was landless and the primary occupation of 24% households was labour. In Chaknaju village 39% of the households was landless and 33.2% was labourer.

(ii) In both the villages majority of the households (Baruka: 66%, Chaknaju 79.5%) lived in single room accommodation. Roofing materials of majority households (Baruka: 54.4%, Chaknaju: 56.0%) were made of biomass materials (e.g. straw, leaves etc). The majority of the households (Baruka: 88%, Chaknaju: 77.6%) used drinking water from handtubewell.

(iii) In both the study villages majority of the tree were fruit trees (Baruka; 61.3% Chaknaju; 71.4%). The total number of trees per household were 10.1 and 13.4 in Baruka and Chaknaju respectively. The number of tree per household in the study villages was less than that estimated by Briscoe (1979) and Islam (1980) in Comilla (40 trees per household) and Barisal (51 trees per household) respectively. In both the study villages trees were uniformly distributed according to homestead land area. More than 90% of the households were in homestead land area category of 0.005-0.1 acre and owned more than 90% tree resources.

(iv) On total household basis the quantity of food grain produced the electrified village was more in comparison to the non-electrified village (Baruka: 1152kg/household/year, Chaknaju: 674kg/household/year). In Baruka village 50% of the total cultivated land was under irrigation.

(v) In Baruka and Chaknaju 49.2% and 55.6% of the households respectively did not have any cattle. In both the study villages households with smaller landholding reported the shortage of draft power. The shortages were generally met by hiring (cost of bullock power is paid in cash), exchange (mutual exchange of bullock power) and lending (cost of bullock power is paid in kind). Draft power used for paddy threshing may be released for land preparation with the introduction of manually operated paddy threshers. Only 6.7% of the total households in both the villages had more than four heads of cattle (dung available from which) required to install of family size biogas plant.

(vi) In both the villages average per capita consumption of biomass fuels was nearly same (Baruka; 7.79 GJ/year, Chaknaju; 7.51 GJ/year). The average per capita consumption of biomass fuels of the two study villages was 55% more than the estimate of the Bangladesh Energy Planning Project (GOB 1985a) for the whole country.

(vii) The proportion of fuelwood in total biomass fuels was higher in Baruka (32.3% of total) than in Chaknaju (19.4% of total).

(viii) Per capita consumption of biomass fuels increased with the increase in landholding size. In Baruka village per capita consumption of landless households (5.76 GJ/year) was 74% to that of the weighted average consumption (7.79 GJ/year). In Chaknaju village rating in landless households was 80% of the weighted average value (7.51 GJ/year). Landless household with their meagre income purchased higher proportion of the biomass fuels in comparison to higher landholding groups.

(ix) Due to the benefit of economy of scale of cooking for a particular landholding group per capita consumption of biomass fuels decreased with the increase of family size (number of person per household). This finding is similar to that reported by Islam, Morse and Soesastro (1984).

(x) In both the villages kerosene was mainly used for lighting and the annual consumption increased with the increase of landholding size. In Baruka village 28% of households used electricity for lighting and average consumption per household was less (Baruka: 23.31 kg/year) than Chaknaju (38.62 kg/year). Estimated consumption of kerosene by the present study was higher than the estimate made by the BEPF (GOB 1985) for whole Bangladesh and lower than the estimate made by Islam (1980) for a rural location in Barisal district.

(xi) In Baruka (electrified village) of the total commercial energy (kerosene, diesel, electricity) 59.8% was consumed for household use and 40.2% was consumed for productive was (i.e. irrigation, industry). Of the total commercial energy used for productive purposes 85% was supplied by diesel (used in irrigation) and 15% was supplied by electricity (used in irrigation and industry). Of the total electricity use 75.2% was consumed in household sector 15.4% in irrigation and 20.3% in industry. There is a general trend in shift towards productive use of electricity.

In Chaknaju (non-electrified village) total commercial energy was consumed for household use. There was no effective demand of commercial energy for productive use.

(xii) In both the villages majority of the cooking stoves was of one mouth type (Baruka: 87% of total Chaknaju: 95% of total). The total number of stoves used per household in dry season (Baruka: 1.55, Chaknaju: 1.34) and wet season (Baruka: 1.33, Chaknaju: 1.25) was similar. The daily average hours of cooking stoves was also similar in nature (Baruka: 4.8 hours, Chaknaju 4.6 hours).

(xiii) The total number of lighting devices per household in Baruka was 1.28 (Kupi: 77%, hurricane 23%) and in Chaknaju was 1.23 (kupi 81%, hurricane 19%). Islam (1980) reported 2.46 lighting devices per household (kupi: 81%, hurricane 19%) in a study area of Barisal district. In both the study villages (Baruka and Chaknaju) number of lighting devices per room was 0.9.

Due to the availability of electricity average lighting hours of kerosene lamps (per household per night) were less in Baruka (kupi: 2.57 hours, hurricane: 0.2 hours) than in Chaknaju (kupi: 3.3, hurricane: 0.2).

In the BEPP study (GOB 1985) kerosene consumption for lighting was estimated on the basis of consumption of 3-4.5 lamps hours per night.

(xiv) On total population basis Baruka (electrified village) was in surplus of rice (production: 212 kg/person/year, consumption: 177 kg/person/year) and Chaknaju was in deficit of rice (production: 126 kg/person/year, consumption: 185 kg/person/year).

(xv) In comparison to the average caloric need of 3.47 GJ/person/year (2273 kcal/person/day), the average calorie intake from cereals (rice, wheat, pulses) in Baruka was 3.02 GJ/person/year (94% of need) and in Chaknaju was 3.20 GJ/person/year. In both the villages per capita calorie intake increased with the increase in landholding size.

(xvi) The ratio of heating value of biomass fuels used to cook food to that of calorie intake of food was 1.83 in Baruka and 1.75 in Chaknaju.

The ratio of heating value of total biomass fuels used for total household cooking to that of calorie intake of food was 2.58 for Baruka and 2.34 for Chaknaju.

(xvii) In Baruka village 254 manual irrigation devices, 4 diesel operated deep tubetwlls and 2 electricity operated deep tubewells were used for irrigation irrigation. About 50% of total cultivated land was under irrigation. Of the total irrigated area 94% was irrigated by mechanised devices and 6% by manual devices.

There were 86 manually operated irrigation devices in Chaknaju village.

(xviii) In Baruka village there were 9 handloom units and 2 paddy husking mills. There was no industrial unit in Chaknaju village.

6.2 Conclusions:

On the basis of the analyses of survey data the conclusion of the present study for energy planning purpose are outlined as follows.

(i) As both the study villages were located in same agro-climatic zone there was no appreciable variation in the nature of biomass fuels consumption between the electrified village (Baruka) and non-electrified village (Chaknaju).

(ii) Biomass fuels contributed the major share of the total energy consumed in the study villages but these were consumed for household cooking (subsistence need). There is limited opportunity to enhance productive activities in rural areas by using biomass fuels.

(iii) Delivery of commercial energy is a necessity to enhance productive activities in rural areas. Creation of effective demand and maintaining of reliable supply are two important points to consider in planning the delivery of commercial energy sources for rural development.

In Baruka village 4 diesel operated deep tubewells were installed for irrigation which created effective demand for diesel. Subsequently 2 more electrically operated deep tubewells were installed to expand the irrigation facilities which in turn created demand for electricity. On the other hand in Chaknaju due to the absence of mechanized irrigation facilities there was no demand for consumption of commercial fuels for productive purposes.

In Baruka village due to irregular supply of electricity 4 diesel operated deep tubewells were not switched over to the use of electricity. Similarly at household level electricity users for lighting had to continue with the use of kerosene for lighting at the time of power failure.

(iv) In the electrified village major portion of electricity was used for household lighting but there is a general trend in shifting towards productive uses (i.e. irrigation, industry, commercial).

6.3 Suggestions

6.3.1 Energy Planning for Rural Bangladesh

In rural areas biomass fuels are obtained as the by-products of agricultural crops, trees and livestock resources grown in privately own land. Therefore, planning and development of biomass fuel resources should be considered an integral part of decentralized development plan (upazila development plan). Planning process should consider about mobilization of inputs, technical assistance and credit support. But the actual implementation of plan should be made with active participation of the beneficiaries.

Planning and development of biomass fuel resources should be considered with the concept of energy and development. It means that the development of biomass energy resources should be considered as the resultant effect of other development programmes but not the driving force for them. Specific areas to be considered in this respect are presented as follows.

In rural areas of Bangladesh government action for planning and development of agricultural sector (aiming to boost production in private land) are mainly concentrated to the delivery of inputs (e.g. seed, fertilizer, pesticide, irrigation equipment), provision of technical assistance, credit and price support. As a part of biomass fuel development programme the impact of change in cropping pattern or the supply of agricultural residues for various end uses (e.g. fodder, building materials, fuels, organic matter) need to be assessed on a continuing basis. Location specific programme is to be undertaken to augment the supply of biomass fuel by growing seasonal biomass crop such as sesbania (dhaincha) in marginal land and land that has become temporarily fallow due to failure of normal crop. Departments involved with agricultural extension need to be respensive for the timely supply of sesbania seeds and appropriate advice for its cultivation.

For augmenting the supply of tree resources in rural areas forestry extension activities are to be strengthen by establishing forestry nursary at upazila level. All possible attempts should be made in creating awarness and mobilizing peoples' support for planting trees in limitted land available for this purpose. Tree plantation programme is to be undertaken in public land (on the side of roads, railway lines, embankments etc) with active participation of local people in planting and protecting trees. Forestry nursary should also provide selected (by local population) variety of tree species for planting within home garden areas. Forestry extension workers should provide technical assistance to develope agro-forestry suitable to local condition.

There is good prospect to save biomass fuels by introducing improved cooking stoves. Conservation of biomass fuels through the introduction of improved stoves has been identified by the BEPP study (GOB 1985a) as the most cost effective option to solve biomass fuels problem in rural areas. Therefore, improved stove programme should be initiated by appropriate government and or non-government agencies to save biomass fuels.

Area having good prospect of growing fodder crops may be selected for establishing dairy firms attached with biogas plant.

Considering the potential role of commercial energy in rural development, planning for the delivery of these resources should be considered with the concept of energy for development. It means that the availability of reliable supply of commercial energy would activate and enhance development activities provided there is simultaneous actions to create effective demand for energy consumption. Extension of small industries in rural areas would increase effective demand for commercial energy sources.

6.3.2 Future Studies

With a view to create reliable data base for rural energy planning the following studies may undertaken in future.

(a) Sample survey of the study villages with detailed measurement of energy consumption in different seasons.

(b) Repeatation of the present survey methodology and data analysis for villages located in different agro-climatic zones of Bangladesh.

(c) Repeatative survey of different survey locations (b) after a regular interval of time for generating time series data.

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APPENDIX-I

LIST OF DATA TABLES

Table: 2.1

Composition of Biomass Fuels used for Cooking in Bangladesh

	Composition of Source of Biomass Fuels				Per Capita Fuel Consumption	Remarks
	Tree	Agriculture Residues	Animal Residues	Total		
	Percentage (on heating value basis)				GJ/person/yr	
GOB, 1976	12.5	62.5	25	100	2.8	Macro study (whole country) supply side estimation of traditional fuels.
Tyers, 1978	7	66	27	100	4.98	Rural Areas of Bangladesh Secondary Data.
Brisco, 1979	36	61	3	100	6.8	Micro study. 48 households in one village.
Hughart, 1979	-	-	-	-	4.3-7.6	77 households in one village.
Islam, 1980	71	24	5	100	4.9	2,820 households in 23 villages in on location of Barisal district.
Douglas, 1981	63	37	included in Agri. residues	100	4.44	6,00 households in 43 villages of in whole country.
Rahman, 1982	57	38	5	100	1.6	760 households in 23 village of 9 district.
Quader and Omar, 1982	59	38	3	100	8.7	954 households in 4 villages of Rangpur district
Islam, 1982	74	10	16	100	4.46	One village of Khulna district.

Tree: (Firewood + Branches + Twigs and Leaves)
Agriculture Residues: (Rice straw + Rice hulls + Jute stick + (Bagasse + other crops residues).
Animal Residue: (Dry cow dung)
Islam, M. N. (1983)

Table: 2.2

Village Energy Surveys in Regions of Bangladesh

Type of Fuel	Fuel Consumption Regions					
	1	2	3	4	5	6
	GJ/year					
Firewood	0.79	0.88	0.84	1.20	2.07	1.99
Other Tree Fuel	1.42	0.79	1.22	1.22	1.04	1.0
Residues Including Bamboo	2.84	1.28	2.43	1.35	1.74	2.24
Total	5.05	2.95	4.49	3.77	4.85	5.23
Briscoe			6.8			
Islam				4.9		
Quader and Omer	8.7					
Islam					4.46	

Source: Compiled from Data Presented by Islam (1984)

Note: Region 1: Rajshahi, Bogra, Rangpur, Dinajpur (nortwest)
Region 2: Kushtia, Pabna, Faridpur, Jessore (west)
Region 3: Mymensingh, Dhaka, Comilla (north central)
Region 4: Barisal, Patuakhali (south)
Region 5: Khulna, Sylhet (forest fringe)
Region 6: Dhaka, Khulna (urbal fringe).

Table: 2.3

Composition of Biomass Fuels Consumed in Rural Areas of Bangladesh by Land Holding Size

Landholding	Type of Biomass Fuel Grade 1				Grade 2	Grade 3	Total Biomass
Acres	Firewood	Branches	Bamboo	Total	Residues	Other Parts of Trees	
			GJ/year per capita				
0-1	0.51	0.65	0.38	1.54	2.24	1.63	5.41
1-2	0.36	0.83	0.48	1.67	1.87	1.54	5.08
2-3	0.51	0.68	0.51	1.70	1.87	1.28	4.85
3-5	0.41	0.76	0.41	1.58	1.66	1.08	4.32
4-5	0.57	0.66	0.36	1.59	1.57	1.07	4.23
5-6	0.76	0.71	0.48	1.95	1.39	1.03	4.37
6-7	0.59	0.68	0.50	1.77	1.58	0.79	4.14
7+	0.82	0.95	0.35	2.12	0.94	0.75	3.81
Weighted Average	0.54	0.74	0.42	1.70	1.80	1.32	4.82

Source: Islam (1984) Figures are calculated from (Douglas 1981), Yearly Recall Data.

Note: Firewood is wood from the main trunk of a tree. Branches are large branches cut from a tree. Residues are agricultural and animal residues. Other parts of trees are defined as small branches, twigs, leaves, and bark. Grade 1 fuel quality is superior to Grade 2 and Grade 3.

Table: 2.4

Distribution of Food and Fuel Consumption in Sakoa Village of Kulaghat Union by Landholding Size

	Farm Size (acres of cultivable land)							
	Land-less	0-0.5	0.5-1	1-2	2-3	3-5	5-10	10+
1. Acres/person	0	0.05	0.14	0.30	0.41	0.47	0.87	1.34
2. Cattle/person	0.04	0.06	0.29	0.38	0.31	0.37	0.71	1.04
3. Tree/person	3.1	9.1	14.60	23.40	18.70	18.40	22.30	23.40
	GJ/year per capita							
4. Food consumption (rice and wheat)	2.9	3.39	3.46	3.48	3.64	3.40	4.16	5.79
5. Food cooking fuels								
a. Firewood	1.66	2.11	2.27	4.38	3.17	3.02	4.84	4.54
b. Branches, twigs, leaves	2.72	2.42	2.12	2.42	1.97	1.51	1.66	2.72
c. Agriculture residues	2.26	2.00	1.88	2.14	2.00	1.88	2.26	3.26
d. Total (a+b+c)	6.64	0.53	6.27	8.94	7.14	6.41	8.76	10.52
6. Fuel for parboiling	0.27	0.53	1.07	1.73	2.13	2.27	2.67	4.00
7. Fuel for ghur making	-	-	-	0.15	0.07	0.30	2.16	2.38
8. Total household cooking fuel (5+6+7)	6.91	7.06	7.34	10.82	9.34	8.98	13.59	16.90
9. Kerosene for lighting	0.20	0.20	0.20	0.30	0.28	0.30	0.31	0.48

Source: Figures are calculated from Quader, Omar 1982 (Quoted from Islam 1984).

Note: Total households, 250; total population, 1,407.
Caloric value of rice and wheat = 14.8 MJ/kg = 3,540 kcal/kg.

Table: 2.5

Per Capita Consumption of Cooking Fuels in Four Villages of Nabagram

Number of Household Members	Fuel Consumption			
	Village 8	Village 9	Village 20	Village 22
	GJ/year			
1	-	-	11.00	10.90
2.	7.56	8.91	7.40	6.77
3	4.46	8.44	5.29	5.93
4	4.37	8.44	5.14	4.44
5	4.04	6.45	4.25	3.49
6	4.05	5.80	4.60	3.28
7	3.25	5.60	4.50	3.65
8	3.14	4.68	4.90	3.55
9	2.18	7.20	3.84	2.75
10	3.29	5.27	-	1.38
11	2.28	-	-	1.80
12	2.33	4.99	-	3.49
13	5.98	3.48	-	-
14	1.73	-	-	-
20	4.98	-	5.35	-
Weighted Average	3.43	5.93	4.80	3.82

Source: Islam, Morse and Soesastro (1984)
(Figures are calculated from Islam (1980)).

Table: 2.6

Kerosene Consumption for Lighting by Different Devices Used in Bangladesh.

Type of Device	Kerosene Capacity (gms)	Kerosene Consumption (gm/hr)		
		Wick height	(cm.)	
Kupee (Open Wick Lamp)		(0.50)	(0.75)	(1.00)
Large	244	25.89	38.33	46.23
Medium	89	15.80	18.94	22.43
Small	74	14.90	18.92	21.73
Glass	45	10.92	13.75	18.67
BCSIR improved	140	4.29	5.50	6.38
Hurricane Lantern		(0.10)	(0.15)	(0.20)
Large	371	8.42	10.70	15.49
Small	242	5.81	7.98	12.38

Source: GOB (1985a)

Table: 2.7

Summary of Rural Energy Consumption of Bangladesh in 1981

End Use	Type of Fuel	Quantity (Mio tonnes)	(PJ)	(%)
Cooking	Biomass	27.29	337.0	71.0
Lighting	Kerosene	0.23	10.6	2.2
Industries (except brick)	Biomass	5.37	80.5	17.0
Agriculture				
Irrigation	Diesel	0.03	1.5)	0.3
	Electricity	37,989 MWh	0.1)	
Fertiliser	(Indirect gas & electricity)	0.862	45.0	9.5
TOTAL			474.65	100.0

Notes 1) Estimated energy consumption in rural areas = 6.26 GJ per person/year

Source: BEPP (GOB 1985a)

Table: 4.1.1

Comparative Profile of Fulbaria and Mymensingh Sadar Upazila

Description	Unit	Fulbaria Upazila	Mymensingh Sadar Upazila
1. AREA (including river)	sq. Km	485.4	372.7
2. DENSITY (including river)	Person per sq km	679	1,198
3. HOUSEHOLDS			
Total	Number	59,723	78,497
Urban	Number	4,108	29,418
Rural	Number	55,615	49,079
Size (in dwelling unit)	Person per household		
Total		5.5	5.5
Urban		5.5	6.1
Rural		5.5	5.2
4. POPULATION			
Total: Both sex		329,739	446,529
Male		167,826	234,635
Female		161,913	211,894
Urban: Both sex		22,023	190,911
Male		11,287	104,125
Female		10,736	86,786
Rural: Both sex		307,716	255,618
Male		156,539	130,510
Female		151,177	125,108
Urban Population (percent as of 1981)		6.7	42.8
Sex Ratio (100M/F)			
Total		104	111
Urban		105	120
Rural		104	104

Description		Unit	Fulbaria Upazila	Mymensingh Sadar Upazila
5. LITERACY RATE (5 yrs & over)				
Total:	Both sex		14.5	29.4
	Male		19.6	35.8
	Female		9.1	22.3
Urban:	Both sex		16.0	45.4
	Male		22.9	52.3
	Female		8.7	37.0
Rural:	Both sex		14.4	16.8
	Male		19.4	21.8
	Female		9.1	11.6
6. ADMINISTRATIVE UNIT				
Union			16	13
Mauza			121	126
Village			178	186
Municipality			-	1
Ward			-	9
Mahalla			-	69
7. SERVICES AND FACILITIES				
Institution				
Collage			1	10
High/Junior High School			29	43
Primary School			102	126
Madrasha			8	42
Mosque			508	504
Temple			22	19
Church			-	1

Description	Fulbaria Upazila	Mymensingh Sadar Upazila
Transport and Communication		
Road in km		
Metalled	20.9	235.0
Mutcha	1,512.8	241.4
Rail Road	-	47.0
Modes of transport	Bus, Auto rickshaw, and Rickshaw	Train, Bus, Auto rickshaw, Rickshaw and Boat.
Health facilities		
No. of hospitals	7	4
No. of Dispensaries/Clinics	6	3
No. of Doctors	1	5
No. of Paramedics	2	2
Other facilities available		
No. of hat/bazars	40	28
No. of Post Office	17	23
No. of Telegraph Office	-	1
Percentage of electrified Village	7.9	41.8
8. **PHYSIO-CLIMATIC CONDITION**		
Soil	Flood plain and silty clays	Flood plain and silty clay loams
Climate	Cool	Cool
Maximum temperature	33.31°C	33.31°C
Minimum temperature	11.83°C	11.83°C
Period of Summer Season	April - June	April - June
Period of Winter Season	July - December	July - December
Period of Rainfall	May - September	May - September
Total rainfall (in 1981)	72"	72"

Description	Fulbaria Upazila	Mymensingh Sadar Upazila
Maximum humidity	94%	94%
Minimum humidity	49%	49%
9. SPECIAL FEATURES	Jack fruits and pine apples largely grown here.	A railway junction, Agricultural University, a big hospital, a girls Cadet College, a jute mill are present here.
10. HISTORICAL RELICS	No trace found	Old zaminders places still exist here.

Source: GOB (1985b)

Table: 4.1.2

Population, Attending School and Literacy in Upazila, Union and Study Villages

Name	Area in Acrea	Household	Population							Attending School				Literate Persons		
			Total	Male	Female	0-9 Years	10-17 Years	18-64 Years	65 and Over	Total	5-9 Years	10-14 Years	15-24 Years	Total	Male	Female
Fulbaria Upazila	119,334	59,723	329739	167826	161913	114231	61009	142885	11614	23250	8987	9794	4469	39353	27246	12107
Kushmail Union	7538	5,235	28132	14091	14,041	9499	5002	1259	1038	1499	565	617	317	2916	2120	796
*Baruka Village	1217	992	5163 (100)	2535 (49.10)	2,628 (50.90)	1768 (34.24)	909 (17.61)	2316 (44.86)	170 (3.29)	317 (100)	212 (38.17)	133 (41.96)	63 (19.87)	568 (100)	395 (69.54)	173 (30.46)
Mymensingh Sadar Upazila	95033	78497	446529	234635	211894	142258	85811	205170	13290	51912	16669	20750	14493	109870	70736	39134
Ghagra Union	8246	6636	32171	16341	15830	11296	5728	14151	1002	2289	901	960	428	3633	2439	1254
*Chaknaju Village	-	323	1495 (100)	763 (51.04)	732 (48.96)	486 (32.51)	249 (16.66)	700 (46.82)	60 (4.01)	40 (100)	11 (27.5)	18 (45.0)	11 (27.5)	111 (100)	77 (69.37)	34 (30.63)

* Study Villages

Source: GOB (1985b)

Table: 4.1.3

Households by Use of Dwelling unit structure, Potable water, Ownership of Cultivable land, Own house and Cottage Industry in Upazila, Union and Study Villages

Name	Households			Dwelling Units				Households Having				
	Total	Dwelling Units	Institution	Business Industry	Kutcha	Semi Pucca	Pucca	Potable Water	Agri-Land	Own House	Cottage Industry	Tribal Household
Fulbaria Upazila	59723	59240	139	344	26396	32663	181	32285	44802	56940	3696	259
Kushmail Union	5235	5204	1	30	2520	2675	9	3730	3737	5097	136	3
*Baruka Village	992 (100)	983 (99.09) (100)	0 (0)	9 (0.91)	540 (54.94)	441 (44.86)	2 (0.20)	591 (59.58)	658 (66.33)	953 (96.07)	26 (2.62)	2 (0.20)
Mymensingh Sadar Upazila	78497	77263	704	530	37776	30506	8981	54572	35594	61981	2102	107
Ghagra Union	6636	6629	5	2	3136	3432	61	4403	4145	6308	77	12
*Chaknaju Village	323 (100)	323 (100) (100)	0 (0)	0 (0)	202 (62.54)	121 (37.46)	0 (0)	164 (50.77)	237 (73.37)	296 (91.64)	5 (1.55)	0 (0)

Note: * Study villages
( ) indicates percentage.

Source: GOB (1985b)

Table: 4.1.4

Population by Religion, Occupation and Youth not working (20-29 years) in Upazila, Union and Study Villages

	Religion						Occupation (10-65 Years)							Youths (10-29 years) Not working	
	Total	Muslim	Hindu	Buddhist	Christan	Others	Total	Not Working	Household work	Culti vation	Agri- Non Crop	Manufac- ture	Business	Others	Literate	Illiterate
Fulbaria Upazila	329739	313066	15396	6	849	422	215508	41756	80620	65871	797	740	5224	20500	1814	19324
Kushmail Union	28132	26744	1360	0	9	19	18633	4161	6422	5086	7	26	523	2408	179	2247
*Baruka Village	5163	5013	144	0	0	6	3395	1181	967	688	4	2	34	519	57	604
	(100)	(97.09)	(2.79)	(0)	(0)	(0.12)	(100)	(34.79)	(28.48)	(20.27)	(0.11)	(0.06)	(1.00)	(15.29)		
Mymensingh Sedar Upazila	446529	413542	31571	73	618	725	304271	76390	96098	43667	1447	6704	21757	58208	5875	25282
Ghagra Union	32171	31609	525	5	3	29	20875	4394	7546	5077	52	74	980	2752	216	2067
*Chaknaju Village	1495	1421	74	0	0	0	1009	80	462	356	0	2	29	80	2	48
	(100)	(95.05)	(4.95)	(0)	(0)	(0)	(100)	(7.93)	(45.79)	(35.28)	(0)	(0.20)	(2.87)	(7.93)		

Note: * Study Village ( ) indicates percentage

Source: GOB (1985b)

Table: 4.2.1

Distribution of Population by Age Group and Sex

Village: Baruka (b)

Age Group	Male		Female		Total	%
	Number	%	Number	%		
0-9	632	50.97	608	49.03	1240	31.74
10-19	420	55.85	332	44.15	752	19.25
20-29	315	45.65	375	54.35	690	17.66
30-39	235	51.20	224	48.80	459	11.75
10-49	179	46.74	204	53.26	383	9.80
50+	233	60.84	150	39.16	383	9.80
Total	2014	51.55	1893	48.45	3907	100

Village: Chaknaju (c)

	Male		Female		Total	%
	Number	%	Number	%		
0-9	225	53.44	196	46.56	421	31.51
10-19	126	46.67	144	53.33	270	20.21
20-29	117	47.18	131	52.82	248	18.56
30-39	76	48.10	82	51.90	158	11.83
40-49	73	57.03	55	42.97	128	9.58
50+	77	69.37	34	30.63	111	8.31
Total	694	51.95	642	48.05	1336	100

Table: 4.2.2(b)

Distribution of Family Size According to the Size of Cultivated Land.

Village: Baruka

COUNT / TOT PCT / Family Size	VARO Farm Size (Acres of Cultivated Land)							ROW TOTAL
	LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	
1.	1 0.1	5 0.7	0 0.0	0 0.0	0 0.0	0 0.0	1 0.1	7 0.9
2.	24 3.2	36 4.9	2 0.3	0 0.0	0 0.0	0 0.0	7 0.9	69 9.3
3.	40 5.4	60 8.1	8 1.1	1 0.1	0 0.0	0 0.0	3 0.4	112 15.1
4.	35 4.7	63 8.5	7 0.9	1 0.1	0 0.0	1 0.1	3 0.4	110 14.8
5.	28 3.8	90 12.1	7 0.9	0 0.0	1 0.1	0 0.0	3 0.4	129 17.4
6.	18 2.4	53 7.1	17 2.3	2 0.3	0 0.0	0 0.0	4 0.5	94 12.7
7.	18 2.4	45 6.1	16 2.2	6 0.8	1 0.1	1 0.1	1 0.1	88 11.9
8.	5 0.7	24 3.2	11 1.5	3 0.4	0 0.0	0 0.0	1 0.1	44 5.9
9.	3 0.4	12 1.6	18 2.4	5 0.7	2 0.3	0 0.0	0 0.0	40 5.4
10.	2 0.3	11 1.5	24 3.2	7 0.9	3 0.4	2 0.3	0 0.0	49 6.6
COLUMN TOTAL	174 23.5	399 53.8	110 14.8	25 3.4	7 0.9	4 0.5	23 3.1	742 100.0

Table: 4.2.2(c)

Distribution of Family Size According to the Size of Cultivated Land

Village: Chaknaju

COUNT / TOT PCT / Family Size	VARO Farm Size (Acres of Cultivated Land)							ROW TOTAL
	LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	
1.	2 0.8	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	2 0.8
2.	14 5.4	10 3.9	1 0.4	0 0.0	0 0.0	0 0.0	2 0.8	27 10.4
3.	20 7.7	16 6.2	0 0.0	0 0.0	0 0.0	0 0.0	2 0.8	38 14.7
4.	24 9.3	16 6.2	5 1.9	0 0.0	0 0.0	0 0.0	3 1.2	48 18.5
5.	17 6.6	21 8.1	4 1.5	0 0.0	0 0.0	0 0.0	1 0.4	43 16.6
6.	11 4.2	18 6.9	6 2.3	2 0.8	1 0.4	0 0.0	1 0.4	39 15.1
7.	3 1.2	8 3.1	3 1.2	0 0.0	0 0.0	0 0.0	0 0.0	14 5.4
8.	4 1.5	5 1.9	1 0.4	2 0.8	0 0.0	0 0.0	0 0.0	12 4.6
9.	4 1.5	4 1.5	6 2.3	4 1.5	0 0.0	0 0.0	0 0.0	18 6.9
10.	2 0.8	2 0.8	9 3.5	4 1.5	0 0.0	1 0.4	0 0.0	18 6.9
COLUMN TOTAL	101 39.0	100 38.6	35 13.5	12 4.6	1 0.4	1 0.4	9 3.5	259 100.0

Table: 4.3.1(b)

Type of Families by Landholding Size

Village: Baruka

Type of Family (TYOF)	VARO Farm Size (Acres of Cultivated Land)							ROW TOTAL
COUNT / TOT PCT	LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	
1. NUCLEUS FAMILY	158 21.3	344 46.4	86 11.6	16 2.2	4 0.5	3 0.4	22 3.0	633 85.3
2. EXTENDED FAMILY	14 1.9	49 6.6	19 2.6	7 0.9	2 0.3	1 0.1	1 0.1	93 12.5
3. COMBINED FAMILY	2 0.3	6 0.8	5 0.7	2 0.3	1 0.1	0 0.0	0 0.0	16 2.2
COLUMN TOTAL	174 23.5	399 53.8	110 14.8	25 3.4	7 0.9	4 0.5	23 3.1	742 100.0

Table: 4.3.1(c)

Type of Families by Landholding Size

Village: Chaknaju

Type of Family (TYOF)	VARO Farm Size (Acres of Cultivated Land)							ROW TOTAL
COUNT / TOT PCT	LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	
1. NUCLEUS FAMILY	95 36.7	93 35.9	25 9.7	5 1.9	0 0.0	1 0.4	7 2.7	226 87.3
2. EXTENDED FAMILY	6 2.3	5 1.9	7 2.7	6 2.3	1 0.4	0 0.0	2 0.8	27 10.4
3. COMBINED FAMILY	0 0.0	2 0.8	3 1.2	1 0.4	0 0.0	0 0.0	0 0.0	6 2.3
COLUMN TOTAL	101 39.0	100 38.6	35 13.5	12 4.6	1 0.4	1 0.4	9 3.5	259 100.0

Table: 4.3.2(b)

Distribution of Own Land and Cultivated Land.

Village: Baruka

VARD	COUNT TOT PCT. Own Land	VARO Farm Size (Acres of Cultivated Land) LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	ROW TOTAL
LANDLESS	1.	144 19.4	38 5.1	1 0.1	0 0.0	0 0.0	0 0.0	0 0.0	183 24.7
0-0.5 ACRE	2.	26 3.5	355 47.8	24 3.2	1 0.1	0 0.0	0 0.0	1 0.1	407 54.9
0.5-1 ACRE	3.	3 0.4	6 0.8	74 10.0	1 0.1	1 0.1	0 0.0	0 0.0	85 11.5
1-1.5 ACRE	4.	1 0.1	0 0.0	10 1.3	20 2.7	1 0.1	0 0.0	0 0.0	32 4.3
1.5-2.5 ACRE	5.	0 0.0	0 0.0	1 0.1	2 0.3	5 0.7	0 0.0	0 0.0	8 1.1
2.5-7.5 ACRE	6.	0 0.0	0 0.0	0 0.0	1 0.1	0 0.0	4 0.5	0 0.0	5 0.7
7.5 + ACRE	7.	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	22 3.0	22 3.0
	COLUMN TOTAL	174 23.5	399 53.8	110 14.8	25 3.4	7 0.9	4 0.5	23 3.1	742 100.0

Table: 4.3.2(c)

Distribution of Own Land and Cultivated Land.

Village: Chaknaju

VARO	COUNT / TOT PCT / Own Land	VARO Farm Size (Acres of Cultivated Land)							ROW TOTAL
		LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	
LANDLESS	1.	98 37.8	10 3.9	2 0.8	1 0.4	0 0.0	0 0.0	0 0.0	111 42.9
0-0.5 ACRE	2.	3 1.2	85 32.8	4 1.5	1 0.4	0 0.0	0 0.0	0 0.0	93 35.9
0.5-1 ACRE	3.	0 0.0	2 0.8	27 10.4	2 0.8	0 0.0	0 0.0	0 0.0	31 12.0
1-1.5 ACRE	4.	0 0.0	0 0.0	2 0.8	7 2.7	1 0.4	0 0.0	0 0.0	10 3.9
1.5-2.5 ACRE	5.	0 0.0	2 0.8	0 0.0	1 0.4	0 0.0	0 0.0	0 0.0	3 1.2
2.5-7.5 ACRE	6.	0 0.0	1 0.4	0 0.0	0 0.0	0 0.0	1 0.4	0 0.0	2 0.8
7.5 + ACRE	7.	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	9 3.5	9 3.5
	COLUMN TOTAL	101 39.0	100 38.6	35 13.5	12 4.6	1 0.4	1 0.4	9 3.5	259 100.0

Table: 4.3.3(b)

Distribution of Households According to Annual Income and by Landholding Size

Village: Baruka

Yearly Income	VARO Farm Size (Acres of Cultivated Land)							ROW TOTAL
VARC / COUNT / TOT PCT	1. LANDLESS	2. 0-0.5 ACRE	3. 0.5-1 ACRE	4. 1-1.5 ACRE	5. 1.5-2.5 ACRE	6. 2.5-7.5 ACRE	7. 7.5+ ACRE	
1. 0-5999 TK	26	34	5	1	0	0	9	75
	3.5	4.6	0.7	0.1	0.0	0.0	1.2	10.1
2. 6000-17999 TK	119	246	27	5	2	0	10	409
	16.0	33.2	3.6	0.7	0.3	0.0	1.3	55.1
3. 18000-29999 TK	22	89	39	6	1	0	2	159
	3.0	12.0	5.3	0.8	0.1	0.0	0.3	21.4
4. 30000-59999 TK	5	28	32	13	4	2	1	85
	0.7	3.8	4.3	1.8	0.5	0.3	0.1	11.5
5. 60000 TK +	2	2	7	0	0	2	1	14
	0.3	0.3	0.9	0.0	0.0	0.3	0.1	1.9
COLUMN TOTAL	174	399	110	25	7	4	23	742
	23.5	53.8	14.8	3.4	0.9	0.5	3.1	100.0

Table: 4.3.3(c)

Distribution of Households According to Annual Income and by Landholding Size

Village: Chaknaju

VARC Yearly Income	COUNT / TOT PCT	VARO Farm Size (Acres of Cultivated Land)							ROW TOTAL
		LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	
1. 0-5999 TK		27	15	3	0	0	0	1	46
		10.4	5.8	1.2	0.0	0.0	0.0	0.4	17.8
2. 6000-17999 TK		67	62	6	2	0	0	6	143
		25.9	23.9	2.3	0.8	0.0	0.0	2.3	55.2
3. 18000-29999 TK		6	16	13	2	0	1	2	40
		2.3	6.2	5.0	0.8	0.0	0.4	0.8	15.4
4. 30000-59999 TK		1	6	12	7	1	0	0	27
		0.4	2.3	4.6	2.7	0.4	0.0	0.0	10.4
5. 60000 TK +		0	1	1	1	0	0	0	3
		0.0	0.4	0.4	0.4	0.0	0.0	0.0	1.2
COLUMN TOTAL		101	100	35	12	1	1	9	259
		39.0	38.6	13.5	4.6	0.4	0.4	3.5	100.0

Table: 4.4.1(b)

Distribution of Households by Number of Dwelling Units and Landholding Size

Village: Baruka

COUNT TOT PCT Dwelling Units	VARO Farm Size (Acres of Cultivated Land) LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	ROW TOTAL
0.	2 0.3	1 0.1	0 0.0	0 0.0	0 0.0	0 0.0	1 0.1	4 0.5
1.	158 21.3	350 47.2	77 10.4	16 2.2	3 0.4	2 0.3	21 2.8	627 84.5
2.	11 1.5	44 5.9	30 4.0	6 0.8	4 0.5	1 0.1	1 0.1	97 13.1
3.	3 0.4	2 0.3	3 0.4	2 0.3	0 0.0	0 0.0	0 0.0	10 1.3
4.	0 0.0	2 0.3	0 0.0	0 0.0	0 0.0	1 0.1	0 0.0	3 0.4
5.	0 0.0	0 0.0	0 0.0	1 0.1	0 0.0	0 0.0	0 0.0	1 0.1
COLUMN TOTAL	174 23.5	399 53.8	110 14.8	25 3.4	7 0.9	4 0.5	23 3.1	742 100.0

Table: 4.4.1(c)

Distribution of Households by Number of Dwelling Units and Landholding Size

Village: Chaknaju

	VARO	Farm Size (Acres of Cultivated Land)							
COUNT TOT PCT Dwelling Units	LANDLESS	0-0.5 ACRE	0.5-1 ACRE	1-1.5 ACRE	1.5-2.5 ACRE	2.5-7.5 ACRE	7.5+ ACRE	ROW TOTAL
	1.	2.	3.	4.	5.	6.	7.	
0.	0 0.0	1 0.4	0 0.0	0 0.0	0 0.0	0 0.0	1 0.4	2 0.8
1.	89 34.4	80 30.9	18 6.9	2 0.8	1 0.4	0 0.0	8 3.1	198 76.4
2.	9 3.5	13 5.0	11 4.2	5 1.9	0 0.0	1 0.4	0 0.0	39 15.1
3.	2 0.8	6 2.3	5 1.9	3 1.2	0 0.0	0 0.0	0 0.0	16 6.2
4.	0 0.0	0 0.0	1 0.4	1 0.4	0 0.0	0 0.0	0 0.0	2 0.8
5.	0 0.0	0 0.0	0 0.0	1 0.4	0 0.0	0 0.0	0 0.0	1 0.4
9.	1 0.4	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	1 0.4
COLUMN TOTAL	101 39.0	100 38.6	35 13.5	12 4.6	1 0.4	1 0.4	9 3.5	259 100.0

Table: 4.4.2(b)

Distribution of Number of Living Rooms by Landholding Size

Village: Baruka

COUNT TOT PCT Living Rooms	VARO LANDLESS 1.	Farm Size (Acres of Cultivated Land) 0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	ROW TOTAL
1.	149 20.1	260 35.0	50 6.7	7 0.9	1 0.1	1 0.1	22 3.0	490 66.0
2.	23 3.1	129 17.4	45 6.1	9 1.2	2 0.3	2 0.3	1 0.1	211 28.4
3.	0 0.0	10 1.3	15 2.0	5 0.7	3 0.4	0 0.0	0 0.0	33 4.4
4.	0 0.0	0 0.0	0 0.0	3 0.4	0 0.0	0 0.0	0 0.0	3 0.4
5.	0 0.0	0 0.0	0 0.0	1 0.1	1 0.1	1 0.1	0 0.0	3 0.4
8.	2 0.3	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	2 0.3
COLUMN TOTAL	174 23.5	399 53.8	110 14.8	25 3.4	7 0.9	4 0.5	23 3.1	742 100.0

Table: 4.4.2(c)

Distribution of Number of Living Rooms by Landholding Size

Village: Chaknaju

COUNT / TOT PCT / Living Rooms	VARO LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	ROW TOTAL
1.	93 35.9	80 30.9	18 6.9	5 1.9	0 0.0	1 0.4	9 3.5	206 79.5
2.	7 2.7	17 6.6	8 3.1	2 0.8	1 0.4	0 0.0	0 0.0	35 13.5
3.	0 0.0	3 1.2	2 0.8	3 1.2	0 0.0	0 0.0	0 0.0	8 3.1
4.	1 0.4	0 0.0	4 1.5	0 0.0	0 0.0	0 0.0	0 0.0	5 1.9
5.	0 0.0	0 0.0	2 0.8	2 0.8	0 0.0	0 0.0	0 0.0	4 1.5
6.	0 0.0	0 0.0	1 0.4	0 0.0	0 0.0	0 0.0	0 0.0	1 0.4
COLUMN TOTAL	101 39.0	100 38.6	35 13.5	12 4.6	1 0.4	1 0.4	9 3.5	259 100.0

Table: 4.4.3(b)

Distribution of Households by Type of Roofing Materials and Landholding Size

Village: Baruka

Roofing Materials	VARO COUNT / TOT PCT	Farm Size (Acres of Cultivated Land)							
		LANDLESS	0-0.5 ACRE	0.5-1 ACRE	1-1.5 ACRE	1.5-2.5 ACRE	2.5-7.5 ACRE	7.5+ ACRE	ROW TOTAL
ROOFMAT		1.	2.	3.	4.	5.	6.	7.	
1. CORRUGATED IRON		31 4.2	182 24.5	87 11.7	24 3.2	6 0.8	4 0.5	2 0.3	336 45.3
2. STRAW OR LEAVES		143 19.3	215 29.0	23 3.1	1 0.1	1 0.1	0 0.0	21 2.8	404 54.4
4. OTHERS		0 0.0	2 0.3	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	2 0.3
COLUMN TOTAL		174 23.5	399 53.8	110 14.8	25 3.4	7 0.9	4 0.5	23 3.1	742 100.0

Table: 4.4.3(c)

Distribution of Households by Type of Roofing Materials and Landholding Size.

Village: Chaknaju

Roofing Materials	COUNT / TOT PCT	VARO LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	ROW TOTAL
ROOFMAT									
1. CORRUGATED IRON		16 6.2	51 19.7	29 11.2	11 4.2	1 0.4	1 0.4	3 1.2	112 43.2
2. STRAW OR LEAVES		85 32.8	49 18.9	4 1.5	1 0.4	0 0.0	0 0.0	6 2.3	145 56.0
4. OTHERS		0 0.0	0 0.0	2 0.8	0 0.0	0 0.0	0 0.0	0 0.0	2 0.8
COLUMN TOTAL		101 39.0	100 38.6	35 13.5	12 4.6	1 0.4	1 0.4	9 3.5	259 100.0

Table: 4.4.4(b)

Distribution of Households by Sources of Drinking Water and Landholding Size

Village: Baruka

Sources of Drinking Water	COUNT TOT PCT	VARO LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	ROW TOTAL
SODRIW									
1. POND OR RIVER		13	3	0	0	0	C	1	17
		1.8	0.4	0.0	0.0	0.0	0.C	0.1	2.3
2. MUD WELL		11	34	8	1	0	C	3	57
		1.5	4.6	1.1	0.1	0.0	0.C	0.4	7.7
3. PUCCA WELL		0	4	5	1	0	C	0	10
		0.0	0.5	0.7	0.1	0.0	0.C	0.0	1.3
4. HAND TUBEWELL		149	355	97	22	7	4	19	653
		20.1	47.8	13.1	3.0	0.9	0.5	2.6	88.0
5. DEEP TUBEWELL		1	3	0	1	0	C	0	5
		0.1	0.4	0.0	0.1	0.0	0.C	0.0	0.7
COLUMN TOTAL		174	399	110	25	7	4	23	742
		23.5	53.8	14.8	3.4	0.9	0.5	3.1	100.0

Table: 4.4.4(c)

Distribution of Households by Sources of Drinking Water and Landholding Size

Village: Chaknaju

Sources of Drinking Water	COUNT TOT PCT	VARD LANDLESS	Farm Size (Acres of Cultivated Land) 0-0.5 ACRE	0.5-1 ACRE	1-1.5 ACRE	1.5-2.5 ACRE	2.5-7.5 ACRE	7.5+ ACRE	ROW TOTAL
SOURCE		1.	2.	3.	4.	5.	6.	7.	
1. POND OR RIVER		18 6.9	21 8.1	3 1.2	2 0.8	0 0.0	0 0.0	2 0.8	46 17.8
2. MUD WELL		1 0.4	3 1.2	1 0.4	1 0.4	0 0.0	0 0.0	0 0.0	6 2.3
3. PUCCA WELL		5 1.9	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	1 0.4	6 2.3
4. HAND TUBEWELL		77 29.7	76 29.3	31 12.0	9 3.5	1 0.4	1 0.4	6 2.3	201 77.6
COLUMN TOTAL		101 39.0	100 38.6	35 13.5	12 4.6	1 0.4	1 0.4	9 3.5	259 100.0

Table: 4.5.1(b)

Distribution of Tree Resources According to the Size of Homestead Land

Village: Baruka

Description	Homestead Land (in Acre)			
	Landless	0-0.005	0.005-0.1	0.1-0.5	Total
		(Number of Trees)			
Fruit Trees	0	10	4227	353	4590
Fuelwood Trees	0	1	2548	343	2892
Timber Trees	0	0	3	0	3
Total Trees		11	6778	696	7485
		(0.14)	(96.55)	(9.29)	(100.0)
Total households		3	692	47	742
		(0.4)	(93.3)	(6.3)	(100)
		(Number of trees/household)			
Fruit Trees		3.33	6.10	7.51	6.19
Fuelwood Trees		0.33	3.68	7.30	3.90
Timber Trees			0.004		
Total		3.66	9.78	14.81	10.09

Table: 4.5.1(c)

Distribution of Tree Resources According to the Size of Homestead Land

Village: Chaknaju

Type of Trees	Homestead Land in Acre			
	Landless	0-0.005	0.005-0.1	0.1-0.5	Total
		(Number of Trees)		
Fruit Trees		2276	211	2487
Fuelwood Trees		944	24	968
Timber Trees		24	3	27
Total Trees		3244 (93.16)	238 (6.84)	3482 (100.0)
Total households		241 (93.05)	18 (6.95)	259 (100.0)
		(Number of Trees/household)		
Fruit Trees		9.44	11.72	9.6
Fuelwood Trees		3.91	1.33	3.74
Timber Trees		0.01	0.17	0.10
Total		13.36	13.22	13.44

Table: 4.5.2(b)

Distribution of Tree Resources According to the Size of Cultivated Land

Village: Baruka

Type of Trees	Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
	(Number of Trees)							
Fruit Trees	706	2336	1045	354	57	83	9	4590
Fuelwood Trees	511	1514	553	234	37	53	2	2904
Timber Trees	0	0	2	0	1	0	0	3
Total Trees	1217 (16.2)	3850 (51.4)	1600 (21.3)	588 (7.8)	95 (1.3)	136 (1.8)	11 (0.15)	7497 (99.95)
Total households	174 (25.5)	399 (53.8)	110 (14.8)	25 (3.4)	7 (0.9)	4 (0.5)	23 (3.1)	742 (100)
	(Number of Trees/household)							
Fruit Trees	4.06	5.85	9.5	14.16	8.4	20.75	0.39	6.19
Fuelwood Trees	2.94	3.79	5.03	9.36	5.29	13.25	0.29	3.9
Timber Trees	0	0	0.02	0	0.14	0	0	0.004
Total	6.99	9.64	14.55	23.52	13.57	34.0	0.68	10.09

Table: 4.5.2(c)

Distribution of Tree Resources According to the Size of Cultivated Land

Village: Chaknaju

Type of Trees	Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
	(Number of Trees)							
Fruit Trees	514	986	647	317	30	5	6	2505
Fuelwood Trees	254	414	204	84	3	7	2	968
Timber Trees	1	9	7	9	0	0	1	27
Total Trees	769	1409	858	410	33	12	9	3500
	(22.0)	(40.3)	(24.5)	(11.7)	(0.94)	(0.34)	(0.26)	(100)
Total households	101	100	35	12	1	1	9	259
	(39.0)	(38.6)	(13.5)	(4.6)	(0.4)	(0.4)	(3.5)	(100)
	(Number of Trees/household)							
Fruit Trees	5.08	9.86	18.48	26.41	30.0	5.0	0.66	9.6
Fuelwood Trees	2.51	4.14	5.82	7.0	3.0	7.0	0.22	3.74
Timber Trees	0.009	0.09	0.2	0.75	0.0	0.0	0.11	0.10
Total Trees	7.60	14.09	24.5	34.16	33.0	12.0	0.99	13.44

Table: 4.6.1(b)

Distribution of Cropped Areas by Landholding Size

Village: Baruka

Type of Crops	Farm Size (Acres of Cultivated Land)						
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
	(Acre per household)							
Aus	0	0.13	0.42	0.68	0.97	0.69	0.01	0.17
Aman	0	0.17	0.58	0.98	1.47	1.63	0.03	0.23
Traditional Boro	0	0.007	0.03	0.08	0	0	0.03	0.01
Irrigated Boro	0	0.04	0.15	0.17	0.26	1.3	0.002	0.06
Total for food crops		0.35	1.18	1.91	2.7	3.62	0.07	0.47
Jute	0	0.03	0.09	0.14	0.17	0.16	0.002	0.04
Others	0	0.006	0.03	0.02	0.03	0.06	0.003	0.009
Total	0	0.38	1.3	2.07	2.9	3.84	0.08	0.52

Table: 4.6.1(c)

Distribution of Cropped Areas by Landholding Size

Village: Chaknaju

Type of Crops	Farm Size (Acres of Cultivated Land)						
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
	(Acre per Household)							
Aus	0	0.11	0.43	0.64	0.17	0.58	0.10	0.14
Aman	0	0.13	0.59	0.94	0.67	1.63	0.19	0.19
Traditional Boro	0	0.02	0.08	0.12	0.50	0	0.04	0.02
Irrigated Boro	0	0.008	0.03	0.07	0	0	0	0.007
Total Food Crops	0	0.27	1.13	1.77	1.34	2.21	0.33	0.36
Jute	0	0.06	0.18	0.36	0.33	0.50	0.03	0.05
Others	0	0.02	0.12	0.07	0.05	0.50	0.22	0.02
Total		0.35	1.43	2.2	1.72	3.21	0.58	0.43

Table: 4.6.2(b)

Distribution of Crops by Landholding Size

Village: Baruka

Crops	Landless	Farm Size (Acres of Cultivated Land) 0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total weighted average
		(kg/person/year)						
Aus Rice (for food)	80	170	190	150	240	10	77.64	
Aman Rice (for food)	90	210	230	250	310	8	91.56	
Traditional Boro Rice (for food)	3	8	20	0	0		3.47	
Irrigated Boro Rice (for food)	40	80	90	90	310	5	39.08	
Sub-Total of Rice	213	468	530	490	860	23	211.75	
Jute	20	30	50	40	40	9	17.76	
Others	2	5	20	2	30	0.9	2.70	

Table: 4.6.2(c)

Distribution of Crops by Landholding Size

Village: Chaknaju

Crops	Farm Size (Acres of Cultivated Land)						Total weighted average
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+
	(kg/person/year)						
Aus Rice	50	100	100	60	50	40	39.27
Aman Rice	80	190	210	200	230	110	71.78
Traditional Boro	10	20	50	160	0	10	9.85
Irrigated Boro	5	20	4	0	0	0	4.82
Sub-Total of Rice	145	330	364	420	280	160	125.71
Jute	40	70	90	100	60	40	31.08
Others	5	20	7		10	30	6.04

Table: 4.6.3 (b)

Distribution of Crop Residues by Landholding Size

Village: Baruka

Type of Residues		Farm Size (Acres of Cultivated Land)							Total weighted average
		Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	
		(Tonnes/household)							
Aus	(Plant residues)	0	0.64	2.01	3.37	4.69	3.07	0.001	0.82
	(Husk)	0	0.13	0.35	0.54	0.52	0.53	0.03	0.15
	(Bran)	0	0.60	1.71	2.53	2.43	2.47	0.14	0.70
Aman	(Plant residues)	0	0.98	2.64	2.13	7.75	11.2	0.65	1.14
	(Husk)	0	0.16	0.48	0.65	0.83	0.85	0.02	0.19
	(Bran)	0	0.72	2.21	3.05	3.84	3.95	0.11	0.88
Traditional Boro	(Plant residues)	0	0.02	0.19	0.45	0	0	0	0.05
	(Husk)	0	0.005	0.03	0.08	0	0	0	0.01
	(Bran)	0	0.28	0.94	1.00	1.59	3.95	0.006	0.36
Jute Stick		0	0.22	0.48	0.88	0.71	0.39	0.01	0.23
Others		0	0.009	0.04	0.12	0.02	0.14	0.006	0.02

Table: 4.6.3 (c)

Distribution of Crop Residues by Landholding Size

Village: Chaknaju

Type of Residues		Farm Size (Acres of Cultivated Land)							Total weighted average
		Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	
		(Tonnes/household)							
Aus	(Plant residues)	0	0.34	0.73	0.93	0.56	0.22	0.27	0.29
	(Husk)	0	0.09	0.26	0.34	0.13	0.17	0.07	0.09
	(Bran)	0	0.42	1.21	1.58	0.60	0.80	0.34	0.42
Aman	(Plant residues)	0	0.68	1.97	3.68	3.73	1.12	0.94	0.75
	(Husk)	0	0.13	0.44	0.69	0.43	0.85	0.18	0.15
	(Bran)	0	0.64	2.04	3.21	1.1	3.95	0.88	0.72
Traditional Boro	(Plant residues)	0	0.04	0.26	0.90	3.36	0	0.04	0.11
	(Husk)	0	0.02	0.06	0.14	0.34	0	0.02	0.02
	(Bran)	0	0.13	0.28	1.64	1.59	0	0.13	0.17
Irrigated Boro	(Plant residues)	0	0.02	0.21	0.09	0	0	0.0	0.04
	(Husk)	0	0.009	0.05	0.03	0	0	0.0	0.01
	(Bran)	0	0.04	0.24	0.12	0	0	0.0	0.05
Jute Sticks		0	0.27	0.67	1.42	1.19	0.75	0.63	0.29
Others		0	0.02	0.08	0.05	0	0.11	0.12	0.03

Table: 4.7.1

Distribution of Livestock Resources by Landholding Size

Village: Baruka(b)

Type of Animal	Landless	Farm Size (Acres of Cultivated Land) 0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
		(Number of animals)						
Male Cattle	0	64	107	47	20	16	1	255
Female Cattle	21	336	158	68	23	18	2	626
Buffaloes	0	5	0	0	0	0	0	5
Horse	0	0	0	0	0	0	0	0
Goat and Sheep	44	279	123	39	9	17	2	513
Total Number of Households	174	399	110	25	7	4	23	742

Village: Chaknaju(c)

Type of Animals	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
		(Number of Animals)						
Male Cattle	0 0	55	24	26	1	0	8	114
Female Cattle	15	70	65	15	3	2	10	180
Buffaloes	0	1	0	0	0	0	0	1
Horse	0	0	0	0	0	0	0	0
Goat and Sheep	9	17	24	19	0	0	0	69
Total Number of Households	101	100	35	12	1	1	9	259

Table: 4.7.2(b)

Distribution of Adult Bullocks and Adult Cows by Landholding Size

Village: Baruka

Description	Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
Adult Bullocks (Nos).	0	42	91	36	18	12	1	200
Adult Cows (Nos) (Nos)	14	251	123	46	13	12	3	462
Total Adult Bullocks and Cows (Nos.)	14	293	214	82	31	24	4	662
Cultivated Land (acres)	0	78.07	76.24	29.98	11.78	13.79	174.8	384.66
Bullock/ Cultivated land (No/acre)	0	0.54	1.19	1.2	1.53	0.87	0.01	0.52
(Bullock + Cow)/ Cultivated land (No/acre)		3.75	2.81	2.74	2.63	1.74	0.02	1.72

Table: 4.7.2(c)

Distribution of Adult Bullocks and Adult Cows by Landholding Size.

Village: Chaknaju

Description	Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
Adult Bullocks (Nos)	0	41	27	22	0	2	8	100
Adult Cows (Nos)	9	42	44	12	2	1	1	111
Total Adult Bullocks and Cows (Nos)	9	83	71	34	2	3	9	211
Cultivated Land (acres)	0	18.68	25.77	14.57	1.58	4.13	68.4	133.13
Bullock/ Cultivated land (No/acre)	0	2.19	1.05	1.51	0	0.48	0.12	0.75
(Bullock + Cow)/ Cultivated land (No/acre)	0	4.44	2.76	2.33	1.27	0.73	0.13	1.58

Table: 4.7.3(b)

Household Distribution of Different Type of Livestock Resources

Village: Baruka

Description	Landless	Farm Size (Acres of Cultivated Land) 0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total weighted average
		(Number of animal per household)						
Adult bullock	0	0.11	0.83	1.44	2.57	3.0	(0.04)	0.27
	(0)	(8.20)	(55.45)	(72.0)	(85.7)	(75.0)	(4.0)	
Total bullock	0	0.16	0.97	1.88	2.86	4.0	0.04	0.34
	(0)	(11.0)	(60.0)	(72.0)	(85.7)	(100.0)	(4.0)	
Adult Cow	0.08	0.63	1.12	1.84	1.86	3.0	(0.09)	0.62
	(5.75)	(46.87)	(76.36)	(84.0)	(100.0)	(75.0)	(8.7)	
Total Cow	0.12	0.84	1.44	2.72	3.28	4.5	0.09	0.84
	(9.2)	(49.9)	(80.0)	(84.0)	(100.0)	(100.0)	(8.7)	
Buffaloe	0	0.01	0	0	0	0	0	0.006
		(0.8)						
Goat and Sheep	0.25	0.68	1.11	1.56	1.28	3.75	0.08	0.69
	(12.6)	(29.6)	(44.5)	(60.0)	(42.9)	(50.0)	(4.3)	
Total Number of of households	174	399	110	25	7	4	23	

Number in ( ) indicates percent of household in specific landholding group having animals.

Table: 4.7.3(c)

Household Distribution of Different Type of Livestock Resources

Village: Chaknaju

Description	Farm Size (Acres of Cultivated Land)							Total weighted average
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	
	(Number of animal per household)							
Adult bullock	0	0.41	0.77	1.83	0	0.5	0.89	0.39
	(0)	(31.0)	(54.29)	(100)	(0)	(100)	(11.11)	
Total bullock	0	0.53	0.68	2.16	1.0	0	00	0.41
	(0)	(35.0)	(45.7)	(100)	(100)	(0)	(0)	
Adult Cow	0.09	0.42	1.26	1.0	2.0	1.0	0.11	0.43
	(6.93)	(35.0)	(68.57)	(58.33)	(100.)	(100.0)	(11.11)	
Total Cow	0.14	0.67	1.85	1.26	3.0	2.0	5.0	0.69
	(7.9)	(37.0)	(74.3)	58.3)	(100.)	(100.0)	(22.2)	
Buffaloe	0	1	0	0	0	0	0	0.003
		(1.0)						
Goat and Sheep	0.08	0.17	0.68	1.58	0	0	0	0.27
	(5.0)	(7.0)	(25.7)	(41.7)	(0)	(0)	(0)	
Total Number of households	101	100	35	12	1	1	9	259

Number in ( ) indicates percent of household in specific landholding group having animals.

Table: 4.7.4(b)

Distribution of the Size of Adult Bullocks by Landholding Size

Village: Baruka

No. of Adult Bullocks	VARO LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	ROW TOTAL
0.	174 23.5	367 49.5	49 6.6	7 0.9	1 0.1	1 0.1	22 3.0	621 83.7
1.	0 0.0	22 3.0	29 3.9	4 0.5	0 0.0	0 0.0	1 0.1	56 7.5
2.	0 0.0	10 1.3	31 4.2	12 1.6	3 0.4	0 0.0	0 0.0	56 7.5
4.	0 0.0	0 0.0	1 0.1	2 0.3	3 0.4	3 0.4	0 0.0	9 1.2
COLUMN TOTAL	174 23.5	399 53.8	110 14.8	25 3.4	7 0.9	4 0.5	23 3.1	742 100.0

Table: 4.7.4(c)

Distribution of the Size of Adult Bullocks by Landholding Size

Village: Chaknaju

VARO / Farm Size (Acres of Cultivated Land)								
COUNT TOT PCT No. of Adult Bullocks	LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	ROW TOTAL
0.	101 39.0	69 26.6	16 6.2	0 0.0	1 0.4	0 0.0	8 3.1	195 75.3
1.	0 0.0	23 8.9	11 4.2	2 0.8	0 0.0	0 0.0	0 0.0	36 13.9
2.	0 0.0	6 2.3	8 3.1	10 3.9	0 0.0	1 0.4	0 0.0	25 9.7
3.	0 0.0	2 0.8	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	2 0.8
8.	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	1 0.4	1 0.4
COLUMN TOTAL	101 39.0	100 38.6	35 13.5	12 4.6	1 0.4	1 0.4	9 3.5	259 100.0

Table: 4.7.5

Distribution of Usage of Own Draft Animal by Landholding Size

Village: Baruka(b)

Usage	Landless	Farm Size (Acres of Cultivated Land) 0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total weighted average
		(Draft animal/household)						
Land Preparation	0	0.79	1.86	2.58	3.93	3.5	0.09	0.85
Paddy Threshing	0	0.69	1.77	3.02	3.71	4.5	0.09	0.80
Transport	0	0	0.02	0	0	0	0	0.003
Total	0	1.48	3.65	5.6	7.64	8.0	0.18	1.65

Village: Chaknaju(c)

Usage	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total weighted average
		(Draft animal/household)						
Land Preparation	0	0.85	1.77	2.21	2.0	2.0	0	0.69
Paddy Threshing	0	0.09	1.74	2.25	2.0	2.0	0	0.39
Transport	00	0	0	0	0	0	0	0
Total	0	0.94	3.51	4.46	4.0	4.0	0	1.07

Table: 4.7.6

Distribution of Usage of Highered Draft Power by Landholding Size

Village: Baruka(b)

Usage	Landless	Farm Size (Acres of Cultivated Land) 0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total weighted Average
		(Bullock-days/household/year)						
Land preparation	0	16.56	7.61	8.32	0	0	0	10.31
Paddy Threshing	0	8.43	7.16	8.0	0	0	0	5.86
Transport	0	0.02	0	0	0	0	0	0.01
Total	0	25.01	14.77	16.32	0	0	0	16.19

Village: Chaknaju(c)

Usage	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total weighted average
Land Preparation	0	12.45	10.51	0	0	0	11.43	6.62
Paddy Threshing	0	4.96	0.8	0	0	0	0.9	2.05
Transport	0	0	0	0	0	0	0	0
Total	0	17.41	11.31	0	0	0	12.33	8.86

Table: 4.7.7

Seasonal Distribution of Draft Power Shortage by Landholding Size

Village: Baruka (b)

Draft Power Shortage Season	Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
	(Number of households having shortage)							
Dry Season	0	3	2	0	0	0	0	5
Wet Season	0	4	6	1	0	0	0	11
Both Seasons	0	316	47	9	4	1	23	377
* Total Number of Households	174	399	110	25	7	4	23	742

Village: Chaknaju(c)

Draft Power Shortage Season	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
Dry Season	3	1	0	0	0	0	0	4
Wet Season	6	3	3	0	0	0	0	12
Both Seasons	71	15	2	1	0	0	0	89
* Total Number of Households	101	100	35	12	1	1	9	259

* Total number of households in each category is tabulated to compare with the number number of households actually having shortage.

Table: 4.7.8

Distribution of Strategies in Meeting Draft Power Shortage by Landholding Size.

Village: Baruka (b)

Strategies for Meeting Draft Power Shortage	Farm Size (Acres of Cultivated Land) (Number of households)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
Hired	0	212	21	6	0	0	0	239
Exchange	0	104	44	5	0	1	0	154
Purchase	0	3	2	0	1	0	0	6
Lending	1	68	9	5	3	0	0	86
Total households	174	399	110	25	7	4	23	742

Village: Chaknaju (c)

Strategies for Meeting Draft Power Shortage	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
Hired	0	21	5	0	0	0	0	26
Exchange	0	21	3	3	00	0	0	27
Purchase	0	1	1	0	0	0	0	2
Lending	0	54	11	3	1	0	0	69
Total households	101	100	35	12	1	1	9	259

Table: 4.7.9(b)

Distribution of the Size of Cattleheads by Landholding Size

Village: Baruka

VARO COUNT TOT PCT Number of Cattleheads	Farm Size (Acres of Cultivated Land) LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	ROW TOTAL
0.	158 21.3	178 24.0	6 0.8	2 0.3	0 0.0	0 0.0	21 2.8	365 49.2
1.	11 1.5	93 12.5	9 1.2	1 0.1	1 0.1	0 0.0	1 0.1	116 15.6
2.	5 0.7	90 12.1	53 7.1	2 0.3	0 0.0	0 0.0	1 0.1	151 20.4
3.	0 0.0	30 4.0	27 3.6	2 0.3	0 0.0	0 0.0	0 0.0	59 8.0
4.	0 0.0	5 0.7	10 1.3	8 1.1	0 0.0	0 0.0	0 0.0	23 3.1
5.	0 0.0	2 0.3	3 0.4	5 0.7	1 0.1	1 0.1	0 0.0	12 1.6
6.	0 0.0	0 0.0	0 0.0	1 0.1	2 0.3	0 0.0	0 0.0	3 0.4
7.	0 0.0	1 0.1	2 0.3	0 0.0	1 0.1	0 0.0	0 0.0	4 0.5
8.	0 0.0	0 0.0	0 0.0	1 0.1	1 0.1	1 0.1	0 0.0	3 0.4
10.	0 0.0	0 0.0	0 0.0	2 0.3	1 0.1	1 0.1	0 0.0	4 0.5
11.	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	1 0.1	0 0.0	1 0.1
13.	0 0.0	0 0.0	0 0.0	1 0.1	0 0.0	0 0.0	0 0.0	1 0.1
COLUMN TOTAL	174 23.5	399 53.8	110 14.8	25 3.4	7 0.9	4 0.5	23 3.1	742 100.0

Table: 4.7.9(c)

Distribution of the Size of Cattleheads by Landholding Size

Village: Chaknaju

Number of Cattleheads	LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	ROW TOTAL
0.	93 35.9	37 14.3	7 2.7	0 0.0	0 0.0	0 0.0	7 2.7	144 55.6
1.	4 1.5	31 12.0	2 0.8	0 0.0	0 0.0	0 0.0	0 0.0	37 14.3
2.	1 0.4	21 8.1	9 3.5	6 2.3	0 0.0	1 0.4	1 0.4	39 15.1
3.	3 1.2	9 3.5	8 3.1	2 0.8	0 0.0	0 0.0	0 0.0	22 8.5
4.	0 0.0	1 0.4	4 1.5	1 0.4	1 0.4	0 0.0	0 0.0	7 2.7
5.	0 0.0	0 0.0	2 0.8	1 0.4	0 0.0	0 0.0	0 0.0	3 1.2
6.	0 0.0	0 0.0	2 0.8	1 0.4	0 0.0	0 0.0	0 0.0	3 1.2
7.	0 0.0	0 0.0	1 0.4	0 0.0	0 0.0	0 0.0	0 0.0	1 0.4
8.	0 0.0	0 0.0	0 0.0	1 0.4	0 0.0	0 0.0	0 0.0	1 0.4
17.	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	1 0.4	1 0.4
21.	0 0.0	1 0.4	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	1 0.4
COLUMN TOTAL	101 39.0	100 38.6	35 13.5	12 4.6	1 0.4	1 0.4	9 3.5	259 100.0

Table: 4.8.1(b)

Consumption of Biomass Fuels for Household Cooking According to the Size of Cultivated Land

Village: Baruka

Type of Fuels		Farm Size (Acres of Cultivated Land)							Total weighted Average
		Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	
		(GJ/person/year)							
Fuelwood	D	1.11	1.36	1.27	1.72	1.11	1.37	0.50	1.27
	W	1.07	1.47	1.28	1.80	1.19	1.50	0.56	1.25
	T	2.18	2.83	2.45	3.52	2.30	2.87	1.06	2.52
Twigs and leaves	D	1.00	1.06	1.02	0.85	0.78	0.86	2.59	1.08
	W	0.44	1.04	1.05	1.06	0.81	0.86	1.82	0.92
	T	1.44	2.10	2.07	1.91	1.59	1.72	4.41	2.00
Straw	D	0.28	0.66	0.79	0.68	0.53	1.51	0.31	0.58
	W	0.29	0.68	0.82	0.67	0.79	1.45	0.50	0.61
	T	0.57	1.34	1.61	1.35	1.32	2.96	0.81	1.19
Husk	D	0.42	0.64	0.58	0.66	0.39	0.66	0.62	0.58
	W	0.46	0.60	0.60	0.71	0.41	0.69	0.77	0.58
	T	0.88	1.24	1.18	1.37	0.80	1.35	1.41	1.16
Jutestick	D	0.34	0.52	0.49	0.57	0.37	0.30	0.46	0.47
	W	0.34	0.49	0.46	0.56	0.38	0.34	0.52	0.43
	T	0.68	1.01	0.95	1.13	0.75	0.64	0.98	0.9
Other residues	D	0.005	0.10	0.03	0.03	0.01	0.00	0.02	0.01
	W	0.005	0.004	0.01	0.10	0.00	0.00	0.01	0.01
	T	0.01	0.014	0.04	0.13	0.01	0.00	0.03	0.02
Total	D	3.155	4.25	4.18	4.51	3.19	4.7	4.5	3.99
	W	2.605	4.284	4.22	4.9	3.58	4.84	4.2	3.80
	T	5.76	8.53	8.4	9.41	6.77	9.54	8.7	7.79

Table: 4.8.1(c)

Consumption of Biomass Fuels for Household Cooking According to the Size of Cultivated Land

Village: Chaknaju

Type of Fuels		Farm Size (Acres of Cultivated Land)							Total weighted Average
		Landless	0-0.5	0.5-1	1-1.5	1.5-25	2.5-7.5	7.5+	
		(GJ/person/year)							
Fuelwood	D	0.36	0.64	1.14	0.5	0.47	1.3	0.08	0.57
	W	0.68	1.07	1.30	0.67	0.56	1.35	0.09	0.89
	T	1.04	1.71	2.44	1.17	1.03	2.65	0.17	1.46
Twigs and leaves	D	1.82	2.25	1.73	2.62	0.78	0.93	2.22	2.02
	W	1.73	1.55	1.16	0.89	0.78	0.84	2.40	1.56
	T	3.55	3.80	2.89	3.51	1.56	1.77	4.62	3.58
Straw	D	0.27	0.70	0.72	0.60	0.39	0.37	0.05	0.50
	W	0.11	0.51	0.48	0.40	0.23	0.19	0.04	0.33
	T	0.38	1.21	1.20	1.00	0.62	0.56	0.09	0.83
Husk	D	0.16	0.32	0.60	0.40	0.31	0.37	0.61	0.31
	W	0.23	0.40	0.66	0.39	0.39	0.28	0.43	0.37
	T	0.39	0.72	1.26	0.79	0.70	0.65	1.04	0.68
Jutestick	D	0.21	0.56	0.53	0.44	1.17	0.51	0.05	0.40
	W	0.40	0.56	0.85	0.66	1.01	0.33	0.009	0.52
	T	0.61	1.12	1.38	1.10	2.18	0.84	0.059	0.92
Other residues	D	0.01	0.04	0.02	0.00	0.00	0.00	0.00	0.02
	W	0.006	0.008	0.004	0.00	0.00	0.00	0.03	0.01
	T	0.016	0.048	0.024	0.00	0.00	0.00	0.03	0.03
Total	D	2.83	4.51	4.74	4.56	3.12	3.48	3.01	3.82
	W	3.16	4.10	4.45	3.01	2.97	2.99	3.0	3.69
	T	5.99	8.61	9.19	7.57	6.09	6.47	6.01	7.51

Table: 4.8.2

Distribution of Biomass Fuels Supply Sources According to the Size of Cultivated Land.

Village: Baruka(b)

Sources	Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
	(Percent of Consumption							
Own Source	24.18	72.65	85.85	86.67	90.60	95.0	[illegible].89	
Gathered	48.63	17.04	7.55	7.27	6.30	0.0	8[illegible].96	
Non Commercial	72.81	89.69	93.4	93.94	96.9	95.0	8[illegible].85	
Purchased	27.19	10.31	6.60	6.06	3.10	5.0	1[illegible].15	
Total	100	100	100	100	100	100	[illegible]00	

Village: Chaknaju(c)

Sources	Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
	(Percent of Consumption							
Own Source	18.00	64.80	80.55	86.44	88.0	85.0	5.82	
Gathered	58.90	22.00	8.60	6.49	12.0	0.0	80.07	
Non-Commercial	76.90	86.8	89.15	92.93	100	85.0	85.89	
Purchased	23.10	13.22	10.85	7.07	0.0	15.00	14.11	
Total	100	100	100	100	100	100	100	

Table: 4.8.3

Distribution of Usage of Biomass Fuels According Landholding Size

Village: Baruka (b)

Usage	Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
	(GJ/person/year)							
Food Cooking	4.64	5.72	5.56	6.31	4.63	12.19	7.97	
Parboiling	1.07	2.60	2.75	2.92	2.04	3.30	0.73	
Other Uses	0.06	0.21	0.09	0.18	0.10	0.40	0.0	
Total (weighted average)	5.77	8.53	8.40	9.41	6.77	15.89	8.70	

Village: Chaknaju (c)

Usage	Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-25	2.5-7.5	7.5+	Total
	(GJ/person/year)							
Food Cooking	5.49	5.90	5.77	4.55	4.70	4.46	4.78	
Parboiling	0.40	2.53	3.15	2.77	1.39	2.01	1.23	
Other Uses	0.12	0.18	0.27	0.25	0.0	0.0	0.008	
Total	5.97	8.61	9.19	7.57	6.9	6.47	6.01	

Table: 4.9.1

Domestic Kerosene Consumption by Landholding Size

Village: Baruka (Electrified)(b)

Usage		Farm Size (Acres of Cultivated Land) Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total weighted average
		(Household/year)							
Cooking	kg	0.32	0.05	0.70	0.44	0	0.39	0	0.14
	%	2	1	1	2	0	4	0	
Lighting	kg	18.82	23.04	32.39	25.75	27.19	30.79	15.58	23.17
	%	98	99	99	98	100	96	100	
Total	kg	19.14	23.09	32.46	26.19	27.19	32.18	15.58	23.31
	%	100	100	100	100	100	100	100	

Village: Chaknaju (non-electrified) (c)

Usage		Farm Size (Acres of Cultivated Land) Landless	0-0.5	0.5-1	1-1.5	1.5-25	2.5-7.5	7.5+	Total weighted average
		(Household/year)							
Cooking	kg	1.49	1.56	0.63	3.11	0	0	0	1.53
	%	5	4	1	5	0	0	0	
Lighting	kg	30.16	35.61	52.30	64.07	55.98	61.58	23.64	37.09
	%	95	96	99	95	100	100	100	
Total	kg	31.65	37.17	52.93	67.18	55.98	61.98	23.64	38.62
	%	100	100	100	100	100	100		

Table: 4.9.2(b)

Domestic Use of Electricity by Landholding Size

Village: Baruka (electrified)

Uses	Landless	Farm Size (Acres of Cultivated Land) 0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+
		(kWh/household/year)					
Cooking ??	0	1.39	7.85	0	0	0	0
Lighting	22.82	51.01	132.27	179.76	228.85	405.0	14.34
Total	22.82	52.4	140.12	179.76	228.85	405.0	14.34

Table: 4.9.3

Distribution of Households According to the Type of Fuels Used for Lighting by Landholding Size.

Village: Baruka (b)

Type of Fuel	Farm Size (Acres of Cultivated Land) (Number of households)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
Kerosene	173	397	108	24	7	4	23	736
Electricity	20	98	57	17	4	4	2	202
Total Number of households	174	399	110	25	7	4	23	742

Village: Chaknaju (c)

Type of Fuel	Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
Kerosene	101	100	35	12	1	1	9	259
Total Number of households	101	100	35	12	1	1	9	259

Table: 4.9.4

Distribution of Households According to the Type of Fuels Used for Cooking by Landholding Size

Village: Baruka (b)

Type of Fuel Used For Cooking	Farm Size (Acres of Cultivated Land) (Number of household)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
Biomass Fuels	174	399	110	25	7	4	23	742
Kerosene	4	3	1	1	0	1	0	10
Electricity	0	7	6	0	0	0	0	13
Total Number of households	174	399	110	25	7	4	23	742

Village: Chaknaju (c)

Type of Fuel	(Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
Biomass Fuels	101	100	35	12	1	1	9	259
Kerosene	11	14	2	3	0	0	0	30
Total Number of households	101	100	35	12	1	1	9	259

Table: 4.10.1(b)

Distribution of Household Stove (Used in Dry Season) According to the Size of Cultivated Land

Village: Baruka

Type of Chula	Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
	(Number of Stoves)							
One mouth	184	515	180	44	11	8	24	971
Two mouth	0	87	43	10	1	2	0	143
Movable	4	24	1	1	2	0	0	32
Kerosene Cooker	1	0	0	0	0	0	0	1
Others	0	0	0	0	0	0	0	0
Total stoves	189	626	224	60	14	10	24	1147
Total Households	174	399	110	25	7	4	23	742

Table: 4.10.1(c)

Distribution of Household Stoves (Used in Dry Season) According to the Size of Cultivated Land

Village: Chaknaju

Type of Chula	Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
	(Number of Stoves)							
One mouth	113	118	56	24	1	2	9	323
Two mouth	2	5	6	0	0	1	0	14
Movable	3	0	1	0	0	1	0	5
Kerosene Cooker	0	0	2	0	0	0		2
Others	1	2	0	0	0	0	0	3
Total	119	125	65	24	1	4	9	347
Total Households	101	100	35	12	1	1	9	259

Table: 4.10.2(b)

Distribution of Household Stoves (Used in Wet Season) According to the Size of Cultivated Land

Village: Baruka.

Type of Chula	Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
	(Number of Stoves)							
One mouth	178	444	158	40	11	8	23	862
Two mouth	0	66	26	6	0	2	0	100
Movable	3	20	1	1	0	0	0	25
Kerosend Cooker	0	1	0	0	0	0	0	1
Others	0	2	0	0	0	0	0	2
Total Stoves	181	533	185	47	11	10	23	990
Total Households	174	399	110	25	7	4	23	742

Table: 4.10.2(c)

Distribution of Household Stoves (Used in Wet Season) According to the Size of Cultivated Land

Village: Chaknaju

Type of Chula	Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
	(Number of Stoves)							
One mouth	113	114	49	20	1	2	9	308
Two mouth	2	1	6	0	0	1	0	10
Movable	1	2	0	0	0	0	0	3
Kerosene Cooker	0	0	1	0	0	0	0	1
Others	0	1	0	0	0	0	0	1
Total Stoves	116	118	56	20	1	3	9	323
Total Households	101	100	35	12	1	1	9	259

Table: 4.10.3(b)

Distribution of Operating Hours of Cooking Stoves by Landholding Size

Village: Baruka VARO

Farm Size (Acres of Cultivated Land)

COUNT / TOT PCT / Operating Hours	LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	ROW TOTAL
0.20	0 0.0	1 0.1	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	1 0.1
0.50	0 0.0	0 0.0	1 0.1	0 0.0	0 0.0	0 0.0	0 0.0	1 0.1
1.50	0 0.0	3 0.4	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	3 0.4
2.00	4 0.5	7 0.9	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	11 1.5
2.50	17 2.3	14 1.9	2 0.3	0 0.0	0 0.0	0 0.0	0 0.0	33 4.4
3.00	29 3.9	36 4.9	2 0.3	0 0.0	0 0.0	0 0.0	4 0.5	74 10.0
3.50	4 0.5	4 0.5	0 0.0	0 0.0	0 0.0	0 0.0	1 0.1	9 1.2
4.00	39 5.3	60 8.1	3 0.4	0 0.0	1 0.1	0 0.0	9 1.2	112 15.1
4.50	7 0.9	29 3.9	4 0.5	0 0.0	1 0.1	0 0.0	1 0.1	42 5.7
5.00	53 7.1	127 17.1	29 3.9	9 1.2	1 0.1	0 0.0	5 0.7	224 30.2
5.50	2 0.3	24 3.2	8 1.1	2 0.3	0 0.0	0 0.0	0 0.0	36 4.9
6.00	17 2.3	77 10.4	40 5.4	7 0.9	1 0.1	3 0.4	3 0.4	148 19.9
6.50	0 0.0	2 0.3	2 0.3	1 0.1	0 0.0	0 0.0	0 0.0	5 0.7
7.00	1 0.1	6 0.8	10 1.3	3 0.4	1 0.1	0 0.0	0 0.0	21 2.8
7.50	1 0.1	2 0.3	1 0.1	1 0.1	1 0.1	0 0.0	0 0.0	6 0.8
8.00	0 0.0	7 0.9	5 0.7	2 0.3	1 0.1	0 0.0	0 0.0	15 2.0
9.00	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	1 0.1	0 0.0	1 0.1
COLUMN TOTAL	174 23.5	399 53.8	110 14.8	25 3.4	7 0.9	4 0.5	23 3.1	742 100.0

Table: 4.10.3(c)

Distribution of Operating Hours of Cooking Stoves by Landholding Size

Village: Chaknaju

Operating Hours	VARO LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	ROW TOTAL
1.50	1 0.4	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	1 0.4
2.00	4 1.5	0 0.0	1 0.4	0 0.0	0 0.0	0 0.0	1 0.4	6 2.3
2.50	3 1.2	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	3 1.2
3.00	8 3.1	8 3.1	0 0.0	0 0.0	0 0.0	0 0.0	2 0.8	18 6.9
3.50	9 3.1	6 2.3	1 0.4	0 0.0	0 0.0	0 0.0	0 0.0	16 6.3
4.00	32 12.4	27 10.4	5 1.9	3 1.2	0 0.0	0 0.0	3 1.2	70 27.0
4.50	9 3.5	12 4.6	3 1.2	1 0.4	0 0.0	0 0.0	1 0.4	26 10.0
5.00	21 8.1	23 8.9	6 2.3	5 1.9	1 0.4	0 0.0	2 0.8	58 22.4
5.50	3 1.2	4 1.5	8 3.1	2 0.8	0 0.0	0 0.0	0 0.0	17 6.6
6.00	12 4.6	18 6.9	10 3.9	1 0.4	0 0.0	1 0.4	0 0.0	42 16.2
6.50	0 0.0	0 0.0	1 0.4	0 0.0	0 0.0	0 0.0	0 0.0	1 0.4
7.00	0 0.0	1 0.4	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	1 0.4
8.00	0 0.0	1 0.4	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	1 0.4
COLUMN TOTAL	101 39.0	100 38.6	35 13.5	12 4.6	1 0.4	1 0.4	9 3.5	259 100.0

Table: 4.10.4(b)

Distribution of Illuminating Devices and Other Appliances According to Size of Cultivated Land

Type of Appliances	(Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
	(Number of Units)							
Kupi	173	397	108	24	7	4	23	736
Hurricane	28	98	61	13	5	3	6	214
Iron	1	4	1	1	1	0	0	8
Fan	2	2	0	0	0	0	0	4
Bulb	18	105	57	18	7	4	0	209
Radio	3	10	12	2	2	2	0	31
T.V	1	0	1	0	1	0	0	3
Heater	2	3	4	0	0	0	0	9
Motor	0	0	0	0	0	0	0	0
Total Households	174	399	110	25	7	4	23	

Table: 4.10.4(c)

Distribution of Illuminating Devices and Other Household Appliances According to the Size of Cultivated Land

Type of Appliances	Farm Size (Acres of Cultivated Land)							
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total
	(Number of Units)							
Kupi	100	100	35	12	1	1	9	258
Hurricane	9	20	19	5	1	1	5	60
Iron	0	0	0	0	0	0	0	0
Bulb	0	0	0	0	0	0	0	0
Radio	1	3	10	4	1	0	0	19
T.V	0	0	0	0	0	0	0	0
Heater	0	0	0	0	0	0	0	0
Motor	0	0	0	0	0	0	0	0

Table: 4.10.5(b)

Distribution of Operating Hours of Kupis by Landholding Size.

Village: Baruka

COUNT / TOT PCT / Operating Hours	VARO LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	ROW TOTAL
0.	1 0.1	3 0.4	2 0.3	0 0.0	0 0.0	0 0.0	0 0.0	6 0.8
1.	28 3.8	45 6.1	22 3.0	5 0.7	3 0.4	3 0.4	4 0.5	110 14.8
2.	58 7.8	162 21.8	44 5.9	11 1.5	1 0.1	0 0.0	16 2.2	292 39.4
3.	44 5.9	126 17.0	22 3.0	2 0.3	2 0.3	0 0.0	2 0.3	198 26.7
4.	20 2.7	32 4.3	15 2.0	4 0.5	1 0.1	1 0.1	1 0.1	74 10.0
5.	12 1.6	22 3.0	1 0.1	2 0.3	0 0.0	0 0.0	0 0.0	37 5.0
6.	11 1.5	9 1.2	3 0.4	1 0.1	0 0.0	0 0.0	0 0.0	24 3.2
8.	0 0.0	0 0.0	1 0.1	0 0.0	0 0.0	0 0.0	0 0.0	1 0.1
COLUMN TOTAL	174 23.5	399 53.8	110 14.8	25 3.4	7 0.9	4 0.5	23 3.1	742 100.0

Farm Size (Acres of Cultivated Land)

Table: 4.10.5(c)

Distribution of Operating Hours of Kupis by Landholding Size

Village: Chaknaju

VARO COUNT TOT PCT Operating Hours	Farm Size (Acres of Cultivated Land)							ROW TOTAL
	LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	
0.	1 0.4	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	1 0.4
1.	3 1.2	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	3 1.2
2.	26 10.0	25 9.7	6 2.3	0 0.0	0 0.0	0 0.0	2 0.8	59 22.8
3.	39 15.1	35 13.5	8 3.1	4 1.5	1 0.4	0 0.0	5 1.9	92 35.5
4.	27 10.4	30 11.6	13 5.0	7 2.7	0 0.0	0 0.0	1 0.4	78 30.1
5.	2 0.8	7 2.7	1 0.4	0 0.0	0 0.0	1 0.4	1 0.4	12 4.6
6.	3 1.2	3 1.2	6 2.3	1 0.4	0 0.0	0 0.0	0 0.0	13 5.0
7.	0 0.0	0 0.0	1 0.4	0 0.0	0 0.0	0 0.0	0 0.0	1 0.4
COLUMN TOTAL	101 39.0	100 38.6	35 13.5	12 4.6	1 0.4	1 0.4	9 3.5	259 100.0

Table: 4.10.6(b)

Distribution of Operating Hours of Hurricane Lantern by Landholding Size

Village: Baruka

VARO COUNT TOT PCT Operating Hours	Farm Size (Acres of Cultivated Land)							ROW TOTAL
	LANDLESS 1.	0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	
0.	147 19.8	302 40.7	50 6.7	12 1.6	3 0.4	1 0.1	22 3.0	537 72.4
1.	3 0.4	26 3.5	19 2.6	1 0.1	2 0.3	2 0.3	1 0.1	54 7.3
2.	6 0.8	22 3.0	15 2.0	9 1.2	0 0.0	0 0.0	0 0.0	52 7.0
3.	12 1.6	31 4.2	14 1.9	2 0.3	2 0.3	0 0.0	0 0.0	61 8.2
4.	5 0.7	13 1.8	9 1.2	1 0.1	0 0.0	1 0.1	0 0.0	29 3.9
5.	1 0.1	5 0.7	3 0.4	0 0.0	0 0.0	0 0.0	0 0.0	9 1.2
COLUMN TOTAL	174 23.5	399 53.8	110 14.8	25 3.4	7 0.9	4 0.5	23 3.1	742 100.0

Table: 4.10.6(c)

Distribution of Operating Hours of Hurricane Lantern by Landholding Size

Village: Chaknaju

COUNT TOT PCT Operating Hours	VARD LANDLESS 1.	Farm Size (Acres of Cultivated Land) 0-0.5 ACRE 2.	0.5-1 ACRE 3.	1-1.5 ACRE 4.	1.5-2.5 ACRE 5.	2.5-7.5 ACRE 6.	7.5+ ACRE 7.	ROW TOTAL
0.	92 35.5	81 31.3	16 6.2	7 2.7	0 0.0	0 0.0	9 3.5	205 79.2
1.	1 0.4	6 2.3	1 0.4	0 0.0	0 0.0	0 0.0	0 0.0	8 3.1
2.	3 1.2	3 1.2	0 0.0	0 0.0	1 0.4	0 0.0	0 0.0	7 2.7
3.	1 0.4	4 1.5	4 1.5	1 0.4	0 0.0	0 0.0	0 0.0	10 3.9
4.	2 0.8	1 0.4	6 2.3	2 0.8	0 0.0	0 0.0	0 0.0	11 4.2
5.	1 0.4	0 0.0	4 1.5	0 0.0	0 0.0	1 0.4	0 0.0	6 2.3
6.	1 0.4	2 0.8	1 0.4	2 0.8	0 0.0	0 0.0	0 0.0	6 2.3
7.	0 0.0	2 0.8	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	2 0.8
9.	0 0.0	1 0.4	3 1.2	0 0.0	0 0.0	0 0.0	0 0.0	4 1.5
COLUMN TOTAL	101 39.0	100 38.6	35 13.5	12 4.6	1 0.4	1 0.4	9 3.5	259 100.0

Table: 4.11.1(b)

Consumption of Cereals by Landholding Size

Village: Baruka

Type of Creals	Farm Size (Acres of Cultivated Land) Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total weighted average
	(kg/person/year)							
Rice	164.79	177.06	185.14	197.1	189.99	310.8	179.37	177.06
Ata	21.81	26.58	15.64	12.93	5.33	0	1.45	22.26
Total of Rice + Ata	186.61	203.64	200.78	210.03	195.32	310.8	180.82	199.32
Dal	8.27	8.36	9.14	10.68	9.41	31.23	15.57	8.89
Total Cereals	194.88	212.0	209.92	220.71	204.73	342.03	196.39	208.21
Caloric Intake from Cereals GJ/person/year	2.82	3.07	3.04	3.20	2.97	4.95	2.85	3.02
GJ/household/year	12.58	15.56	22.50	27.84	30.89	49.5	11.11	16.40

Cereal Caloric Value = 14487 kJ/kg.

Table: 4.11.1(c)

Consumption of Cereals by Landholding Size

Village: Chaknaju

Type of Cereals	Farm Size (Acres of Cultivated Land) Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	Total weighted average
	(kg/person/year)							
Rice	175.80	194.23	186.58	186.59	149.28	223.92	173.33	184.87
Ata	28.70	20.29	22.01	10.70	0	44.78	27.57	23.63
Total of Rice + Ata	204.5	214.52	208.59	197.29	149.28	268.7	200.9	208.5
Dal	13.03	12.18	11.46	7.53	9.33	22.39	14.53	12.32
Total Cereals	217.53	226.7	220.05	204.82	158.61	291.09	215.43	220.82
Caloric Intake from Cereals GJ/person/year	3.15	3.28	3.19	2.97	2.30	4.22	3.12	3.20
GJ/household/year	14.11	16.43	24.43	29.46	13.8	42.20	11.45	17.15

Cereal Caloric Value = 14487 kJ/kg.

Table: 4.11.2(b)

Distribution of Consumptions of Food and Biomass Fuels by Landholding Size.

Village: Baruka

Description	Farm Size (Acres of Cultivated Land)							Total weighted average
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	
	(GJ/person/year)							
A. Consumtion of Cereals	2.82	3.07	3.04	3.20	2.97	4.95	2.85	3.02
B. Consumption of Biomass Fuels for Food Cooking	4.64	5.72	5.56	6.31	4.63	7.32	7.97	5.53
C. Consumption of Biomass Fuels for Household Cooking	5.77	8.53	8.40	9.41	6.77	9.54	8.70	7.79
Food Cooking Fuel/Food=B/A	1.64	1.86	1.82	1.97	1.56	1.48	2.80	1.83
Household Fuel/ Food=C/A	2.05	2.78	2.76	2.94	2.28	1.93	3.05	2.58

Table: 4.11.2(c)

Distribution of Consumptions of Food and Biomass Fuels by Landholding Size

Village: Chaknaju

Description	Farm Size (Acres of Cultivated Land)							Total weighted average
	Landless	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-7.5	7.5+	
	(GJ/person/year)							
A. Consumption of Cereals	3.15	3.28	3.19	2.97	2.30	4.22	3.12	3.20
B. Consumption of Biomass Fuels for Food Cooking	5.49	5.90	5.77	4.55	4.70	4.46	4.78	5.61
C. Consumption of Biomass Fuels for Household Cooking	5.97	8.61	9.19	7.57	6.09	6.47	6.01	7.51
Food Cooking Fuel/Food=B/A	1.74	1.80	1.80	1.53	2.04	1.1	1.53	1.75
Household Fuel/ Food=C/A	1.89	2.63	2.88	2.55	2.65	1.53	1.93	2.35

Table: 4.12.1

Area Irrigated by Manual Devices

Type of Irrigation Devices	Baruka (Electrified Village)				Chaknaju (Non-Electrified Village)			
	No. of Units	Area Irrigated acres	Days of Operation	Hours of Operation	No. of Units	Area Irrigated acres	Days of Operation	Hours of Operation
Hand Tubewell	-	-	-	-	-	-	-	-
Doon	-	-	-	-	2	0.5	32	130
Dug Well	-	-	-	-	-	-	-	-
Swing Busket	254	11.63	1224	4953	84	9.08	1262	3844
Total	254	11.63	1224	4953	86	9.58	1294	3974

Table: 4.12.2

Area Irrigated By Mechanised Devices and Their Energy Use

Baruka (Electrified Village)

	Number of Units		Area Irrigated (Acre)	Days of Operation	Hours of Operation	Fuel Consumption	
	Diesel	Electricity				Diesel kg.	Electricity (kWh)
Deep Tubewell	4		141.44	413	6280	12412.40	
Deep Tubewell		2	38.45	193	3260		11793
Shallow Tubewell	-	-	-	-	-	-	-
Low Lift Pump	-	-	-	-	-	-	-
Total	4	2	179.89	606	9540	12412.40	11793

APPENDIX-A

HOUSEHOLD QUESTIONNAIRE

Bangladesh University of Engineering and Technology
Department of Urban and Regional Planning

Energy Planning in Rural Bangladesh: Research questionnaire for a comparative assessment of an electrified and a non-electrified village of Mymensingh District.

Section - 1 : Questionnaire on
General, Supply and Demand.

1. Interview No: [1 - 4]

2. Village : [5 - 6]

CARD NO : [7 - 8] 01

3. Name of Head of Household :

4. Sex : (Incircle the correct answer) [9]

1. Male 1
2. Female 2

5. How old are you ? (Encircle the correct answer) [10]

1. Beloe 18 years 1
2. 20 - 29 2
3. 30 - 39 3
4. 40 - 49 4
5. 50+ 5

6. What is you level of eduction ? (Encircle the correct answer)

	11
1. Primary	1
2. Secondary	2
3. Higher Secondary	3
4. Above Higher Secondary	4
5. Illiterate	5

7. Please indicate the type of your household (Encircle the correct answer)

	12
1. Nucleus Family	1
2. Extended Family	2
3. Combined Family	3

8. How many (Including you) person take meal in your household ?

Family member	Permanent Servant	House Teacher	Others	Total
13-14	15	16	17	18-19

9. Number of active family member including head of the household

	Male	Female
	20	21
No. of own family member		
No. of permanent labour	22	23

Now, I would like to ask same questions about your family member.

10. Among your family members:

Age	Male	Female
1. Below 9 years	24	25
2. 10 - 19	26	27
3. 20 - 29	30	31
4. 30 - 39	32	33
5. 40 - 49	34	35
6. 50+	36	37

Level of Education:

	Male		Female	
	Passed	Student	Passed	Student
1. Primary	38	39	49	48
2. Secondary	40	41	49	50
3. Higher Secondary	42	43	51	52
4. Above Higher Secondary	44	45	53	54
5. Illiterate	46		55	

11. (i) What is your Primary Occupation ? (Encircle the correct answer)

56

1. Agriculture	1
2. Business	2
3. Service	3
4. Farm labour	4
5. Other labour	5
6. Blacksmith/fisherman/ Rickshaw puller/ carpenters	6
7. Active but umemployee	7
8. Inactive	8

(ii) What is your Secondary Occupation ? (Encircle the correct answer)

57

1.	Agriculture	1
2.	Business	2
3.	Service	3
4.	Farm labour	4
5.	Other labour	5
6.	Crafting	6
7.	Active but unemployee	7
8.	Inactive	8

12. What is your monthly income ? 58 - 61 [ ]

13. Living Conditions:

(i) How many dwelling units and rooms your have in the following categories ?

	Dwelling unit	Rooms
Residence	[ ] 62	[ ] 63
Cooking (Separate)	[ ] 64	[ ] 65
Store (Seperate)	[ ] 66	[ ] 67
Cow-shed (Separate)	[ ] 68	[ ] 69

(ii) Type of Roofing Materials of your dwelling house (Encircle the correct answers)

70

1.	Corrugated Iron Sheet	1
2.	Straw/leaves	2
3.	Concreate	3
4.	Others	4

(iii) Type of wall materials of your dwelling house (Encircle the correct answer)

		71
1.	Corrugated Iron sheet	1
2.	Straw/leaves	2
3.	Concreate	3
4.	Others	4

(iv) Sources of Drinking water (Encircle the correct answer)

		72
1.	Pond/River	1
2.	Mud well	2
3.	Pucca well	3
4.	Tubewell	4
5.	Deep tubewell	5

(v) Type of Toilet (Encircle the correct answer)

		73
1.	Open	1
2.	Mud	2
3.	Pucca	3

Supply

Card No. 7 - 8 [02]

14. Tree Resources:

How many of the following you have ?

	Big	Medium	Small	Total
	9-10	11-12	13-14	15-16
Fruit Trees				
	17-18	19-20	21-22	23-24
Fuelwood Trees				
	25	26	27	28
Timber Trees				

15. Land

How much land (is Kalha) you have in each type ?

Homestead Land	Own Cultivable Land	Share/Lease out	Share/Lease in	Total Cultivated Land
29-31	32-	35-36	37-38	39-41

16. Agricultural Crop and Residues

	Land under Cultivation (katha)	Total crop Production (mds)	Total residues (Straw/Jute stocks) (mds)
Aus (Rice)	42-43	44-45	46-48
Aman (Rice)	49-50	51-52	53-55
Traditional Boro (Rice)	56-57	58-59	60-62
Irrigated Boro (Rice)	63-64	65-66	67-69
Jute	70-71	72-73	74-76
Card No. 7-8 03			
Others (Specify name)	9-10	11-12	13-15

17. Have you any Dheki/Gani ? (Encircle the right answer) 16

1. Yes 1
2. No 2

(If yes then) No. of Dheki [ ] 17

No. of Gani [ ] 18

18. Livestock Resources and Their Uses:

How may do you have in the following ?

	Adult (3 years and above)	Calf (Under 3 years)	Total
a) Cow	19 [ ]	20 [ ]	21-22 [ ]
b) Bullock	23 [ ]	24 [ ]	25-26 [ ]
c) Buffalo	27 [ ]	28 [ ]	29-30 [ ]
d) Goat	31 [ ]	32 [ ]	33-34 [ ]
e) Castrated Goat	35 [ ]	36 [ ]	37-38 [ ]
f) Horse	39 [ ]	40 [ ]	41 [ ]
g) Sheep	42 [ ]	43 [ ]	44 [ ]

19. What is the Sources of your used cow dung ? (Encircle the correct answer)

1. Self
2. Pruchased from others
3. Collected from others
4. Not available

[1 / 2 / 3 / 4]

45-46 ED [ ]

20. What amount of cowdung do you use in the following season and cases.

	As fertilizer %	As Household cooking %	Other activities %	Total %
Dry season	47-49 [ ]	50-52 [ ]	53-54 [ ]	55-57 [ ]
Wet season	58-60 [ ]	61-63 [ ]	64-65 [ ]	66-68 [ ]

Card No. 7-8 [04]

21. How many Bullock/Buffaloe do you use in the following seasons and purposes (end uses)

	Dry season or Aus/Boro				Wet season or Aman			
	Self No.	Hired No.	Hiring days	Hiring Price (Tk)	Self No.	Hired No.	Hiring days	Hiring Price (Tk)
	9-10	11-12	13-15	16-19	42-43	44-45	46-48	49-52
Land Preparation								
	20-21	22-23	24-26	27-30	53-54	55-56	57-59	60-63
Paddy Threshing								
	31-32	33-34	35-37	38-41	64-65	66-67	68-70	71-74
Transport								

Card No. 7-8 [05]

22. (i) Do you have any shortage of draft power ?
(Encircle the correct answer)

9

1. Yes [1]
2. No [2]

(If yes then) how many number of bullocks you have shortage ?

10 [ ]

(ii) In which season you have draft power shortage
(Encircle the correct answer)

11

1. Dry season (Aus and Boro season) [1]
2. Wet season (Aman season) [2]
3. Both season [3]

ED [ ]

23. How do you meet animal power shortage ?
(Encircle the correct answer)

13

1. Hiring [1]
2. Exchanging animal power [2]
3. Purchasing [3]
4. Not answered [4]
5. Not applicable [5]
6. Lending [6]

Demand:

24.(i) What amount of fuels do you use in the following end uses ?

Dry Season (Agrahayan Baisakh): (Nov.-Dec. to April - May)

	Food Cooking	Paddy Perboiling	Others (specify name)	Total	From others: Owned amount %	From others: Buying amount %	From others: Collected amount %
	14-15	16-17	18-19	20-22	23-25	26-28	29-31
Woodfuels (mds)							
	32-33	34-35	36-37	38-40	41-43	44-46	47-49
Twigs and leaves							
	50-51	52-53	54-55	56-57	58-60	61-63	64-66
Straw (mds)							
	67-68	69-70	71-72	73-74	75-77	78-80	9-11
Husk (mds)							

Card No. 7-8 06

	12-13	14-15	16-17	18-19	20-22	23-25	26-28
Jute stick (mds)							
	29-30	31-32	33	34-35	36-38	39-41	42-44
Other (mds)							
(Specify name)							

Wet season (Jaistha - Kartik)): May-June to Oct.-Nov.).

	45-46	47-48	49-50	51-53	54-56	57-59	60-62
Woodfuels (mds)							
	63-64	65-66	67-68	69-71	72-74	75-77	78-80
Twigs and leaves (mds)							
	9-10	11-12	CARD NO. 7-8 07 13-14	15-16	17-19	20-22	23-25
Straw (mds)							
	26-27	28-29	30-31	32-33	34-36	37-39	40-42
Husk							
	43-44	45-46	47-48	49-50	51-53	54-56	57-59
Jute sticks							
	60-61	62-63	64	65-66	67-69	70-72	73-75
Others (mds)							
(specify name)							

7-8
Card No. 08

(ii) During last year How many Taka worth of fuels you have purchased

9-12
[ ]

- The amount of fuel you have purchased 13-15
[ ]

25. (i) Specify the uses of the following ?

a. Type of Chula	No. of unit used in dry season	Location of Chula (1. Inside the house 2. Outside the house 3. In and outside)	No. of unit used in wet season	Location of Chula (1. Inside the house 2. Outside the house 3. In and outside)
a. One mouth Chula	16 [ ]	17 [ ]	26 [ ]	27 [ ]
b. Two mouth Chula	18 [ ]	19 [ ]	28 [ ]	29 [ ]
c. Movale Chula	20 [ ]	21 [ ]	30 [ ]	31 [ ]
d. Kersoend Chula	22 [ ]	23 [ ]	32 [ ]	33 [ ]
e. Others (specify name)	24 [ ]	25 [ ]	34 [ ]	35 [ ]

(ii) Other things:

	No.	Average operating hours per day
1. Kupi	36 [ ]	37 [ ]
2. Hurricane	38 [ ]	39 [ ]
3. Iron	40 [ ]	41 [ ]
4. Fan	42 [ ]	43-44 [ ]
5. Bulb	45 [ ]	46-47 [ ]
6. Radio	48 [ ]	49-50 [ ]
7. T.V.	51 [ ]	52 [ ]
8. Heater	53 [ ]	54 [ ]
9. Motor	55 [ ]	56-57 [ ]
10. Others (specify name)	58 [ ]	59 [ ]

26. Have you any motor Circle (Encircle the correct answer)

60

1. Yes [1]
2. No [2]

(If yes then) - Monthly expenditure on account of fuel for Motor Cycle

61-63 [ ]

27. Consumption Pattern of Kerosene, Diesel and Electricity:

What quantity of fuel do you use per month in the following season and end uses.

	Dry Season			Wet Season		
	For Cooking	For Lighting	Total	For Cooking	For Lighting	Total
a. kerosene (Seer/month)	64-65 [ ]	66-67 [ ]	68-70 [ ]	9-10 [ ]	11-12 [ ]	13-15 [ ]
b. Diesel (Seer/month)	71 [ ]	72 [ ]	73 [ ]	16-17 [ ]	18-19 [ ]	20-22 [ ]
c. Electricity (kWh/month)	74-75 [ ]	76-77 [ ]	78-80 [ ]	23-24 [ ]	25-26 [ ]	27-29 [ ]

Card No. 7-8 [09]

28. Information of Food

What quantity of the following items is needed per month for your family ?

a. Rice (mds/month) 30-31 [ ]
b. Flour (Seer/month) 32-33 [ ]
c. Dal (Seer/month) 34-35 [ ]
d. Salt (Seer/month) 36-37 [ ]

29. How many hours the cooking stove (chulah) are operated in your household ?

Morning (hours)	Noon (hours)	Afternoon (hours)	Night (hours)	Total (hours)
38-39 [ ]	40-41 [ ]	42-43 [ ]	44-45 [ ]	46-48 [ ]

Signature of the Investigator

APPENDIX-B
COMPUTER PROGRAMME

```
SPSS FOR DOS/360, VERSION H, RELEASE 9.0, OCT 22, 1981

                         CURRENT DOCUMENTATION FOR THE SPSS BATCH SYSTEM
ORDER FROM MCGRAW-HILL    SPSS, 2ND ED. (PRINCIPAL TEXT)        ORDER FROM SPSS INC.    SPSS STATISTICAL ALGORITHMS
                          SPSS UPDATE 7-9 (USE W/SPSS,2ND FOR REL. 7, 8, 9)             KEYWORDS  THE SPSS INC. NEWSLETTER
                          SPSS POCKET GUIDE, RELEASE 9
                          SPSS PRIMER (BRIEF INTRO TO SPSS)

DEFAULT SPACE ALLOCATION..     ALLOWS FOR..   169 TRANSFORMATIONS
WORKSPACE     118380 BYTES                    676 RECODE VALUES + LAG VARIABLES
TRANSPACE      16908 BYTES                   2706 IF/COMPUTE OPERATIONS

COMMENT         0000000000000000000000000000000000000000000000000000000000000000000
                0
                0 THIS PROGRAME HAS BEEN DEVELOPED DURING 1986 BY MD. AZHARUL      0
                0 ISLAM,THESIS STUDENT OF THE DEPARTMENT OF U.R.P.BUET.DHAKA.      0
                0                                                                  0
                0000000000000000000000000000000000000000000000000000000000000000000
                THESIS TITLE               * ENERGY PLANNING FOR RURAL BANGLADESH
                                             --COMPARATIVE ASSESSMENT OF ENERGY
                                             SITUATION IN AN ELECTRIFIED AND A
                                             NON-ELECTRIFIED VILLAGE OF
                                             MYMENSINGH DISTRICT.

                NAME OF THE SUPERVISOR-  *   DR. M. NURUL ISLAM
                                             PROFESSOR,
                                             DEPARTMENT OF CHEMICAL ENGG.
                                             AND
                                             DIRECTOR,
                                             INSTITUTE OF APPROPRIATE TECHNOLOGY
                                             BUET
                                             DHAKA.

                NAME OF THE CO-SUPERVISOR*   MR. A.S.M. ABDUL QUIUM
                                             ASSTT. PROFESSOR,
                                             DEPARTMENT OF URBAN AND
                                             REGIONAL PLANNING(U.R.P)
                                             BUET
                                             DHAKA.

RUN NAME        THESIS ON ENERGY PLANNING FOR RURAL BANGLADESH.
FILE NAME       ENERGY
DATA LIST       FIXED (9)/1 SLNO 1-4 VILNO 5-6 CARDNO 7-8 SEX 9 AGE 10 EDUCAT 11
                TYOF 12 FTBMOF 13-14 FTBSER 15 FTBHIE 16 FTBOTHR 17 FTBTOM 18-19
                ACTMM 20 ACTFM 21 ACTMS 22 ACTFS 23 MLNINE 24 FUNINE 25 MBTENTN
                26 FBTENTN 27 MBTWIN 30 FBTWIN 31 METFIHN 32 FBTHTFN 33 MBFFTN 34
                FBFFTN 35 MAFIF 36 FAFIF 37 PRPAMM 38 PRMS 39 SEPAMM 40 SEMS 41
                HSEPAMM 42 HSEMS 43 AHSPMM 44 AHSMS 45 ILLIMM 46 PRPAFM 47 PRFS
                48 SEPAFM 49 SEFS 50 HSEPAFM 51 HSEFS 52 AHSPFM 53 AHSFS 54
                ILLIFM 55 MOCCUP 56 SEOCCUP 57 MINCOME 58-61 LIVUNT 62 LIVROOM 63
                 COOKUNT 64 COOKRCOM 65 GLAUNT 66 GLAROOM 67 GOLUNT 68 GOLRCOM 69
                 ROOFMAT 70 WALEMAT 71 SOORIW 72 TYCICI 73 /2 BIGFRT 9-10 MDMFRT
                11-12 LITFRT 13-14 TOTFRT 15-16 BIWFT 17-18 MEWFT 19-20 LIWFT
                21-22 TOTWFT 23-24 BIGTIM 25 MCOTIM 26 LITTIM 27 TOTTIM 28
                LNOOHCM 29-31 (1) CLAND 32-34 RCUT 35-36 RIN 37-38 TOCL 39-41
                LUNAUS 42-43 TOPOAUS 44-45 TAOAJST 46-49 LUNAMAN 49-50 TPCAMAN
                 51-52 TAMANST 53-55 LUIRBO 56-57 TFOIRBO 58-59 TIRBOST 60-62
                LUIRBC 63-64 TPOIRBC 65-66 TIRBCST 67-69 LUJUTE 70-71
                TPOJUTE 72-73 TJUSTIC 74-76 /3 LUCTHE 9-10 TPOOTHE 11-12 TPORES
                13-15 [illegible] 16 NCOHAKI 17 NOCANI 18 NBIOCOW 19 NLITCOW 20 TNOCOW
                21-22 [illegible] 23 NLBULCK 24 TNBULCK 25-26 [illegible] 27 NLBFALW 28
                TNBFALW [illegible]-30 NBGCAT 31 NLGCAT 32 TNGCAT 33-34 NBCCCAT 35
                NLCCCAT 36 TNCCCAT 37-38 NBHORSE 39 NLHORSE 40 TNHORSE 41
                NBSHEEP 42 NLSHEEP 43 TNSHEEP 44 SD1 45 SD2 46 DFEFTO 47-49
                DCOOKD 50-52 DLTHED 53-54 DTOTD 55-57 [illegible] 58-60 DCOOFW 61-63
                [illegible] 64-65 DTCTW 66-68 RCUGDP 69-71 [illegible] 72-74
                /4 SBPHD 9-10 HBLPD 11-12 OHBLPD 13-15 [illegible] 16 19 SBPHD 20-21
                HBPHD 22-23 OHBPHD 24-26 PHBPHD 27-30 SBOCD 31-32 FBOCD 33-34
                OHBOCD 35-37 PHBOCD 38-41 SBLPW 42-43 [illegible] 44-45 EHBLPW 46-48
                PHBLPW 49-52 SBPHW 53-54 HBPHW 55-56 [illegible] 57-59 PHBPHW 60-63
                SBOCW 64-65 HBOCW 66-67 OHBOCW 68-70 [illegible]
                /5 [illegible] 9 [illegible] 10 [illegible] 11 [illegible] 12 [illegible] COKD 14-15
                WBUTLL 16-17 WTTHEP 18-19 TOTW 20-22 [illegible] 25 PTIRWD 26-28
                [illegible] 32-33 TCOKD [illegible] TPOTLF [illegible] 38-40
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                66                  OWNEDTD 41-43 PURTD 44-46 COLLTD 47-49 STCOOKD 50-51
                67                  STBOILD 52-53 STOTHED 54-55 TOTSTD 56-57 OWNEDSTD 58-60
                68                  PURSTD 61-63 COLLSTD 64-66 RCOOKD 67-68 RBOILD 69-70
                69                  ROTHED 71-72 TOTRD 73-74 OWNEDRD 75-77 PURRD 78-80 /6
                70                  COLLRD 9-11 JCOOKD 12-13 JBOILD 14-15 JOTHED 16-17 TOTJC 18-19
                71                  OWNEDJD 20-22 PURJD 23-25 COLLJD 26-28 OCOOKD 29-30 OBOILD 31-32
                72                  OOTHED 33 TOTOD 34-35 OWNEDCD 36-38 PURCD 39-41 COLLCD 42-44
                73                  WCOOKW 45-46 WBOILW 47-48 WOTHEW 49-50 TOTWW 51-53 OWNEDWW 54-56
                74                  PURWW 57-59 COLLWW 60-62 TCOOKW 63-64 TBOILW 65-66 TOTHEW 67-68
                75                  TOTTW 69-71 OWNEDTW 72-74 PURTW 75-77 COLLTW 78-80 /7
                76                  STCOOKW 9-10 STBOILW 11-12 STOTHEW 13-14 TOTSTW 15-16
                77                  OWNEDSTW 17-19 PURSTW 20-22 COLLSTW 23-25 RCOOKW 26-27
                78                  RBOILW 28-29 ROTHEW 30-31 TOTRW 32-33 OWNEDRW 34-36 PURRW 37-39
                79                  COLLRW 40-42 JCOOKW 43-44 JBOILW 45-46 JOTHEW 47-48 TOTJW 49-50
                80                  OWNEDJW 51-53 PURJW 54-56 COLLJW 57-59 OCOOKW 60-61 OBOILW 62-63
                81                  OOTHEW 64 TOTOW 65-66 OWNEDCW 67-69 PURCW 70-72 COLLOW 73-75
                82                  /8 TKFOREN 9-12 AMOFEN 13-15 OMCHUD 16 PA 17 TMCHUC 18 PB 19
                83                  MCHUD 20 PC 21 KCHUD 22 PD 23 OCHUD 24 PE 25 OMCHUW 26 POA 27
                84                  TMCHUW 28 POB 29 MCHUW 30 POC 31 KCHUW 32 PCD 33 OCHUW 34 POE 35
                85                  KUPI 36 KUPIN 37 HURICAN 38 HURICANF 39 IRON 40 IRONH 41 FAN 42
                86                  FANH 43-44 BULB 45 BULBH 46-47 RADIC 48 RADIOH 49-50 T.V 51
                87                  T.VH 52 HEATER 53 HEATERH 54 MOTOR 55 MOTORH 56-57 OTHEP 58
                88                  OTHERH 59 MOTORCY 60 MOTORCYC 61-63 KCOOKD 64-65 KLIGHTD 66-67
                89                  TOTKD 68-70 DICOOKD 71 DLIGHTD 72 ICTDC 73-ECCOKD 74-75
                90                  ELIGHTD 76-77 TOTED 78-80 /9 KCOOKW 9-10 KLIGHTW 11-12
                91                  TOTKW 13-15 DICOOKW 16-17 DLIGHTW 18-19 TOTDW 20-22 ECOOKW 23-24
                92                  ELIGHTW 25-26 TOTEW 27-29 RICE 30-31 (1) FLOUR 32-33 PULSES 34-35
                93                  SALT 36-37 MCOOKH 38-39 (1) NCOOKH 40-41 (1) AFCOOKH 42-43 (1)
                94                  NTCOOKH 44-45 (1) TOTCOOKH 46-48 (1)
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THE DATA LIST PROVIDES FOR 316 VARIABLES AND 9 RECORDS--('CARDS') PER CASE. A MAXIMUM OF 80 COLUMNS ARE USED ON A RECORD.

LIST OF THE CONSTRUCTED FORMAT STATEMENT..

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(F4.0,2F2.0,4F1.0,F2.0,3F1.0,F2.0,8F1.0,2X,28F1.0,F4.0,12F1.0/8X,8F2.0,4F1.0,F3.1,F3.0,2F2.0,F3.
0,2F2.0,F3.0,F3.0,2F2.0,F3.0,2F2.0,F3.0,2F2.0,F3.0,2F2.0,F3.0/8X,2F2.0,F3.0,5F1.0,F2.0,2F1.0,F2.0,2F1
.0,F2.0,2F1.0,F2.0,2F1.0,F2.0,8F1.0,2F3.0,F2.0,3F3.0,F2.0,3F3.0/8X,2F2.0,F3.0,F4.0,2F2.0,F3.0,F4
.0,2F2.0,F3.0,F4.0,2F2.0,F3.0,F4.0,2F2.0,F3.0,F4.0,2F2.0,F3.0,F4.0/8X,5F1.0,3F2.0,4F3.0,3F2.0,4F
3.0,4F2.0,3F3.0,4F2.0,2F3.0/8X,F3.0,4F2.0,3F3.0,2F2.0,F1.0,F2.0,3F3.0,3F2.0,4F3.0,3F2.0,4F3.0/8X
,4F2.0,3F3.0,4F2.0,3F3.0,4F2.0,3F3.0,2F2.0,F1.0,F2.0,3F3.0/8X,F4.0,F3.0,27F1.0,F2.0,F1.0,F2.0,F1
.0,F2.0,5F1.0,F2.0,3F1.0,F3.0,2F2.0,F3.0,3F1.0,2F2.0,F3.0/8X,2F2.0,F3.0,2F2.0,F3.0,2F2.0,F3.0,F2
.1,3F2.0,4F2.1,F3.1)
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                95 SUBFILE LIST    VONE (742) VTWO (256)
                96 INPUT MEDIUM    CARD
                97 COMPUTE         VARA=TOTERT+TCTTTM
                98 COMPUTE         VARB=TOTERT+TCTWFT+TCTTTM
                99 COMPUTE         VARC=MINCOME*12
               100 COMPUTE         VARD=CLAND*0.0165
               101 COMPUTE         VARE=LNDOHOM*0.0165
               102 COMPUTE         VARO=TOCL*0.0165
               103 COMPUTE         V91=VARO
               104 COMPUTE         VARE=VARE
               105 COMPUTE         VARG=VARB
               106 COMPUTE         VART=LUNAUS*0.0165
               107 COMPUTE         VARU=LUNAMAN*0.0165
               108 COMPUTE         VARV=LUTRBO*0.0165
               109 COMPUTE         VARW=LUTRBD*0.0165
               110 COMPUTE         VARX=LUJUTE*0.0165
               111 COMPUTE         VARY=LUGTHE*0.0165
               112 COMPUTE         VA=((TOPOAUS*37.32/1000)*0.9*0.7)/FTBTOM
               113 COMPUTE         VB=((TPOAMAN*37.32/1000)*0.9*0.7)/FTBTOM
               114 COMPUTE         VC=((TPOTRBO*37.32/1000)*0.9*0.7)/FTBTOM
               115 COMPUTE         VD=((TPOTRBC*37.32/1000)*0.9*0.7)/FTBTOM
               116 COMPUTE         VE=(TPOJUTE*37.32/1000)/FTBTOM
               117 COMPUTE         VF=(TPORES*37.32/1000)/FTBTOM
               118 COMPUTE         RESA=TAOAUST*37.32/1000
               119 COMPUTE         RESB=TAMANST*37.32/1000
               120 COMPUTE         RESC=TTRBCST*37.32/1000
               121 COMPUTE         RESD=TTRBCST*37.32/1000
               122 COMPUTE         RESE=TJUSTIC*37.32/1000
               123 COMPUTE         RESF=TPORES*37.32/1000
               124 COMPUTE         VG=((TCPOAUS*37.32/1000)*0.23
               125 COMPUTE         VH=((TOPOAUS*37.32/1000)*1.07
               126 COMPUTE         VI=((TPOAMAN*37.32/1000)*0.23
               127 COMPUTE         VJ=((TPOAMAN*37.32/1000)*1.07
               128 COMPUTE         VK=((TPOTRBO*37.32/1000)*0.23
               129 COMPUTE         VL=((TPOTRBO*37.32/1000)*1.07
               130 COMPUTE         VM=((TPOTRBC*37.32/1000)*0.23
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131 COMPUTE      VN=(LPDIRBD*37.32/1000)*15.1
132 COMPUTE      VP=TMBULCK+TNGCOW
133 COMPUTE      VQ=TMGOAT+TNSHEEP
134 COMPUTE      VR=(SPLPD+SPLPW)/2
135 COMPUTE      VS=(SBPHD+SBPHW)/2
136 COMPUTE      VT=(SBOCD+SBOCW)/2
137 COMPUTE      VU=(BBLPD+BBLPW+DHBLPD+DHBLPW
138 COMPUTE      VV=(BBPHD+BBPHW+DHBPHD+DHBPHW
139 COMPUTE      VW=(BBOCD+BBOCW+DHBOCD+DHBOCW
140 COMPUTE      VX=TMBULCK+NBBULCK+NBBULCK
141 COMPUTE      VTK=VX
142 COMPUTE      TCAP=VP+TNBULCW
143 COMPUTE      CCAP=TCAP
144 COMPUTE      XM=((TBTKD*37.32/1000)*15.1)/FTBTCM
145 COMPUTE      XN=((TBTTD*37.32/1000)*12.5)/FTBTCM
146 COMPUTE      XO=((TBTSTD*37.32/1000)*12.5)/FTBTCM
147 COMPUTE      XP=((TBTBD*37.32/1000)*12.5)/FTBTCM
148 COMPUTE      XQ=((TBTJD*37.32/1000)*12.5)/FTBTCM
149 COMPUTE      XR=((TBTOD*37.32/1000)*12.5)/FTBTCM
150 COMPUTE      XS=XM+XN+XO+XP+XQ+XR
151 COMPUTE      XT=((TBTKW*37.32/1000)*15.1)/FTBTCM
152 COMPUTE      XU=((TBTTW*37.32/1000)*12.5)/FTBTCM
153 COMPUTE      XV=((TBTSTW*37.32/1000)*12.5)/FTBTCM
154 COMPUTE      XW=((TBTBW*37.32/1000)*12.5)/FTBTCM
155 COMPUTE      XX=((TBTJW*37.32/1000)*12.5)/FTBTCM
156 COMPUTE      XY=((TBTOW*37.32/1000)*12.5)/FTBTCM
157 COMPUTE      XZ=XT+XU+XV+XW+XX+XY
158 COMPUTE      CA=XM+XT
159 COMPUTE      CB=XN+XU
160 COMPUTE      CD=XO+XV
161 COMPUTE      CE=XP+XW
162 COMPUTE      CF=XQ+XX
163 COMPUTE      CG=XR+XY
164 COMPUTE      OWN=OWNEDKD+OWNEDTD+OWNEDSTD+OWNEDBD+OWNEDJD+OWNEDOD+OWNEDKW
165                +OWNEDTW+OWNEDSTW+OWNEDBW+OWNEDJW+OWNEDOW
166 COMPUTE      GATHER=COLLKD+COLLTD+COLLSTD+COLLBD+COLLJD+COLLOD+COLLKW+COLLTW
167                +COLLSTW+COLLBW+COLLJW+COLLOW
168 COMPUTE      PURCH=PURKD+PURTD+PURSTD+PURBD+PURJD+PUROD+PURKW+PURTW+PURBW
169                +PURJW+PUROW
170 COMPUTE      CH=(WCOOKD+WCOOKW)*37.32/1000*15.1
171 COMPUTE      CI=(TCOOKD+STCOOKD+BCOOKD+JCOOKD+OCCOKD+TCOOKW+STCOKW+BCOKW
172                +JCCOKW+OCOCKW)*37.32/1000*12.5
173 COMPUTE      COOK=(CH+CI)/FTBTCM
174 COMPUTE      CJ=(WBOILD+WBOILW)*37.32/1000*15.1
175 COMPUTE      CK=(TBOILD+STBOILD+BBOILD+JBOILD+OBOILD+TBOILW+STBOILW+BBOILW
176                +JBOILW+OBOILW)*37.32/1000*12.5
177 COMPUTE      BOIL=(CJ+CK)/FTBTCM
178 COMPUTE      CL=(WOTHED+WOTHEW)*37.32/1000*15.1
179 COMPUTE      CM=(TOTHED+STOTHED+BOTHED+JOTHED+OOTHED+TOTHEW+STOTHEW+BOTHEW
180                +JOTHEW+OOTHEW)*37.32/1000*12.5
181 COMPUTE      OTHER=(CL+CM)/FTBTOM
182 COMPUTE      CR=XS+XZ
183 COMPUTE      CS=TOTKD*6*0.933
184 COMPUTE      CT=CS/0.78
185 COMPUTE      CU=TOTKW*6*0.933
186 COMPUTE      CV=CU/0.78
187 COMPUTE      CW=CS+CU
188 COMPUTE      CX=CT+CV
189 COMPUTE      CY=(TOTTED*6+TOTEW*6)
190 COMPUTE      DA=(KCOOKD*6+KCOOKW*6)*0.933
191 COMPUTE      DB=DA/0.78
192 COMPUTE      DC=DA/FTBTOM
193 COMPUTE      DD=DB/FTBTOM
194 COMPUTE      DE=(KLIGHTD*6+KLIGHTW*6)*0.933
195 COMPUTE      DF=DE/0.78
196 COMPUTE      DG=DE/FTBTOM
197 COMPUTE      DH=DF/FTBTOM
198 COMPUTE      DI=ECOOKD*6+ECOOKW*6
199 COMPUTE      DJ=DI/FTBTOM
200 COMPUTE      DK=ELIGHTD*6+ELIGHTW*6
201 COMPUTE      DL=DK/FTBTOM
202 COMPUTE      DM=(RICE*37.32/FTBTCM)*12
203 COMPUTE      DN=DM*14797/10.**9
204 COMPUTE      DO=(FLOUR*37.32/FTBTOM)*12
205 COMPUTE      DP=DO*14797/10.**9
206 COMPUTE      DQ=(PULSES*37.32/FTBTCM)*12
207 COMPUTE      DR=DQ*14797/10.**9
208 COMPUTE      NBK=NBBULCK
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                 (0=1)(0.001 THRU 0.004=2)(0.005 THRU 0.099=3)
                 (0.1 THRU 0.49=4)(0.5 THRU 0.99=5)(1 THRU 1.49=6)(1.5 THRU HI=7)/
                 VAR   (0=1)(1 THRU 5=2)(6 THRU 10=3)(11 THRU 20=4)(21 THRU 40=5)
                  (41 THRU 60=6)(61 THRU HI=7)/
                 FTBTOM (1=1)(2=2)(3=3)(4=4)(5=5)(6=6)(7=7)(8=8)(9=9)(ELSE=10)/
                 VARQ (0=1)(.01 THRU 0.499=2)(0.5 THRU 0.999=3)(1 THRU 1.499=4)
                 (1.5 THRU 2.499=5)(2.5 THRU 7.499=6)(7.5 THRU HI=7)/
                 VARQ (0=1)(0.001 THRU 0.499=2)(0.5 THRU 0.999=3)(1 THRU 1.499=4)
                 (1.5 THRU 2.499=5)(2.5 THRU 7.499=6)(7.5 THRU HI=7)/
                 VARC (0 THRU 5999=1)(6000 THRU 17999=2)(18000 THRU 29999=3)
                 (30000 THRU 59999=4)(60000 THRU HI=5) /
                 NBBULCK (0=0)(1=1)(2=2)(3=3)(4=4)(5=5)(6=6)(ELSE=7)/
                 VX (0=0)(1=1)(2=2)(3=3)(4=4)(5=5)(6=6)(7=7)(ELSE=8)/
                 TCAB (0=0)(1=1)(2=2)(3=3)(4=4)(5=5)(6=6)(7=7)(ELSE=8)/
                 VARA TO VARB (9,99=999)/VARD TO VARC(59,999=9999)/
                 VART TO VN(88,888,880=555)/VP TO VQ(9,99=999)/VR TO VW(77=777)/
                 VOX(9,99=999)/CCBB(9,99=999)/NBX(9,99=999)
COUNT            VARS = TOTFRT, TOTWFT, TOTTIM (0)/
                 VQ = TNOCOW, TNBULCK, TNBFALW, TNGOAT, TNCGOAT, TNHORSE, TNSHEEP
                  (0)/
VAR LABELS       SEX,SEX OF HEAD OF HOUSEHOLD/AGE,AGE IN YEARS/EDUCAT,EDUCATION OF
                 HEAD OF HOUSEHOLD/TYOF,TYPE OF FAMILY OF HEAD OF HOUSEHOLD/
                 FTBMOF,FOOD TAKEN BY HEAD+FAMILY MEMBERS/FTBSER,FOOD TAKEN BY
                 PARMANENT SERVANT/FTBHTE,FOOD TAKEN BY HOUSE TEACHER/FTBOTHR,
                 FOOD TAKEN BY OTHER/FTBTOM,FOOD TAKEN BY TOTAL FAMILY MEMBERS/
                 ACTMM,NO. OF ACTIVE MALE FAMILY MEMBER/ACTFM,NO. OF ACTIVE FEMALE
                 FAMILY MEMBER/ACTMS,NO. OF ACTIVE MALE SERVANT/ACTFS,NO. OF
                 ACTIVE FEMALE SERVANT/MUNINE,NO. OF MALE FAMILY MEMBER UNDER 9
                 YEARS/FUNINE,NO. OF FEMALE MEMBER UNDER 9 YEARS/MBTENTN,NO. OF
                 MALE MEMBER BETWEEN 10-19YEARS/FBTENTN,NO. OF FEMALE MEMBER BET.
                 10-19 YEARS/MBTWTN,NO. OF MALE MEMBER BETWEEN 20-29 YEARS/FBTWTN,
                 NO. OF FEMALE MEMBER BETWEEN 20-29 YEARS/MBTHTHN,NO. OF MALE
                 MEMBER BETWEEN 30-39 YEARS/FBTHTHN,NO. OF FEMALE MEMBER BETWEEN
                 30-39 YEARS/MBFFTN,NO. OF MALE MEMBER BETWEEN 40-49 YEARS/FBFFTN,
                 NO. OF FEMALE MEMBER BETWEEN 40-49 YEARS/MAFIF,NO. OF MALE MEMBER
                 ABOVE 50 YEARS/FAFIF,NO. OF FEMALE MEMBER ABOVE 50 YEARS/PRPAMM,
                 NO. OF PRIMARY PASSED MALE MEMBER/PRMS,NO. OF PRIMARY MALE STUDEN
                 T /SEPAMM,NO. OF SECONDARY PASSED MALE MEMBER/SEMS,NO. OF
                 SECONDARY MALE STUDENT/HSEPAMM,HIGHER SECONDARY PASSED MALE
                 MEMBER/HSEMS,HIGHER SECONDARY MALE STUDENT/AHSPMM,ABOVE HIGHER
                 2DARY PASSED MALE MEMBER/AHSMS,ABOVE HIGHER 2DARY MALE STUDENT/
                 ILLIMM,NO. OF ILLITERATE MALE MEMBER/PRPAFM,NO. OF PRIMARY PASSED
                 FEMALE MEMBER/PRFS,NO. OF PRIMARY FEMALE STUDENT/SEPAFM,NO. OF
                 SECONDARY PASSED FEMALE MEMBER/SEFS,NO. OF SECONDARY FEMALE
                 STUDENT/HSEPAFM,HIGHER 2DARY PASSED FEMALE MEMBER/HSEFS,HIGHER
                 SECONDARY FEMALE STUDENT/AHSPFM,ABOVE HIGHER 2DARY PASSED FEMALE
                 MEMBER/AHSFS,ABOVE HIGHER 2DARY FEMALE STUDENT/ILLIFM,NO. OF
                 ILLITERATE FEMALE MEMBER/MOCCUP,MAIN OCCUPATION OF HEAD OF
                 HOUSEHOLD/SEOCCUP,SECENC OCCUPATION OF HEAD OF HOUSEHOLD/MINCOME,
                 MONTHLY INCOME OF HEAD OF HOUSEHOLD/LIVUNT,NO.OF LIVING UNIT/
                 LIVROOM,NO. OF LIVING ROOM/COCKUNT,NO. OF COOKING UNIT/COCKROOM,
                 NO. OF COOKING ROOM/GLAUNT,NO OF STORE UNIT/GLAROOP,NO. OF STORE
                 ROOM/GULUNT,CCW-SHED UNIT/COLROOM,CCW-SHED ROOM/ROOFMAT,
                 ROOF MATERIAL OF HOUSE OF HEAD/WALEMAT,WALE MATERIAL OF HOUSE OF
                 HEAD/SOURIW,SOURCES OF DRINKING WATER/TYOTOI,TYPE OF TOILET OF
                 HOUSE OF HEAD/BIGFRT,NO. OF BIG FRUIT TREES/MDMFRT,NO. OF MEDIUM
                 FRUIT TREES/LITFRT,NO. OF LITTLE FRUIT TREES/TOTFRT,NO. OF TOTAL
                 FRUIT TREES/BIWFT,NO. OF BIG WOOD FUEL TREES/MEWFT,NO. OF MEDIUM
                 WOOD FUEL TREES/LIWFT,NO. OF LITTLE WOOD FUEL TREES/TOTWFT,NO.
                 OF TOTAL WOOD FUEL TREES/BIGTIM,NO. OF BIG TIMBER/MEDTIM,NO. OF
                 MEDIUM TIMBER/LITTIM,NO. OF LITTLE TIMBER/TOTTIM,NO. OF TOTAL
                 TIMBER/LNDOHOM,LAND AREA OF HOUSEHOLD OF HEAD/CLAND,CULTIVATED
                 LAND OF HEAD OF HOUSEHOLD/ROUT,LAND RENT OUT LAST YEAR-1985 /RIN,
                 LAND RENT IN LAST YEAR-1985 /TOCL,TOTAL CULTIVATED LAND OF HEAD
                 OF HOUSEHOLD/LUNAUS,LAND UNDER AUS PADDY CULTIVATION/TOPOAUS,
                 TOTAL PRODUCTION OF AUS PADDY- MOUND /TAOAUST,TOTAL AMOUNT OF AUS
                 STRAW-MOUND /LUNAMAN,LAND UNDER AMAN PADDY CULTIVATION/TPOAMAN,
                 TOTAL PRODUCTION OF AMAN PADDY-MOUND /TAMANST,TOTAL AMOUNT OF
                 AMAN STRAW-MOUND /LUTRBO,LAND UNDER TRADITIONAL BORO PADDY/
                 TPOTRBO,TOTAL PRODUCTION OF TRADITIONAL BORO-MD  /TTRBOST,TOTAL
                 STRAW OF TRADITIONAL BORO -MD /LUIREQ,LAND UNDER IRRIGATED BORO
                 PADDY/TPOIRBO,TOTAL PRODUCTION OF IRRIGATED BORO-MD  /TIRBOST,
                 TOTAL STRAW OF IRRIGATED BORO -MD /LUJUTE,LAND UNDER JUTE
                 CULTIVATION/TPOJUTE,TOTAL AMOUNT OF PRODUCTION OF JUTE-MD /
                 TOJSTC,TOTAL AMOUNT OF JUTE STICKS -MD /LUOTHR,LAND UNDER OTHERS
                 CULTIVATION/TPOOTHR,TOTAL PRODUCTION OF OTHERS -MD /TPORES,TOTAL
                 AMOUNT OF RESIDUES -MD /DGAV,AVAILABILITY OF DHAKI-GANI /NODHAKI,
                 NO. OF DHAKI/NOGANI,NO. OF GANI/NBIGCOW,NO. OF BIG COW -ABOVE 3
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YEARS /NLITCOW,NO. OF LITTLE COW -BELOW 3 YEARS /TNOCOW,TOTAL NO.
OF COWS/NBOULCK,NO. OG BIG BULLOCK-ABOVE 3 YEARS /NLBULCK,NO. OF
LITTLE BULLOCK-BELOW 3 YEARS /TNBULCK,TOTAL NO. OF BULLOCK/
NBOFALW,NO. OF BIG BAFALLOW -ABOVE 3 YEARS /NLBFALW,NO. OF LITTLE
BAFALLOW -BELOW 3 YEARS /TNBFALW,TOTAL NO. OF BAFALLOW /NBGOAT,
NO. OF BIG GOAT -ABOVE 3 YEARS /NLGOAT,NO. OF LITTLE GOAT-BELOW 3
YEARS /TNGOAT,TOTAL NO. OF GOAT/NBCGOAT,NO. OF BIG CASTRATED
GOAT-ABOVE 3YRS /NLCGOAT,NO. OF LITLE CASTRATED GOAT-BELOW 3YRS
/TNCGOAT,TOTAL NO. OF CASTRATED GOAT/NBHORSE,NO. OF BIG HORSE
-ABOVE 3 YEARS /NLHORSE,NO. OF LITTLE HORSE-BELOW 3 YEARS /
TNHORSE,TOTAL NO. OF HORSE/NBSHEEP,NO. OF BIG SHEEP-ABOVE 3 YEARS
/NLSHEEP,NO. OF LITTLE SHEEP-BELOW 3 YRS /TNSHEEP,TOTAL NO. OF
SHEEP/SD1,S-DUNG/SD2,SOURCE OF DUNG/ OFERTD,COWDUNG P IN DRY
SEASON AS FERTILIGER/DCCOKD,COWDUNG P IN DRY SEASON AS COCKING/
DOTHED,COWDUNG P IN DRY SEASON AS OTHER ACTS/DTOTD,TOTAL P OF
COWDUNG/DFERTW,COWDUNG P IN WET SEASON AS FERILIGER/DCOCKW,
COWDUNG P IN WET SEASON AS COOKING/DOTHEW,COWDUNG P IN WET SEASON
AS OTHER ACTS/DTOTW,TOTAL P OF COWDUNG/RCOGDRY,COWDUNG P RATIO IN
DRY SEASON/RCOGWET,COWDUNG P RATIO IN WET SEASON/SELPD,SELF
BULLOCK FOR LAND PREP IN DRY SEASON/HBLPD,HIRED BULLOCK FOR LAND
PREP-DRY SEASON/DHBLPD,DAYS OF HIRING BULLOCK FOR L-PREP IN DRY S
EA/PHBLPD,HIRING PRICE OF BULLOCK IN L-PREP IN DRY/SBPHD,SELF BUL
LOCK FOR PADDY HUSKING IN DRY SEA/HBPHD,HIRED BULLOCK FOR PADDY H
USKING IN DRY/DHBPHD,DAY OF HIRING BLK FOR PAD-HUSKING IN DRY
PHBPHD,BLK HIRING PRICE FOR PAD HUSKING IN DRY/SBDCD,SELF BULLOCK
FOR DRAWING CART IN DRY SEA/HBDCD,HIRED BULLOCK FOR DRAWING CART
IN DRY/DHBDCD,BLK HIRING DAYS FOR DRAWING CART IN DRY/PHBDCD,BLK
HIRING PRICE IN DRAWING CART IN DRY/SBLPW,SELF BULLOCK FOR LAND
PREP IN WET/HBLPW,HIRED BULLOCK IN LAND-PREP IN WET SEASON/
DHBLPW,DAYS OF HIRING BLK FOR LAND-PREP IN WET/PHBLPW,PRICE OF HI
RING BLK FOR L-PREP IN WET/SBPHW,SELF BULLOCK FOR PADDY HUSKING I
N WET/HBPHW,HIRED BULLOCK FOR PADDY HUSKING IN WET/DHBPHW,DAYS OF
HIRING BLK FOR PAD-HUSKING IN WET/PHBPHW,BLK HIRING PRICE FOR PA
D-HUSKING IN WET/SBDCW,SELF BULLOCK FOR DRAWING CART IN WET/
HBDCW,HIRED BULLOCK FOR DRAWING CART IN WET/DHBDCW,BLK HIRING DAY
S FOR DRAWING CART IN WET/PHBDCW,BLK HIRING PRICE FOR DRAWIG CART
IN WET/

PHBDCW,BLK HIRING PRICE FOR DRAWIG CART
IN WET/CRIDANI,CRISIS OF DRAFT ANIMAL/PRECRI,NO.OF PRESENT CRISIS
DRY/WBOILD,WOOD FUEL SPENT IN PARBOILING IN DRY/WCTHED,WOOD FUEL
CRISIS OF DRAFT ANIMAL/WCOOKD,WOOD FUEL SPENT FOR FOOD COOKING IN
DRY/WBOILD,WOOD FUEL SPENT IN PARBOILING IN DRY/WCTHED,WOOD FUEL
SPENT IN OTHER-ACT IN DRY SEA/TOTWD,TOTAL WOOD FUEL SPENT IN DRY
SEASON/OWNEDWD,OWNED AMOUNT OF WOOD FUEL IN P IN DRY/PURWD,PURCHA
SED WOOD FUEL IN P IN DRY /COLLWD,COLLECTED WOOD FUEL IN P IN DRY
SEASON/TCOOKD,TREE BRANCHES FOR FOOD COOKING IN DRY/TBOILE,TREE B
RANCHES FOR PADDY PARBOILING-DRY S/TOTHED,TREE BRANCHES FOR OTHER
ACTS IN DRY SEA/TOTTD,TOTAL TREE BRANCHES SPENT IN DRY SEASON/
OWNEDTD,OWNED TREE BRANCHES IN P IN DRY SEASON/PURTD,PURCHASED TR
EE BRANCHES IN P IN DRY SEA/COLLTD,COLLECTED TREE BRANCHES IN P I
N DRY SEA/STCOOKD,STRAW SPENT FOR FOOD COOKING IN DRY SEA/STBOILD
,STRAW FOR PADDY PARBOILING IN DRY SEASON/STOTHED,STRAW FOR OTHER
ACTIVITIES IN DRY SEASON/TOTSTD,TOTAL STRAW SPENT IN DRY SEASON-W
D/OWNEDSTD,OWNED STRAW IN P IN DRY SEASON/PURSTD,PURCHASED STRAW
IN P IN DRY SEASON/COLLSTD,COLLECTED STRAW IN P IN DRY SEASON/
RCOOKD,RICE HULLS SPENT FOR FOOD COOKING IN DRY/RBOILD,RICE HULLS
SPENT IN PADDY PARBOILING IN DRY/TOTRD,TOTAL RICE HULLS SPENT IN
DRY SEASON/OWNEDRD,OWNED RICE-HULLS IN P IN DRY SEASON/PURRD,PURC
HASED RICE-HULLS IN P IN DRY SEASON/COLLRD,COLLECTED RICE-HULLS I
N P IN DRY SEASON/JCOOKD,JUTE STICKS SPENT IN FOOD COOKING IN DRY
/JBOILD,JUTE STICKS FOR PADDY PARBOILING IN DRY/JOTHED,JUTE STICK
S FOR OTHER ACTIVITIES IN DRY/TOTJD,TOTAL JUTE STICKS SPENT IN DR
Y SEASON/OWNEDJD,OWNED JUTE STICKS IN P IN DRY SEASON/PURJD,PURCH
ASED JUTE STICKS IN P IN DRY SEASON/COLLJD,COLLECTED JUTE STICKS
IN P IN DRY SEASON/OCOOKD,OTHER ENERGY SPENT FOR FOOD COOKING-DRY
/OBOILD, OTHER ENERGY FOR PADDY PARBOILING IN DRY/OOTHED,OTHER EN
ERGY FOR OTHER ACTIVITIES IN DRY/TOTOD,TOTAL OTHER ENERGY SPENT I
N DRY SEASON/OWNEDOD,OWNED OTHER ENERGY IN P IN DRY SEASON/PUROD,
PURCHASED OTHER ENERGY IN P IN DRY SEA/COLLOD,COLLECTED OTHER ENE
RGY IN P IN DRY SEA/WCOOKW,WOOD FUEL SPENT IN FOOD COOKING IN WET
SE/WBOILW,WOOD FUEL FOR PADDY-PARBOILING IN WET SE/WOTHEW,WOOD FU
EL FOR OTHER ACTIVITIES IN WET SE/TOTWW,TOTAL WOOD FUEL SPENT IN
WET SEASON/OWNEDWW,OWNED WOOD FUEL IN P IN WET SEASON/PURWW,PURCH
ASED WOOD FUEL IN P IN WET SEASON/COLLWW,COLLECTED WOOD FUEL IN P
IN WET SEASON/TCOOKW,TREE BRA S LEA FOR FOOD COOKING IN WET /
FBOILW,TREE BAL FOR PADDY PARBOILING IN WET S/TOTHEW,TREE BAL FOR
OTHER ACTIVITIES IN WET S/TOTTW,TOTAL TREE BAL SPENT IN WET SEASO
N/OWNEDTW,OWNED AMOUNT OF TREE BAL IN P IN WET S/PURTW,PURCHASED

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TREE B&L IN P IN WET SEASON/COLLTW,COLLECTED TREE B&L IN P IN WET SEASON/STCOOKW,STRAW SPENT FOR FOOD COOKING IN WET S/STBOILW,STRAW SPENT FOR PADDY PARBOILING IN WET S/STOTHEW,STRAW SPENT FOR OTHER ACTIVITIES IN WET S/TOTSTW,TOTAL STRAW SPENT IN WET SEASON/OWNEDSTW,OWNED AMOUNT OF STRAW IN P IN WET SEASON/PURSTW,PURCHASED AMOUNT OF STRAW IN P IN WET S/COLLSTW,COLLECTED AMOUNT OF STRAW IN P IN WET S/RCOOKW,RICE-HULLS SPENT FOR FOOD COOKING IN WET/RBOILW,RICE-HULLS FOR PADDY PARBOILING IN WET S/ROTHEW,RICE-HULLS FOR OTHER ACTIVITIES IN WET S/TOTRW,TOTAL RICE-HULLS SPENT IN WET SEASON /OWNEDRW,OWNED RICE-HULLS IN P IN WET SEASON/PURRW,PURCHASED RICE-HULLS IN P IN WET SEASON/COLLRW,COLLECTED RICE-HULLS IN P IN WET SEASON/JCOOKW,JUTE STICKS FOR FOOD COOKING IN WET S/JBOILW,JUTE STICKS FOR PADDY PARBOILING IN WET/JOTHEW,JUTE STICKS FOR OTHER ACTIVITIES IN WET/TOTJW,TOTAL JUTE STICKS SPENT IN WET SEASON/OWNEDJW,OWNED JUTE STICKS IN P IN WET SEASON/PURJW,PURCHASED JUTE STICKS IN P IN WET S/COLLJW,COLLECTED JUTE STICKS IN P IN WET S/OCOOKW,OTHER ENERGY FOR FOOD COOKING IN WET S/OBOILW,OTHER ENERGY FOR PADDY PARBOILING IN WET/OOTHEW,OTHER ENERGY FOR OTHER ACTIVITIES IN WET S/TOTOW,TOTAL OTHER ENERGY SPENT IN WET SEASON/OWNEDOW,OWNED OTHER ENERGY IN P IN WET SEASON/PUROW,PURCHASED OTHER ENERGY IN P IN WET S/COLLOW,COLLECTED OTHER ENERGY IN P IN WET S/TKFOREN,TOTAL TAKA SPENT FOR PURCHASING ENERGY/AMOFEN,TOTAL ENERGY PURCHASED IN LAST YEAR-1985/ONCHUD,NO. OF 1 MOUTH CHULA USED IN DRY SEASON/PA,PLACE OF CHULA IN DRY SEASON/TMCHUD,NO OF 2 MOUTH CHULA USED IN DRY SEASON/PB,PLACE OF CHULA IN DRY SEASON/MCHUD,NO OF MOVABLE CHULA USED IN DRY SEASON/PC,PLACE OF CHULA IN DRY SEASON/KCHUD,NO OF KEROSENE CHULA USED IN DRY SEASON/PD,PLACE OF CHULA IN DRY SEASON/OCHUD,NO OF OTHERS CHULA USED IN DRY SEASON/PE,PLACE OF CHULA IN DRY SEASON/ONCHUW,NO OF 1-MOUTH CHULA USED IN WET SEASON/POA,PLACE OF CHULA IN WET SEASON/TMCHUW,NO OF 2-MOUTH CHULA USED IN WET SEASON/PCB,PLACE OF CHULA IN WET SEASON/MCHUW,NO OF MOVABLE CHULA USED IN WET SEASON/POC,PLACE OF CHULA IN WET SEASON/KCHUW,NO OF KEROSENE CHULA USED IN WET SEASON/POC,PLACE OF CHULA IN WET SEASON/OCHUW,NO OF OTHERS CHULA USED IN WET SEASON/POE,PLACE OF CHULA IN WET SEASON/KUPI,NO. OF KUPI USED/KUPIH,AVERAGE RUNNING HOURS OF KUPI PER DAY/HURICAN,NO. OF HURRICANE USED/HURICANH,AV. RUNNING HOURS OF HURRICANE PER DAY/IRON,NO. OF IRON USED/IRONH,AVERAGE RUNNING HOURS OF IRON PER DAY/FAN,NO. OF FAN/FANH,AVERAGE RUNNING HOURS OF FAN PER DAY/BULB,NO. OF BULBS/BULBH,AVERAGE RUNNING HOURS OF BLLBS PER DAY/RADIO,NO. OF RADIO/RADIOH,AVERAGE RUNNING HOURS OF RADIO PER DAY/T.V,NO. OF T.V/T.VH, AVERAGE RUNNING HOURS OF T.V PER DAY/HEATER,NO. OF HEATER/HEATERH,AV.RUNNING HOURS OF HEATER PER DAY/MOTOR,NO. OF ELECTRIC MOTOR/MOTORH,AV. RUNNING HOURS OF EL. MOTOR PER DAY/OTHER,NO. OF OTHERS/OTHERH,AV. RUNNING HOURS OF OTHERS PER DAY/MOTORCY,MOTOR CYCLE AVILABLE OR NOT/MOTORCYC,FUEL COST OF MOTOR CYCLE PER MONTH/KCOOKD,KEROSENE USED FOR COOKING IN DRY SEASON/KLIGHTD,KEROSENE USED FOR LIGHTING IN DRY S/TOTKD,TOTAL KEROSENE USED IN DRY SEASON/DICOKD,AMT OF DIESEL USED FOR COOKING IN DRY S/OLIGHTD,DIESEL USED FOR LIGHTING IN DRY SEASON/TOTDC,TOTAL DIESEL USED IN DRY SEASON/ECOOKD,ELECTRICITY USED FOR COOKING IN DRY SEASON/ELIGHTD,ELECTRICITY USED FOR LIGHTING IN DRY SEASON/TOTED,TOTAL ELECTRICITY USED IN DRY SEASON/KCOOKW,KEROSENE USED FOR COOKING IN WET SEASON/KLIGHTW,KEROSENE USED FOR LIGHTING IN WET SEASON/TOTKW,TOTAL KEROSENE USED IN WET SEASON/DICOKW,DIESEL USED FOR COOKING IN WET SEASON/OLIGHTW,DIESEL USED FOR LIGHTING IN WET SEASON/TOTDW,TOTAL DIESEL USED IN WET SEASON/ECOOKW,ELECTRICITY USED FOR COOKING IN WET SEASON/ELIGHTW,ELECTRICITY USED FOR LIGHTING IN WET SEASON/TOTEW,TOTAL ELECTRICITY USED IN WET SEASON/RICE,AMOUNT OF RICE REQUIRED FOR HOUSEHOLD/FLOUR,AMOUNT OF FLOUR REQUIRED FOR HOUSEHOLD/PULSES,AMOUNT OF PULSES REQUIRED FOR HOUSEHOLD/SALT,AMOUNT OF SALT REQUIRED FOR HOUSEHOLD/MCOOKH,HOURS TAKEN FOR MCURING COOKING/NCOOKH,HOURS TAKEN FOR NOON COOKING/AFCOOKH,HOURS TAKEN FOR AFTERNOON COOKING/NTCOOKH,HOURS TAKEN FOR NIGHT COOKING/TOTCOKH,TOTAL HOURS TAKEN FOR COOKING/VARA,TOTAL FRUIT AND TIMBER TREES/VARB,TOTAL TREES/VARC,YEARLY INCOME OF HOUSEHOLD-HEAD/VARD,OWN LAND OF HOUSEHOLD-HEAD IN ACRE/VARE,HOMESTEAD LAND AREA IN ACRE/VARF,TOTAL CULTIVATED LAND IN ACRE/

VARS,NO TREES/VARF,UNCODED HOMESTEAD LAND AREA/VARG,UNCODED TOTAL TREES/VART,AUS LAND AREA IN ACRE/VARU,AMAN LAND AREA IN ACRE/VARV,TRADITIONAL BORO LAND AREA IN ACRE/VARW,IRRIGATED BORO LAND AREA IN ACRE/VARX,JUTE LAND AREA IN ACRE/VARY,OTHERS LAND AREA IN ACRE/VA,TOTAL AUS RICE PER FAMILY MEMBER/VB,TOTAL AMAN RICE PER FAM. MEMBER/VC,TOTAL TRADITIONAL BORO RICE/VD,IRRIGATED BORO RICE PER F. MEMBER/VE,TOTAL JUTE PER FAMILY MEMBER/VF,TOTAL RESIDUES PER F. MEMBER/RESA,AUS PLANT RESIDUES/RESB,AMAN PLANT RESIDUES/RESC,TRA. BORO PLANT RESIDUES/RESD,IRRI. BORO PLANT RESIDUES/RESE,JUTE PLANT RESIDUES/RESF,

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                OTHER PLANT RESIDUES/VG,AUS HUSK RESIDUES/VH,AUS BRAN RESIDUES/
                VI,AMAN HUSK RESIDUES/VJ,AMAN BRAN RESIDUES/VK,T. BORO HUSK RESID
                UES/VL,T. BORO BRAN RESIDUES/VM,IRRI. BORO HUSK RESIDUES/VN,IRRI.
                 BORO BRAN RESIDUES/VC,NO ANIMAL/VP,TOTAL CATTLE/VQ,TOTAL GOAT+SH
                EEP/VR,OWN DRAFT POWER FOR L. PRE PER YR/VS,OWN D. POWER PER YR.
                 FOR THRESHING/VT,OWN D. POWER PER YR FOR TRANSPORT/VU,HIRED BULK
                 PER YR IN L. PREP/VV,HIRED BULK PER YR FOR THRESHING/VW,HIRED BU
                LK PER YR FOR TRANSPORT/VX,NO. OF ACULT CATTLE AND BUFFALOE/
                TCAB,TOTAL CATTLE AND BUFFALOES/XS,TOTAL BOIMASS PER PERSON FOR
                DRY SEA/XZ,TOTAL BIOMASS PER PERSON FOR WET SEA/CA,FUELWOOD CONS.
                 PER YR/CB,TWIGS+LEAVES C PER YR/CD,STRAW C PER YR/CE,HUSK C. PER
                 YR/CF,JUTE STICKS C. PER YR/CG,OTHER RESIDUES C. PER YR/
                OWN,OWNED BIOMASS IN P PER YR/GATHER,GATHERED BIOMASS IN P PER YR
                /PURCH,PURCHASED BIOMASS IN P PER YR/COOK,BIOMASS FOR FOOD COOKIN
                G PER YR/BOIL,BIOMASS NEED FOR PAREOILING PER YR/CTHER,OTHER BIO
                MASS PER YR/CR,ALL BIOMASS PER YR GJ P YR /CW,TOTAL KEROSENE IN
                 KG PER YR/CX,TOTAL KEROSENE IN LITRE PER YR/CY,ELECTRICITY IN
                KWH PER YR/DA,KEROSENE FOR COOKING IN KG PER YR/DB,KEROSENE FOR C
                OOKING IN LITRE PER YR/DC,KERO. FOR COK PER YR PER H. MEMBER/
                OD,KERO FOR COOK PER YR PER H. MEMBER/DE,KEROSENE FOR LIGHTING IN KG
                 PER YR/DF,KERO FOR LIGHTING IN LITRE PER YR/DG,KERO F LIGHT IN K
                G PER H. MEM/DH,KERO F LIGHT IN LITRE PER H. MEM/DI,ELECTRICITY
                 COOKING PER YR/DJ,ELECTRICITY F COCKING PER H. MEM PER YR/
                DK,ELECTRICITY FOR LIGHTING PER YR/DL,ELEC. F LIGHT PER H-MEM PER
                 YR/DM,RICE IN KG P YR/DN,RICE IN GJ P YR/DC,ATA IN KG P YR/
                DP,ATA IN GJ P YR/DQ,DAL IN KG P YR/DR,DAL IN GJ P YR
VALUE LABELS    SEX (1)MALE (2)FEMALE/AGE (1)LESS THAN 18 YEARS (2)BET 20-29 (3)B
                ET 30-39 (4)BET 40-49 (5)ABOVE 50 YEAPS/VARC (1)LANDLESS (2)0-0.5
                 ACRE (3)0.5-1 ACRE (4)1-1.5 ACRE (5)1.5-2.5 ACRE (6)2.5-7.5 ACRE
                 (7)7.5+ ACRE/TYOF (1)NUCLEUS FAMILY (2)EXTENDED FAMILY
                (3)COMBINED FAMILY /MOCCUP (1)AGRICULTURE (2)BUSINESS (3)SERVICE
                 (4)FARM LABOUR (5)OTHER LABOUR (6)ALL CRAFTS (7)ACTIVE UNEMPLOY
                MENT (8)INACTIVE /SECOCCUP (1)AGRICULTURE (2)BUSINESS (3)SERVICE
                (4)FARM LABOUR (5)OTHER LABOUR (6)ALL CRAFTS (7)ACTIVE UNEMPLOYME
                NT (8)INACTIVE /ROOFMAT (1)CORRUGATED IRON SHEET (2)STRAW OR LEAV
                ES (3)CONCRETE (4)OTHERS /SOURCW (1)POND OR RIVER (2)MUD WELL
                (3)PUCCA WELL (4)HAND TUBEWELL (5)DEEP TUBEWELL /DCAV (1)YES
                (2)NO /
                 SCRISIS (1)DRY SEASON (2)WET SEASON
                (3)BOTH SEASON/
                                                PA (1)INSIDE (2)OUTSIDE (3)BOTHSIDE
                /PB (1)INSIDE (2)OUTSIDE (3)BOTHSIDE /PC (1)INSIDE (2)OUTSIDE
                (3)BOTHSIDE /PD (1)INSIDE (2)OUTSIDE (3)BOTHSIDE /PE (1)INSIDE
                (2)OUTSIDE (3)BOTHSIDE /PCA (1)INSIDE (2)OUTSIDE (3)BOTHSIDE /
                PDB (1)INSIDE (2)OUTSIDE (3)BOTHSIDE /PCC (1)INSIDE (2)OUTSIDE
                (3)BOTHSIDE /PDD (1)INSIDE (2)OUTSIDE (3)BOTHSIDE /PDE (1)INSIDE
                 (2)OUTSIDE (3)BOTHSIDE /VARC (1)0-5999 TK (2)6000-17999 TK
                (3)18000-29999 TK (4)30000-59999 TK (5)60000 TK +
                /VARD (1)LANDLESS (2) 0-0.5 ACRE (3) 0.5-1 ACRE (4) 1-1.5 ACRE
                 (5) 1.5-2.5 ACRE (6) 2.5-7.5 ACRE (7) 7.5 + ACRE /
                VARE (1)LANDLESS (2)0-0.005 ACRE (3)0.005-0.1ACRE
                 (4)0.1-0.5 ACRE (5)0.5-1 ACRE (6)1-1.5 ACRE (7)1.5+ ACRE /
                VARB (1)NONE (2)1-5 (3)6-10 (4)11-20-(5)21-40 (6)41-60 (7)61+ /
                     SD1,SD2 (1)OWN SOURCE (2)PURCHASED
                (3)GATHERED FROM OTHERS (4)NOT APPLICABLE /
                MD1,MD2 (1)HIRED (2)EXCHANGE (3)PURCHASE (4)NO RESPONSE
                (5)NOT APPLICABLE (6)LENDING
ASSIGN MISSING  VARA,VAPB (999)/
                VARO TO VARQ (999)/
                VART TO VN (555)/
                VP,VQ (995)/
                VR TO VW(777)/VX TO TCAB(999)/VDX(959)/CCAB(999)/NEK(995)
MISSING VALUES  OTGERT TO TOTTIM (99,9)/
                LNDOTCM TO TOCL(99,999)/
                LUNAUS TO TPORES(888,888,888)/
                NBTOTW TO TNSHEEP(9,99)/OFERTO TO RCCOWET(66,666,66)/
                SPLMD TO PHBOCW(77)/CPICANI(3)/PRECPI(0)/CPI(3)(4)/
                TKIOREN TO AMCREN(999)/TAGAUST(888)/TAMANST(888)/TIRBOST(888)/
                TIRPOST(888)/SD1,SD2 (4)/
                MD1,MD2 (5)
PRINT FORMATS                   VARE,VOL (3)/VARI TO VARY (3)/VA TO VI (3)/
                RESA TO RESF (3)/VG TO VN (3)/XY TO X7 (3)/CA TO CC (3)/
                COOK,BOIL,OTHER (3)/CR TO CY (3)/DA TO DI (3)/KICE (1)/
                MCOOKH TO TOTCOOKH (2)/FM,DX (4)
RUN SUBFILES    EACH
LIST CASES      CASES=1001/VARIABLES=MCOOKH TO TOTCOOKH
CROSSTABS       TABLES MCOOKH TO TOTCOOKH BY VAR
OPTIONS         3,4,9
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