

BIBLIOGRAPHIC DATA SHEET
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Africa Energy Survey Methodology

Appendix II

DATA BASE



Volume Two

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OUTPUT 1

TO MEASURE HOUSEHOLD AND VILLAGE DEMOGRAPHIC, ECONOMIC, CLIMATIC AND POLITICAL INDICATORS.

I POPULATION

1. Number of People in Household

How many people live in the household being considered?

- 1) 1-2
- 2) 3-5
- 3) 6-10
- 4) More than 10

For the time period under consideration, did the size of the household remain the same? Fluctuate by how much?

- 1) stayed the same
- 2) grew by one
- 3) grew by 2-3
- 4) decreased by 1
- 5) decreased by 2-3
- 6) decreased by more than 3

2. Age Distribution

What is the breakdown of household members by age?

By sex?

Sex

Age

What are the relationships of these people to the head of the household? _____

3. Religious Affiliation

4. Family Form and Relationships

Relationship	Age (yrs)	Relationship	Age (yrs)
Head Male		Head Female	
Grand-father		Grand-mother	
Father		Mother	
Son		Daughter	
Brother		Sister	
Uncle		Aunt	
Nephew		Niece	

Household

Particulars of the family

Occupation £		Education and Training	Income cash	Income kind	Total Income
Main	Subsidiary				
A Agriculturalist	A	a Illiterate (with no training)			
B Tailor	B	b Illiterate (with training in agriculture)			
C Blacksmith	C	c Illiterate (with training in non-agriculture)			
D Mason	D	d Literate with postal education			
E Weaver	E	e up to primary school			
F Cobbler	F	f up to middle school			
G Potter	G	g up to matriculation			
H Washerman	H	h up to college			
I Block Making	I	i Post graduate			
J Flour Mills	J	j Professional training: Agricultural			
K Basket Making	K	k Professional training: non-agricultural			
L Grain Grinding	L	l unemployed			
M Cur Making	M	m 9 months underemployment			
N Oil extracting	N	n 6 months underemployment			
O Poultry	O	o 3 months underemployment			
P Piggery	P				
Q Dairy	Q				
R Hotel	R				
S Retail Shop	S				
T Arrack Shop	T				
U Agricultural labourer	U				

Relationship	Age (yrs)	Relationship	Age (yrs)
Cousin - Male		Cousin - Female	
Father-in-law		Mother-in-law	
Son-in-law		Daughter-in-law	
Brother-in-law		Sister-in-law	
Other relatives - male		Other relatives - female	
Unrelated male		Unrelated female	

5. Sex Distribution

6. Ethnic Group

7. Number of Households in Village

What is the population of the village and surrounding area? (surrounding area includes those folks who primarily use the facilities of the village for their needs)

- | | |
|------------|-----------------|
| 1) 0-99 | 1000-4999 |
| 2) 100-499 | |
| 3) 500-999 | 5000 or greater |

8. Age Distribution

Please indicate the approximate age patterns of the area under 10 years of age:

10-20 years of age

20-50 years of age

50 years and over

1) less than 10%

2) 10-25%

3) 26-50%

4) 50 or more

9. Sex Distribution

10. Ethnic Groups + Religion

What ethnic groups live in the area? Approximate percentage of each. _____

What is the major religion(s) in the area?

II INCOME, WEALTH, & ECONOMIC ACTIVITIES

1. Income Generating Activities

What is the primary source of income for the household?

1) agriculture

2) self-owned small business

3) employment (specify) _____

2. Total Income

Are there secondary sources of income?

Yes

No

Identify them _____

Do the young people/children perform economic (income generating and non-income generating) services for the family?

Yes

No

If no, describe them _____

What percentage (%) of the household income do they make up?

Under 10

10-25

25-50

3. Livestock Owned

LIVESTOCK INVENTORY

Animal	Number	Approximate Value Rs
Bullocks		
Buffaloes		
Cows		
Heifers/Calves		
Poultry Birds		
Sheep/Goats		
Pigs		
Donkeys		
Other Animals		
Other Birds		

Inputs for Livestock

Food	Unit of consumption (code)	CONSUMPTION				PURCHASE		
		Quantity consumed	Period of Consumption			Unit of Purchase	Quantity bought per month	Distance of source of purchase (kms)
			Day	Week	Month			
Jowar Fodder								
Ragi Fodder								
Paddy Fodder								
Tendu								
Concentrates (horse-grass and Groundnut cake)								

8

• How many days does a cart load of Jowar/Ragi/Paddy Fodder last?

4. Land Owned

5. Houses Owned

6. Location and Operation of Village Market Place

There are in the village approximately how many?

- | | |
|----------------|----------------|
| Restaurants | (1) None |
| | (2) 1-5 |
| | (3) 6-20 |
| | (4) 21-50 |
| Bars/Tea shops | (5) 51 or more |

Bakeries

7. Allocation of Grazing Land

8. Ownership and Availability of Resources (i.e., water, food, land)

9. Barter

III EMPLOYMENT AND EDUCATION

1. Occupations

2. Length of Employment

3. Education

4. Literacy

IV GEOGRAPHIC, CLIMATIC AND POLITICAL

1. Area Owned/Possessed by Village

2. Type of Cooperative Organizations in Village

Are there existing cooperatives/cooperative-type groups in the village?

Yes

No

If yes, for what activities? (specify)

How many such organizations are there?

One

Two

Three

Four or More

Is the land worked cooperatively?

Yes

No

3. Agricultural Period (i.e., planting, harvesting, etc.)

Is this a period of:

- 1) Planting
- 2) Growing
- 3) Harvesting
- 4) Fallowing
- 5) Other

4. Local Climatic Conditions

What have the weather conditions been during this period?

- 1) Hot/Dry
- 2) Hot/Rainy
- 3) Mild/Dry
- 4) Cold/Dry
- 5) Cold/Rainy

Did these weather patterns affect the "normal" course of energy use activities in the village?

Yes

No

In what way? (Please describe)

- 1) A greater need for fuel
- 2) A lesser need for fuel

MACRO-ANALYSIS

Background Information About the Region in Question

- Less than 9 square kilometers _____
- 25 square kilometers _____
- 500 square kilometers _____
- 100 square kilometers _____
- More (give approximate figure) _____
- Please sketch below the approximate boundaries of the region on the map provided.

- Approximately how many households reside within the region?

less than 50 _____

100 _____

500 _____

1,000 _____

5,000 (25,000 people) _____

If you can give a more accurate estimate, write the figure in the space provided _____

Geography

- How large is the country? _____ square miles.
- Describe its major geographic regions including regional topography.

- Describe the climate:
What are the major seasonal variations that affect agriculture, transportation, heating?

- What are the seasonal temperature and rainfall averages and ranges?

- Describe the available water resources: underground, surface, riverine, coastal.

- What are the country's non-energy major mineral resources?

What is the annual commercial value of production:

	<u>\$</u>	<u>Tons</u>
1965	_____	_____
1975	_____	_____
Projected 1985	_____	_____

What are the development goals for known reserves of commercial minerals?

Who owns the means of production?

Population

- What is the current population? _____. The growth rate in the last five years _____%/year.

Projected Population: 1985 _____
1990 _____
2000 _____

What percent of population is rural _____
urban _____

	<u>Urban</u>	<u>Rural</u>
1965	_____	_____
1977	_____	_____
Projected 1985	_____	_____

Family Form

- What is the major family form of the area?

Nuclear

Extended

Other (specify) _____

What part of this is attributable to urban migration?

- Describe the current and projected age groups as fractions of the population:

	<u>1965</u>	<u>1975</u>	<u>Projected 1985</u>
15 Years	_____	_____	_____
15-35	_____	_____	_____
35-45	_____	_____	_____
45	_____	_____	_____
	100%	100%	100%

Education

- What is literacy rate? Describe literacy program:

- What educational facilities exist in the village?

	Yes	No
Primary		
Secondary		
Agricultural		
Technical		
Apprenticeships		
Other		

- For each school there, is it operated by a private organization, or the government?

	Private	Government
Primary		
Secondary		
Agricultural		
Technical		

- Do any of the schools sponsor cooperative activity programs for their students; e.g., school gardens?
If so, please describe:

Public Utilities

Is there a Post Office in the village?

Yes

No

Economy

- What are the major economic activities of the village?

Agriculture
Commercial Retail
Shops/Trading
Manufacturing Shop
Other (specify)

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- What percent of the families in the area have farming as the primary economic activity?

- 1) Less than 10
- 2) 10-25%
- 3) 26-50%
- 4) More than 50%

- What percent of the families in the area have government employment as the primary economic activity: (e.g., ag. extension worker, teacher, etc.)

- 1) Less than 10%
- 2) 10-20%
- 3) 20-30%
- 4) more than 30%

- What percent of the families in the area have small retail businesses as the primary economic activity?

- 1) Less than 10%
- 2) 10-20%
- 3) 20-30%
- 4) More than 30%

- Is the village on a major trade route?

Yes

No

- Does the village hold a regular market? If so, how often:

Often

Daily

Twice a Week

Once a Week

Less than once a week

- Is this considered the major market for the area?

Yes

No

- How, in general, is the land owned?

Communal

Individual/Private

Government

Other (specify)

We want you to arbitrarily divide all households into lower income and upper income units. Upper income refers to households which own enough property to provide food, clothing, and shelter for household members. Any household not identified with the upper income group should be classified as a member of lower income group.

Approximately what fraction of the total number of households belong to the lower income group?

1/3

2/3

None

All

If you can make a more refined estimate of the fraction give your answer in the space provided. _____

Comment briefly on any unusual conditions within the region. For example, is the region representative of neighborhood regions? If not, how is it different? Make any additional comments in the space provided. _____

What role does foreign participation (capital/management) play in the economy?

What is the role of the foreign assistance in the economy?

Describe the ownership (private, public) of the means of production, transportation, natural resources, etc., in the economy.

What fraction of the total national cost of imports is for oil? _____
for gas? _____

	<u>Oil</u>	<u>Gas</u>
	1965	
	1977	
Projected	1985	

● What are the major imports and exports? Are there major changes expected in particular commodities?

(a) How did the 1974 oil price increase affect the balance-of-payments?

(b) Is future energy availability perceived to be a major problem?

What has been employment rate of working age population?
What is current employment situation in rural and urban
areas?

How do energy consumption patterns (especially appliances, space cooling and lighting) change with personal income levels?

Is over-urbanization a current problem?

Yes _____

No _____

Anticipated within 10 years _____

Which cities are likely to suffer over-urbanization?

What is the current or anticipated immigration rate, and how much of this contributes to barrier growth?

Name of City	Annual Immigration		Fraction Contributing to Barrios	
	1978	1985	1978	1985
1.				
2.				
3.				
4.				
5.				

How extensive is the "recognized" home-building industry?

How many housing starts are anticipated for 1978?

Home Type	Number of Units to be Built in 1978
Single-family	
Multi-family	
Apartments	
Other	

What countries, commercial enterprises, or government agencies have major plans in the development of domestic non-energy resources?

Future Development Trends

What are national housing development plans and goals, particularly plans to construct additional public housing?

What have been growth trends in villages and farms, especially regarding the introduction of energy-consuming appliances and design features?

Are there any development plans for changing village structure or rural organization?

What plans have been made to assure economic growth in the light of high costs and potential energy shortages (particularly oil and natural gas) in the future?

What percentage of national budget is targeted for development efforts?

How much of the population is outside the nation's "money economy"? Describe the extent to which this portion of the population produces its own food, clothing, shelter, and fuel; in what regions are they found, what "cash crops" or goods are sold for money, and what are the primary purchased products (fuel, food, manufactured goods, etc.).

How important is barter in rural and urban commerce?

What other forms of non-monetary compensation are prevalent?

What is the current balance-of-payments?

What is the balance-of-payments trend?

What role does import/export of energy sources play in balance-of-payments?

What is current Gross National Product (GNP)? _____

Current Gross Domestic Product (GDP)? _____

Current per capita Income _____

What is projected growth rate:

	GNP	Per Capita Income
1985		
2000		

OUTPUT 2

II TO IDENTIFY AND QUANTIFY HOUSEHOLD ENERGY CONSUMPTION PATTERNS (Rural and Urban)

1. COOKING AND HEATING WATER.

1. Types of Cooking Utensils/Vessels

Describe cooking utensils/vessels. _____

2. Fuels Used in Cooking and Heating Water.

What fuel(s) is used for cooking?

Y - yes

N - no

- 1) firewood
- 2) charcoal
- 3) dung
- 4) kerosene
- 5) propane
- 6) Other (specify)

This section of the questionnaire deals with the fuels used in cooking (which we take to include the fuels consumed in hot water preparation and heating).

a) What fuels are customarily used by upper income households for cooking, and what fraction of all upper income households use each fuel?

	0	1/3	2/3	1
Wood	_____	_____	_____	_____
Dung	_____	_____	_____	_____
"Commercial Fuel"	_____	_____	_____	_____
Other (give name)	_____	_____	_____	_____

What fuels are used consistently by lower income households for cooking, and what fraction of all lower income households use for each fuel?

	0	1/3	2/3	1
Wood	_____	_____	_____	_____
Dung	_____	_____	_____	_____
"Commercial Fuel"	_____	_____	_____	_____
Other (give name)	_____	_____	_____	_____

What fuels are used to heat water?

- 1) firewood
- 2) charcoal
- 3) dung
- 4) kerosene
- 5) propane
- 6) electricity
- 7) other (specify) _____

3. Amount of Fuel Used in Cooking and Heating Water

Fuels	Percentage used for	
	Cooking	Heating water:
For how many days does 1 maund of firewood last		
For how many days does 1/2 maund of firewood last		
HUSK: per day consumption of husk (in acru)		
For how many days does 1 gunny bag of husk last		
Dung: No of dung cakes used per day		
Coaking coal: for how many days does an ovenful of coal last		
Vegetable wastes: for how many days did your produce last		
For how many days do you use one cart load of veg wastes		
Kerosene oil: consumption per month (in lit.)		

4. Type of Cooking Facilities

Describe domestic cooking facilities? _____

5. Time Spent in Cooking

How many hours a day are spent in the average upper income household for cooking?

0-3 hours _____
3-6 hours _____
6-9 hours _____
Other _____ (give figure)

If you can provide a more refined estimate, do so.

6. Kind and Amount of Food Cooked _____

7. Cooking Methods

What fraction of all lower income households use which devices for heating/cooking?

	0	1/3	2/3	1
Open hearth	_____	_____	_____	_____
Wood stove	_____	_____	_____	_____
Commercial fuel stove	_____	_____	_____	_____
Other (give name)	_____	_____	_____	_____

What fraction of all upper income households use which devices for heating/cooking?

	0	1/3	2/3	1
Open hearth	_____	_____	_____	_____
Wood stove	_____	_____	_____	_____
Commercial Fuel Stove	_____	_____	_____	_____
Other (give name)	_____	_____	_____	_____
8. <u>Fuel Costs</u>	_____	_____	_____	_____
Open hearth	_____	_____	_____	_____
Wood Stove	_____	_____	_____	_____
Commercial Fuel Stove	_____	_____	_____	_____
Other (give name)	_____	_____	_____	_____

9. Method of Obtaining Fuel

How is the fuel obtained?

Y N

purchased

collected

both

other (specify)

10. Amount of Water Heated

Yes No

people

cooking/eating utensils

clothing

other (specify) _____

Yes	No

Amount of water is heated/day (in liters)

- 1) 0 liter
- 2) 1-5 liters
- 3) 5-10 liters
- 4) more than 10 liters

How many days/month is water heated?

- 1) 0
- 2) 1-5
- 3) 5-10
- 4) 10-20
- 5) 20-30

Appliance	Regularly used	Occasionally used	Estimated volume of appliance (in liter)	Average no of days one filling lasts
Open Chulih				
Closed Chulih				
Wick-fed Kerosene Stove				
Kerosene Stove				
Open-wick Lamp				
Chimney lantern				
Kerosene lantern				
Electric Heater				
Others (specify)				

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Cooking, Lighting

Elwood - Lewis	Village number
	Questionnaire number
	used for cooking
	used for lighting
	used for heating
	source (code)
	Bought in the village
	Bought outside the village
	Distance from the village
	used for cooking
	used for lighting
	used for water heating
source (code)	
Bought in the village	
Bought outside the village	
Distance from the village	
used for cooking	
used for lighting	
used for water heating	
source (code)	
Bought in the village	
Bought outside the village	
Distance from the village	
used for cooking	
used for lighting	
used for water heating	
source (code)	
Bought in the village	
Bought outside the village	
Distance from the village	
used for cooking	
used for lighting	
used for water heating	
source (code)	
Bought in the village	
Bought outside the village	
Distance from the village	

Fuel Uses and Places of Purchase

Card Design

II. LIGHTING

1. For what activities in general is the lighting used?

1. Type of Lighting Fixture.

2. Kind and Amount of Fuel Used.

How are the needs for lighting met in the household?

- 1) candle
- 2) firewood
- 3) kerosene lamp
- 4) propane lamp
- 5) electricity
- 6) other

3. Method of Obtaining Fuel.

How is fuel obtained?

- 1. Purchased
- 2. collected by household members
both % of each _____
- 3. other (specify) _____

5. Time period in Which Lighting is Used.

For what period of time is the need for lighting?

- 1) early morning
- 2) early evening
- 3) all evening

III HEATING AND COOLING.

1. When and for How Many Hours is Heating/Cooling Needed.

Is there a need for heating the house during this period?

Yes

No

When during the day/evening is the heating needed?

- 1) early morning
- 2) all day
- 3) early evening
- 4) all evening
- 5) all night

How many hours a day/evening is the heating needed?

1-4 hours

4-8 hours

8-12 hours

12-16 hours

16-20 hours

2. Type of Heating/Cooling Facility

Describe the domestic heating facility. _____

3. Type of Fuel Used

What type of fuel is used?

firewood

charcoal

dung

kerosene

propane

electricity

other

4. Method of Obtaining Fuel.

How is the fuel obtained?

purchased

collected by household member

both (% of each) _____

other (specify) _____

5. Fuel Costs.

IV WATER LIFTING AND TRANSPORTATION.

1. Where is Water Obtained.

Where does the family unit obtain its water?

- 1) stream
- 2) well
- 3) pond
- 4) rainfall
- 5) central village supply
- 6) piped into house
- 7) other (specify)

If from more than one source what % approximately from each?

- | | |
|------------------|------------------------|
| 1) less than 10% | stream |
| 2) 10-20% | well |
| 3) 21-30% | pond |
| 4) 31-50% | rainfall |
| 5) more than 50% | central village supply |
| | piped into house |
| | none of the above |

2. Types of Devices used in Obtaining and Transporting Water.

How is it transported (what equipment is used)? _____

How is it sorted? _____

WATER LIFTING

Labour Involved

Source of Water	No. of trips per day	No. of pots per trip	<u>Men</u>		<u>Women</u>		<u>Children</u>	
			Owned Labour	Hired Labour	Owned Labour	Hired Labour	Owned Labour	Hired Labour
Private well - with pump								
Private well - without pump								
Public well - with pump								
Public well - without pump								
State tube well - hand pump								
Pond/Tank/Lake								
Canal/River								

3. Fuel Costs for Water

Is there a cost for water?

Yes

No

If so, how much for what amount? _____

4. Fuel Used in Water Lifting and Transportation

5. Time Spent in Water Lifting and Transportation

6. Where is Fuel Obtained

7. Amount of Water Needed

Purpose.

Water that is used for drinking.

Is it filtered?

Is it distilled?

Is it treated in another way?

(specify) _____

What water is used for washing clothes?

stream

well

pond

waterfall

rainfall

other (specify) _____

V FOOD GRINDING (NON-COMMERCIAL)

1. Types of Food that are ground

What crops/grains does the family need to have ground?

(do not include herbs, spices, coffee) _____

2. Devices used in grinding

How are they ground? (describe the equipment that is used)

What is distance traveled to get grains ground?

done at home

less than 2 kilometers

2-5 miles/km

5-10 miles/km

more than 10 miles/km

7. Cost of grinding.

If grinding is done commercially, what is cost for this service? For what amount? _____

VI MISCELLANEOUS HOUSEHOLD APPLIANCES

1. Types of Appliances.

Are there telephone facilities in the village area?

Yes

No

Is there a telegraph service in the village area?

Yes

No

Are there televisions in the area?

Yes

No

Approximately how many?

less than 5

5-10

10-25

more than 25

Are the T.V.s used for education or private entertainment?

education

private entertainment

both

other

2. Fuel Used

3. Fuel Costs

4. Method of Obtaining Fuel

5. Time Appliances Spent in Use

FUEL CONSUMPTION

Daily

Twice a week

Once a week

Once a month

**Local Unit
of Consumption**

**Quantity Consumed
During the Period**

Fuels

Firewood-leaves

Firewood-roots

Firewood-branches

Dungcake & Wet Dung

Husk

Vegetable waste

Charcoal and coal

Kerosene

Electricity

hh

CONSUMER DURABLE AND OTHER APPLIANCES

<u>Item</u>	<u>Quantity Owned</u>
Torch	_____
Clock	_____
Watch	_____
Transistor	_____
Radio Receiver	_____
Fan	_____
Clothes Iron	_____
Electric Stove	_____
Bicycle	_____
Scooter	_____
Motor Cycle	_____
Car Automobile	_____
Refrigerator	_____
Telephone	_____
Bullock Cart	_____
Pumpet	_____
Tractor	_____

MACRO ANALYSIS

Residential Energy Use patterns

1. Rank the following energy uses by magnitude of household energy use and importance to social well-being. (Note: This is a subjective assessment to be made either by the interviewer or one of many host country interviewees.) Rank numerically from 1-7, where 1 is largest household energy use or most important and 7 is smallest use or least important.

Energy Use	Magnitude of Household Energy Use		Importance of Energy Use to Social Well-being	
	Rural	Urban	Rural	Urban
Cooking	_____	_____	_____	_____
Space Heat	_____	_____	_____	_____
Lighting	_____	_____	_____	_____
Space Cooling	_____	_____	_____	_____
Refrigeration	_____	_____	_____	_____
Domestic Hot Water	_____	_____	_____	_____
Other _____	_____	_____	_____	_____

2. Describe the general residential energy use patterns by end-use and fuel used. In particular:
- a. What fuels are used for cooking and water heating in urban areas?

electricity _____
kerosene _____
gas _____
wood _____
charcoal _____
other _____

rural areas?

electricity _____
kerosene _____
gas _____
wood _____
charcoal _____
other _____

How much of each fuel is used on a monthly, daily, or per meal basis?

3. What types of equipment are used for cooking and space heating in urban and rural areas?

Fraction of Population Using this Facility		
	<u>Urban</u>	<u>Rural</u>
<u>Cooking:</u>		
Commercial Stove	_____	_____
Clay Oven	_____	_____
Local Metal Oven	_____	_____
Open/covared Pit	_____	_____
Hearth	_____	_____
Open Fire	_____	_____
<u>Space Heat:</u>		
Central Heating	_____	_____
Commercial Stove	_____	_____
Hearth	_____	_____
Open Fire	_____	_____

4. Are dwellings heated during the winter months? About what fraction are heated in particular rural and urban regions?
-

What fuels are employed for heating in different regions? Give as quantitative description as possible.

Describe the patterns in which heating fuels are used (for example, central climate control for year-round constant temperature or building an open fire when awakening on a cold morning).

What quantities of fuel are consumed for heat by different home types (e.g., urban/rural apartment/house, rich/poor) in different regions?

5. How many residences have space cooling systems (air conditioners and fans)? What types of residences are these (apartments less than ten years old, etc)?

What fuel types are used for air conditioners? Are records available describing air conditioner sales or ownership? If so, either attach them or give the number currently in use. Their level of use, efficiency, and trends in installations.

6. Is electricity available for lighting in rural and urban residences? How many:

What other fuels are used for lighting?

___ kerosene ___ firewood ___ other: ___

How many people employ each fuel in rural and urban areas?

Are buildings lit only during evening hours?

OUTPUT 3

TO IDENTIFY AND QUANTIFY VILLAGE ENERGY RESOURCES

i COMMERCIAL FUELS (except electricity)

1. Types and Amounts of Energy Resource

What commercial fuels are sold in the village/area?

- gasoline
- kerosene
- oil
- propane
- diesel fuel
- other

2. Availability of Energy Resources

Have villagers expressed concern about the availability of fuels? If so, for which ones?

-
- gasoline
 - kerosene
 - oil
 - propane
 - other

Are there times during this period when fuels were not available in the village?

- | | |
|--------------------------|----------|
| - always available | kerosene |
| - most always available | gasoline |
| - occasionally available | oil |
| - seldom available | propane |
| - never available | other |

3. Ownership of Energy Resources

What fraction of the lower income households you have talked with, or if you haven't talked to any, what fraction of the group, if asked (in your opinion) would say they are not able to obtain even required amounts of fuel at all times of the year?

	0	1/3	2/3	1
Amount of fuel sufficient to meet basic needs				
Households require 1/3 more fuel				
Households require twice the fuel				
Present amount of fuel grossly inadequate				

4. Resource Distribution and Location

Where are these fuels sold?

separate store/station

dry goods store

hardware store

other (specify) _____

gasoline

kerosene

oil

propane

diesel fuel

other

5. Relative Energy Prices

What is the cost for each of these fuels (specify unit sold by and give value in U.S. dollars)

gasoline _____

kerosene _____

oil _____

propane _____

diesel fuel _____

other _____

6. Village Plans for Resource Development and Use

What do villagers see as their most crucial fuel needs? _____

Have villagers made efforts and/or recommendations to alleviate problems due to fuel scarcity/unavailability? If so, what? _____

7. Resource Trends

Resource Trends (continued)

If you can, interview households using commercial fuels. We would like to find out about the fuel consumption for a typical household.

(a) How much does the household spend on fuel per month, or if the household uses electricity for cooking and heating, how much does the household spend on electricity? _____
(give figure)

(b) What fuel do they use? _____

(c) How much does a liter/gallon cost?

Cost _____ per _____
(figure) (volume)

II NON-COMMERCIAL FUELS (i.e., firewood, dung, bagasse, charcoal)

1. Types and Amounts of Energy Resources

(1) What non-commercial fuels are sold in the market place:

firewood

charcoal

dung

candles

other

(2) How are the fuels sold?

bundle

firewood

kilo

charcoal

liter

dung

by piece

candles

other

other

2. Availability of Energy Resources

Have villagers expressed concern about the availability of fuels? If so, for which ones?

firewood

dung

charcoal

candles

	Yes	No
firewood		
dung		
charcoal		
candles		

Are there times during this period when these fuels were not available in the village?:

always available	firewood
most always available	charcoal
occasionally available	candles
seldom available	dung
never available	

What fraction of the lower income households you have talked with, or if you haven't talked to any, what fraction of the group, if asked (in your opinion) would say they are not able to obtain even required amounts of fuel at all times of the year?

	0	1/3	2/3	1
amount of fuel sufficient to meet basic needs				
households require 1/3 more fuel				
households require twice the fuel				
present amount of fuel grossly inadequate				

3. Ownership Energy Resources

4. Resource Distribution and Location

If firewood is used how far does it come from?

1) within a kilometer of village

2) 1-5 kilometers

3) 6-10 kilometers

4) more than 10 kilometers

5. Relative Energy Prices

What is the market value of these non-commercial fuels? (please specify value by unit sold given in U.S. dollars)

firewood

charcoal

dung

candles

other

FIREWOOD PURCHASING

Particulars	Cropping Season	Off Season (Summer)	
1. Distance of source of purchase most frequently visited (kms)			
2. Distance of source of purchase less frequently visited (kms)			
3. Frequency of Buying	Every week throughout the Season	Every week throughout the season	Every month throughout the season
4. Quantity of firewood purchased			
	Weekly	Monthly	Yearly
In Rs			
In Maunds			
In Cart Loads			
5. Quantity of firewood recently purchased:			
6. How many days did it last?			

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6. Village Plans for Resource Development and Use

What do villagers see as their most crucial fuel needs?

Would the people prefer to use different fuels if they could afford them?

Yes

No

Have villagers made efforts and/or recommendations to alleviate problems due to fuel scarcity/unavailability?

If so, what? _____

In what ways and to what degrees have villagers invested their time, money and efforts into improving their living conditions? (E.g., invested in construction of community water systems, local improvements.)

7. Resource Trends

III ELECTRICITY

Is electricity available in the village/area?

Yes

No

What percentage of population in the area has access to the electricity?

- 1) Less than 10%
- 2) 1-20
- 3) 21-30
- 4) 31-50
- 5) More than 50

1. How is Electricity Produced?

2. Number of Electric Generators in Village

How many electric generators are there in the area?

One

Two

Three

Four or more

3. Fuel Used in Electricity Generation

Specify how the electricity is generated for each station:

	<u>Generating Station</u>
By diesel fuel	#1
From national grid	#2
By hydro power	#3
Other (specify)	#4

4. Fuel Cost and Availability

5. Availability of Electricity

What is the generating capacity (in Kw/hr) of each of the stations?

<u>Generating Station</u>
#1
#2
#3
#4

6. Distribution of Electricity

For how long during the course of the day is the electricity available from each generator?

	<u>Generating Station</u>
Not at all	#1
1-4 Hours	#2
4-8 Hours	#3
8-16 Hours	#4
16-24 Hours	#5

7. Electricity Prices

If this electricity is sold, what is the cost per Kw/hr for the electricity?

#1 _____
#2 _____
#3 _____
#4 _____

8. Allocation of Electricity

For what activities/functions is the electricity used from each generating station

Home Appliance

#1 _____
#2 _____

Cooking

#2 _____
#3 _____

Lighting

#3 _____
#4 _____

Running Mechanical Engines

#4 _____
#5 _____

Running Telecommunications
Equipment

#5 _____

Running Institutional Equipment (i.e., hospital, other)

9. Village Plans for Resource Development and Use

10. Resource Trends

11. Ownership of Generators

MACRO-ANALYSIS

I. Non-Commercial Fuels

1. Wood

- Deforestation: Is deforestation an actual or potential concern? _____ Yes _____ No
If so, either describe the nature of it on a separate sheet or attach an explanatory document.

Current Problem

Anticipated as a problem within _____ years

Firewood is not important as a "traditional fuel"

No anticipated firewood shortage for residential users

Other: _____

(a) What is the extent of forestland _____ sq. kms (Miles).

(b) What is the rate of deforestation? _____ in sq.kms (Miles/Year).

(c) What kind of forests predominate?

_____ rainforest
_____ deciduous
_____ hard wood

(d) Describe any reforestation plans.

Firewood

- Approximately how much firewood is supplied annually?

1965

1977

Projected 1985

- In what proportions do the following sectors use the firewood?

	<u>88</u>
Residential/ Commercial	___
Industrial	___
Utility	___
Agriculture	___
	100%

- How much firewood is available annually from existing forest resources?

- (a) Has over-harvesting of firewood created a problem?

(b) If so, describe its extent.

Charcoal

- Is charcoal used extensively as a fuel ___ Yes ___ No
If so, who are the major users?

Rural	Urban	
_____	_____	Residential
_____	_____	Commercial
_____	_____	Manufacturing
_____	N/A	Agriculture

(c) By what sector?

Agriculture

Utility

Industry

Residential

● How much bagasse energy is produced?

_____ \$ SALES
1965 _____
1977 _____
Projected 1985 _____

3. Dung

1. Number of baskets of wet dung produced per day _____
2. Number of kgs. of wet dung produced per day _____
3. Do you use dung for making cakes? _____
4. If yes, what is the percentage of dung used in making cakes? _____
5. Estimated diameter of the dung cake in cms _____
6. Do you sell dung cake? _____
7. Quantity of dung cake sold:

Monthly	Quarterly	Half yearly	Yearly

8. Price of each piece of dung cake (paise) _____
9. Do you use dung as farmyard manure? _____
10. Do you sell dung as farmyard manure? _____

(b) How many plants are there in each of the following categories?

	<u>100kw</u>	<u>100W</u>	<u>10-100</u>	<u>100 MW</u>
Projected				
Projected				

(c) What is the location of the majority of plants? (If there are few major electric producing plants, then list plants, capacity, energy output, and year of construction).

d) How extensive is the existing electricity transmission and distribution system? (Attach a map of the power grid, if possible).

(e) How much electricity is sold out of the country? _____ kwh

(f) How much electricity is bought from foreign countries? _____ kwh

(g) How much electric energy has been sold annually?

Total Energy Sales

(KWH)

1965
1978
Projected 1985
Projected 2000

(h) What were the 1978 electricity sales to different customer classes?

1978 Energy Sales

(KWH)

Urban: Residential

Commercial

Rural: Residential

Commercial

Industrial:

Government:

Other:

TOTAL

- (i) How many customers in each class are legally connected to the utility grid?

Number of Customers

1978

Urban: Residential

Commercial

Rural: Residential

Commercial

Industrial:

Government:

Other: _____

- (j) Have illegal electricity connections been a problem in urban or rural areas?

- (k) Does the government limit or ration electricity use or hookups? Describe below:

(l) What method(s) is/are employed in pricing electricity?

_____ Fixed charge

_____ Demand charge

_____ Energy charge

_____ Other: _____

(Check as many as apply)

(m) Does the pricing method vary with different customer classes and regions? Describe below:

(n) What is the current price of electricity for different user classes? (Note: explain regional differences on following:)

	Fixed (per month)	Demand (per peak Kw)	Energy (per Kwh)
Industry			
Urban Residential			
Urban Commercial			
Rural Residential			
Rural Commercial			
Government			
Other			

- (o) If special pricing methods apply to a rural electrification program, describe them below:
- (p) What is the production cost of electricity per kwh? _____
- (q) What percentage of the urban population is served by electricity? _____%
- (r) What is the current status of rural electrification: What percentage of the total rural population or village is served by electricity? _____%
- (s) Describe the major government or utility policies and attitudes toward rural electrification.
- (t) What fraction of the urban population has electricity: _____

The rural population? _____

What are the general uses in urban and rural areas? (lighting, heat, appliances, etc.)

Urban	Rural

(u) What types of appliances are commercially available in urban and rural areas?

(v) Is there a national rural electrification program underway? Yes No
If so, how many villages and/or residential units will be electrified by 1980 and/or 1985 (or other future year?)

	1980	1985
Number of villages electrified?	_____	_____
Projected number of customers:	_____	_____
Estimated per-residence consumption:	_____	_____
Anticipated annual sales	_____	_____
(Note: For planning purposes, what is the maximum population of a "village"?)	_____	

2. Hydro-Electric Power

What is the total existing electricity generating capacity from hydro-power (in KW)? What is the distribution by size of facilities?

What has been the rate of growth of hydro-power capacity?

KW

1965

1977

Projected 1985

What are the estimated untapped hydro-power resources? (estimates based on: (a) theoretical, (b) technical, and, (c) economic considerations)?

(a) In what regions are the developed resources located?

(b) In what regions are the major potential resources located?

(c) How far are they from major population centers?

What is the cost of hydro-electricity?

(a) Have "low-head" hydro resources for electricity generation been considered for development? How extensive is the potential from small-scale hydro resources? Are there plans for developing these resources?

3. Oil and Natural Gas

Are the oil and gas industries owned privately by the government, jointly, or otherwise?

(a) In what regions of the country are there substantial commercial quality oil and gas reserves?

(b) How extensive are the oil and gas reserves (in estimated barrels, tons, cubic feet)?

Known

Probable

Possible

(c) How much exploration is being conducted?

How much does it cost to produce a new barrel of oil?

- (a) What have the past and current production levels been? (barrels and sales)

	<u>Annual Output</u>			
	<u>Barrels of Oil</u>	<u>Sales</u>	<u>Cubic Ft. Gas</u>	<u>Sales</u>
1965				
1977				
Projected 1985				

- (b) How much of the 1977 oil and gas production was exported?

	<u>Quantity Exported</u>	<u>Foreign Revenue Earnings</u>
Oil		
Gas		

- (a) Are there oil refineries in the country?

- (b) How much domestic oil is refined domestically?

- (c) How much imported oil is refined domestically?

- (d) What are the end products of refining of oil?

	<u>Quantity</u>	<u>Sales</u>
Kerosene		
Gasoline		
Diesel		
Distillate		
Jet Fuel		

(e) Is petroleum used for commercial feedstocks?
In what quantity? For what use?

How much crude oil is imported? What trends are projected?

	<u>Barrels</u>	<u>\$</u>
1965		
1977		
Projected 1985		

How many gallons of each of the following petroleum products are imported per year? Trends?

	1973	1977	Projected 198-
Kerosene			
Gasoline			
Distillate			
Residual			
Diesel			
Jet Fuel			

From whom are the oil, gas and petroleum products purchased?

How are oil and gas transported?

Oil

Gas--how extensive are pipelines? What is LNG potential?

What fraction of the urban population has access to gas utilities? _____

Is gas available in rural areas? _____

What are the general residential uses of gas? (i.e., cooking, heating, etc.)

Are urban or rural electricity customers limited to a maximum number of light bulbs per house?

_____ Rural _____ Urban _____ Both _____ Neither

How many? _____ What size? _____

Are illegal hookups a problem? _____

Describe the extent of the problem _____

4. Coal

Is coal being produced in the country?

What is the gross output by year in tons?

_____ TONS \$SALES

1965

1977

How extensive are the national deposits of coal estimated to be (in tons?)

_____ Known Probable Possible

In what regions of the country do deposits of commercial quality (and size) coal lie?

(a) What is the average heating value per pound of coal? (or equivalent metric measure)

(b) What is the rank of the coal (anthracite, bituminous, sub-bituminous, lignite)?

(c) What is the commercial price of coal?

Price

1978

1975

1960

5. Coke

Metallurgical (for the iron and steel industry) and Non-Metallurgical Coke

(a) Is metallurgical coke produced domestically?

(b) How much coal is converted into coke?

(c) What have been the trends in coke production?

	<u>Tons</u>	<u>\$Sales</u>
1965		
1977		
Projected 1985		

Where are major coke industrial centers located?

Is the industry owned privately, by the government, jointly or otherwise?

What is the current price of coke?

(a) Is coke exported or imported?

(b) To or from whom?

(c) How much?

<u>Tons</u>	<u>\$Sales</u>	<u>Imported or Exported</u>
-------------	----------------	-----------------------------

1965

1977

Projected 1985

Are there government policies or legislation that govern coke production, import or export (e.g., taxes)?

How much coal is imported? (in tons and dollar values)

From whom is it purchased?

6. Lignite Briquettes

(a) Are lignite briquettes produced from lignite coal domestically?

(b) How much lignite is converted to briquettes annually?

(c) What have been the trends in lignite briquette production?

	<u>Tons</u>	<u>\$Sales</u>
1965		
1977		
Projected 1985		

What are the major briquettes manufacturing plants located?

Is the industry owned privately, by the government, jointly, or otherwise?

What is the current price of lignite?

(a) Are lignite briquettes imported or exported?

(b) To and from whom?

(c) How much?

	<u>Tons</u>	<u>Sales</u>	<u>Imported or Exported</u>
--	-------------	--------------	-----------------------------

1965

1977

(d) How much yellow coke is exported?

	<u>Tons</u>	<u>Sales</u>
--	-------------	--------------

1973

1977

Projected 1985

7. Geothermal

(a) Have geothermal resources been developed for electricity production?

(b) What is the current generating capacity?

(c) Do economically viable geothermal reserves exist?

(d) Where are they located?

(e) Are significant exploration efforts underway or planned?

OUTPUT 4

TO MEASURE ENERGY CONSUMPTION IN INDUSTRY

I LABOR INPUTS

1. Work Tasks and Labor Required

What type of activity is the business engaged in?

- 1) restaurant
- 2) bar/teashop
- 3) bakery
- 4) other

How many hours per day is the business in operation?

- 1) less than 3
- 2) 3-5
- 3) 6-10
- 4) more than 10

During what period of time is the business in operation?

- 1) morning
- 2) afternoon
- 3) evening
- 4) basically all day
- 5) basically all evening

How many days per week?

- 1) 1
- 2) 2-4
- 3) 5-7

Approximately how many people per day does the
business serve?

- 1) less than 10 _____
- 2) 10-50 _____
- 3) 50-100 _____
- 4) more than 100 _____

AVERAGE PRODUCTION OR TURNOVER OF THE UNIT

	PRODUCTS	UNIT OF PRODUCTION	QUANTITY PRODUCED				UNIT PRICE RS	VALUE OF PRODUCTION PER YEAR
			DAILY	WEEKLY	MONTHLY	YEARLY		

HUMAN AND BULLOCK LABOUR USE

S1 NO	PARTICULARS	HUMAN LABOUR			BULLOCK LABOUR	
		MALE	FEMALE	CHILD		
1	Average number employed					
2	Average number of hours worked per day					
3	Average number of days worked in a year					

ENERGY INPUTS USED

Sl No	Input	Yes * / (used)	No (not used)	Own Source	Family Source	Hired	Distance of Source of supply
1	Human Labour						
2	Bullock Labour						
3	Firewood						
4	Dung cakes						
5	Husk						
6	Vegetable wastes like coconut shells						
7	Coal						
8	Kerosene oil						
9	Electricity						
10	Diesel Oil						
11	Others						

*Punch 1 if yes, and 0 if no

VI CONSUMPTION OF FUELS

Sl No	Input	Unit of Consumption (code)	Daily	Quantity consumed		Yearly
				Weekly	Monthly	
	Fuel					
1	Firewood					
2	Dung cakes					
3	Husk					
4	Vegetable wastes like coconut shells					
5	Coal					
6	Kerosene Oil					
7	Electricity Bill last month					
8	Electricity Bill 2 months ago					
9	Electricity Bill 3 months ago					
10	Diesel Oil					
11	Others (specify)					

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MACRO-ANALYSIS

Production of Principal Industrial Goods

(E.g., iron and steel, mineral extraction and processing, fertilizer, cement, textiles, food processing.)

Industry and/or Firm _____

- What is the annual production output (quantities and value)?

<u>Product</u>	<u>Annual Output Quantity (Units)</u>	<u>Value</u>
----------------	--	--------------

- How many major facilities or production facilities are in operation? Give name, annual output, and work force for each.

<u>Location</u>	<u>Owner</u>	<u>Annual Output</u>	<u>Labor Force</u>
-----------------	--------------	--------------------------	------------------------

Sectoral Statistics

- (a) What are the major industrial goods produced (give annual output and monetary value) by region?

- What are the current plans for changes in the size of industry (e.g., employees, new plants, etc.)?

- How many people are employed in each industry?

Industrial Energy Consumption

- Describe briefly the manufacturing process or methods that are employed in each major industry. How mechanized are the industrial plants?
- What are the annual energy purchases by each industry? Give quantities or monetary value of electricity, petroleum, coal, gas, wood, or other fuels used by each industry?

● To what extent are self-generated fuels (e.g., small hydropower, cogenerated electricity, wood, bagasse, etc.) used by industry? Give quantities used and measurement units.

● What are the principal technologies employed at each factory? Are these expected to change over the next several years?

● What is the annual use of commercial and/or self-generated fuels? How much is imported?

a. Per unit of production:

Units _____

Electricity

Petroleum

Coal

Gas

Wood

Other: _____

b. Total for Industry, Firm, or Plant:

Energy use by: _____

Annual Output: _____

Quantity or Value

Electricity

Petroleum

Coal

Gas

Wood

Other: _____

- Describe the energy uses in the industrial processes employed in this industry? Give demand for direct heat, process steam, hot water, hydro carbon feedstocks (petroleum or other organic substances) in energy value and temperature range, if possible.

Energy Use Per Unit

(Measurement Units: _____)

Name of Process	Electricity	Petroleum	Other Fuels

- Has the potential for increased use of inexhaustible fuels been examined, particularly: hydro mechanical, combustion of agriculture or wood wastes, solar direct heat, wind, etc.?

- How is the mix of energy, labor and capital expected to change over the next several years?

- How has the increase in energy prices since 1974 affected the industry?

OUTPUT 5

TO MEASURE ENERGY CONSUMPTION IN AGRICULTURE

I CROPS AND CROP PATTERNS

1. Types of Crops Planted

What crops are planted? _____

Where in relation to the household is the land that is being worked located?

- 1) next door _____
- 2) less than a Km away _____
- 3) 1-3 Km away _____
- 4) greater than 3 Km away _____

How many times per year are crops planted?

- 1) 1x _____
- 2) 2x _____
- 3) 3 or more x _____

2. Size of Cropped Land

What is the approximate size of the land being worked?

- 1) 0-5 hectares _____
- 2) 2-4 hectares _____
- 3) 5-10 hectares _____
- 4) greater than 10 _____

3. Work Tasks

How is the land prepared for the advent of crops?

- 1) plowing _____
- 2) discing _____
- 3) harrowing _____
- 4) other (specify) _____

How often is weeding performed during the growing cycle?

Who does the weeding? _____

What equipment/tools are used? _____

4. Time Spent on Work Tasks

How many people work the land regularly?

- 1) 1-3 _____
- 2) 4-6 _____
- 3) 7-10 _____
- 4) greater than 10 _____

How many people are needed to do the threshing?

- 1) 1-3 _____
- 2) 4-10 _____
- 3) more than 10 _____

How long does it take to thresh the yield?

- 1) 1-2 days _____
- 2) 3-5 days _____
- 3) more than 5 days _____

How many people harvest the field?

- 1) 1-3 _____
- 2) 4-10 _____
- 3) 10 or more _____

How long does it take to harvest the field?

- 1) 1-3 _____
- 2) 4-10 _____
- 3) more than 10 days _____

LABOUR EQUIPMENT

Operations	No of times performed in one cycle	Man days used	Women days used	Bullock days used
		Family Hired	Family Hired	Owned by Family Hired
Seed-bed preparation and Nursery raising				
Ploughing				
Harrowing				
Manuring				
Slowing Transportation				
Hoeing				
Weeding Irrigation				
Harvesting				
Threshing				
Winnowing				
Transportation				

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Devices used

Item	No Owned	Value	Year the first was purchased	Year the last unit was purchased	Value per unit
Wooden Plough					
Iron Plough					
Bullock Cart					
Sprayer/Duster					

Electric Pump/Diesel oil engine/Tractor

Horse power rating

Values

Year of purchase/installation:

Electric Pump/Diesel oil engine/Tractor

Horse power rating

Value

Year of purchase/ installation:

5. Devices used

Name and describe briefly the equipment and tools used.

6. Fuel Required to Power Devices

If a commercial fuel (e.g. gasoline, diesel fuel, kerosene) is used in working the land, how much is used for what operation (specify) and what does it cost?

7. Availability of Fuel

8. Fuel Costs

FERTILIZER

1. Type of Fertilizer used

Is a fertilizer added to the soil?

Yes _____

No _____

If so which one? _____

2. Quantity of Fertilizer Used

3. When and to What Crops is Fertilizer Used

For what crops is the fertilizer used? _____

How often is it applied? _____

How is it applied? _____

What does the fertilizer cost? _____

III

IRRIGATION

Is irrigation used on the land?

Yes _____

No _____

Does the farmer have plans for future irrigation?

describe _____

1. Quantity of water used

Approximately what amount of water is used to irrigate the fields per one irrigation frequency? _____

2. Source of Water

What is the source of water for the irrigation?

1) stream _____

2) well _____

3) pond _____

4) rainfall _____

5) other _____

IRRIGATION

a Source of Irrigation

Well _____

Tank _____

Canal _____

b Electricity Bill for Pumpsets/Tube wells

JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

3. Location of Water Supply

4. Devices Used to Pump Water

What method of irrigating the fields is used?

- 1) flood _____
- 2) barrow _____
- 3) trickle _____
- 4) sprinkles _____
- 5) other _____

What type of equipment is used? _____

How often is the land irrigated?

- 1) 0-1 times/month _____
- 2) 2-4 _____
- 3) 5 or more _____

How much of the land is irrigated?

- 1) less than hectare _____
- 2) 1-3 hectares _____
- 3) 4-6 hectares _____
- 4) 6-10 hectares _____
- 5) 11 or more _____

5. Fuel Used (type and quantity)

6. Availability of Fuel Used

CROP PROCESSING

1. Type of Crops Processed

How are crops harvested (what process/equipment is used)? _____

2. Processing Technology (i.e., Threshing, Drying, Storing, grinding, etc.)

Threshing

What crops are threshed? _____

How are they threshed (what equipment/tools used)?

Drying

What crops are dried? _____

How are they dried (explain procedure)?

Is any special equipment used in the drying process?

(describe) _____

How long does it take to dry each crop? (specify

time and crop) _____

Storing

Are crops stored for future use?

Yes _____

No _____

How are they stored? (describe storage facilities)

Approximately how long are they stored? _____

What percent of the crops are spoiled in storage?

- 1) 0-10% _____ 3) 26-50% _____
2) 11-25% _____ 4) more than 50% _____

What is the prime cause of spoilage?

- 1) rodent _____
2) heat _____
3) moisture _____
4) other _____

What methods are used to retard spoilage and loss?

Grinding

What crops are ground? _____

How are they ground? (what equipment/tools used)

How often is the grinding done? _____

If grinding is done commercially, what is the cost for this service? for what amount? _____

How are the ground grains stored? _____

4. Fuels Used (type and Quantity)

5. Availability of Fuel Used

MACRO ANALYSIS

What are the country's major agricultural products (by region)?

What are the levels of production? Give number of production units (e.g., tons of rice or wheat and number of livestock).

What plans exist to diversify agricultural output? (e.g., new crops).

What percentage of the total national food requirement is produced domestically?

What agricultural products are imported? How much? From what countries?

What agricultural products are exported? How much? Where to?

What percent of farmers in the area irrigate their fields?

- 1) less than 5% _____
- 2) 5-10% _____
- 3) 10-25% _____
- 4) 25-50% _____
- 5) more than 50% _____

Who is responsible for the irrigation system?

- 1) agriculture extension worker _____
- 2) individual farmer _____
- 3) farming cooperative _____
- 4) other _____

Describe the principal agricultural processes and technologies? What are the fuel requirements of each?

What are the trends in agricultural production methods? (i.e., how rapidly is the agricultural sector becoming mechanized? What are the expectations for the future)?

NOTE: Again, answer in detail; emphasize the crops and methods that are in transition; attempt to quantify answers.

Describe the general farming practices and processes for each major agricultural product. Determine qualitatively how much of the work is mechanized. What technologies are used. How many energy using machines are in use (e.g., tractors)? What fuels? For crops, how much fertilizer, insecticides and what types are used? How are crops irrigated? NOTE: The answer to this question should be as quantitatively detailed as plowing, winnowing, seeding, fertilizing, pesticides, irrigation, weeding, harvesting, further preparation prior to market.

How did the increase in energy costs since 1974 affect the agricultural sector?

How much has the cost of fertilizer increased?

Are fertilizer and pesticide produced nationally or are they imported? From whom?

	<u>Fertilizer</u>	<u>Pesticide</u>
1) Domestic Production:	1965	
	1970	
	1977	
	Projected - 1985	

2) Imported: 1965

1970

1977

Projected - 1985

What have been the major problems in the past that affect agricultural production?

What major problems are foreseen for expansion of agricultural output? (e.g., water shortages)

Are there major national programs or plans to expand agricultural production?

Are there any major international or foreign programs in agriculture?

OUTPUT 6

TO MEASURE ENERGY CONSUMPTION IN TRANSPORTATION

The formulated questions can be divided as follows:

1. Vehicles

Public Transportation

Is there a main-line bus service to this village (bus originates and returns to the capital city)?

Yes _____

No _____

If so, how often?

Hourly _____

Daily _____

Couple of Times a Week _____

Weekly _____

Less than Weekly _____

Are there local buses that serve this area?

_____ Yes

_____ No

If so, how often?

Hourly _____

Daily _____

Couple of Times a Week _____

Weekly _____

Less than Weekly _____

Are there taxis (small passenger vehicles) that serve the village?

_____ Yes

_____ No

If so, how many?

Less than 5 _____

5-10 _____

10-25 _____

25 or more _____

Public Transportation Vehicles

Are there "mamma wagons", (pick-up trucks for passengers or goods) serving the area?

_____ Yes

_____ No

If so, how many?

Less than 5 _____

5-10 _____

10-25 _____

25 or more _____

Private Transportation Facilities

Are bicycles used in the village area?

_____ Yes

_____ No

If so, what percent of the population owns bicycles?

Less than 10% _____

10-25% _____

26-50% _____

More than 50% _____

Are there mopeds/motorcycles used in the village area?

_____ Yes

_____ No

If so, what percent of the population owns them?

Less than 10% _____

10-25% _____

26-50% _____

More than 50% _____

If there are other modes of transportation not discussed above, please state/describe what they are. _____

Are there bicycle mechanics in the village area?

Yes _____

No _____

Are there moped/motorcycle mechanics in the village area?

Yes _____

No _____

Are there automobile/truck mechanics in the village area?

Yes _____

No _____

We will define a trip to be 'travel to any point by any method beyond "walking distance" from the home. This distance will be defined to be the maximum distance that any household member travels by foot on a daily basis. We will refer to travel by foot to any point within "walking distance of the home" as transit.

The transportation questions are divided into 3 groups. The purpose of the first group is to provide us with an average profile of travel patterns. The second is intended to enable us to pick out climactic and other factors that effect travel patterns. The third allows us to prepare a breakdown of the different transportation devices employed by different population groups.

1. Travel Frequency

How many times a month do members of an average lower income household make trips?

Once _____
Twice _____
Three Times _____
Everyday _____
Other _____

How many times a month do members of an average upper income household make trips?

Once _____
Twice _____
Three Times _____
Everyday _____
Other _____

2. Trip Length

What is the average trip length for lower income households?

5 kilometers _____
10 kilometers _____
20 kilometers _____
40 kilometers _____
other _____

What is the average trip length for upper income households?

5 kilometers _____
10 kilometers _____
20 kilometers _____
40 kilometers _____
other _____

XV TRANSPORTATION

Do you use the following vehicles?

Bullock cart _____
 Other animal drawn vehicles _____
 Cycle _____
 Bus _____
 Lorry _____
 Tractor _____
 Scooter or Motor Cycle _____
 Car _____

Purpose	CART			TRACTOR/TRUCK			
	No of Trips	Distance (kms)	No of animals used Own Hired	No of Trips	Distance (kms) per trip	Charges paid (if hired) Rs	Average quantity of fuel used (if owned) Ltrs
Kharif crops - to buy inputs							
Kharif crops - to buy manure							
Kharif crops - to sell output							
Summer crops - to buy inputs							
Summer crops - to buy manure							
Summer crops - to sell output							
To transport family members (per month)							
To transport household goods (per month)							

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MACRO-ANALYSIS

I ROAD TRANSPORT

A. Autos, Trucks, Buses

1. How many automobiles and commercial passenger or shipping vehicles are currently in operation?

What is the rate of growth of vehicle registration?

	<u>1965</u>	<u>1977</u>	<u>Projected</u> <u>1985</u>
Autos	_____	_____	_____
Trucks	_____	_____	_____
Buses	_____	_____	_____

Are these from actual registration or based on estimates?

What percentage of vehicles are operated in rural areas?

2. What is the annual average distance drive per vehicle in the following categories?

	<u>Kilometers</u>	<u>and/or</u>	<u>Tonnage</u>			
Autos	<table border="1"><tr><td> </td></tr><tr><td> </td></tr><tr><td> </td></tr></table>					
Trucks						
Buses						

3. What is the total in-country fuel sales for 1965, 1977 and projected to 1985?

Total Fuel Sales			
	1965	1977	1985
Autos			
Gasoline			
Diesel			
Trucks			
Gasoline			
Diesel			
Buses			
Gasoline			
Diesel			

Who owns these vehicles?

	Private	Commercial	Government
Autos			
Trucks			
Buses			

4. If statistics are not available for fuel sales, estimate the average fuel efficiency for each vehicle class.

Auto _____
 Trucks _____ (km/liter)
 Buses _____

What makes of automobiles are popular now?

5. What is the estimated age of the vehicle fleets?

Auto _____
 Trucks _____
 Buses _____

6. Are there specific programs or industrial development plans that will significantly change transportation patterns? (e.g., new auto manufacturing plant coming into operation; upgraded road systems.)

B. Motorcycles

1. How many motorcycles are registered in the country?

	1965	1975	1985 (projected)
Ownership			
Private			
Commercial			
Government			

2. What is the estimated annual average mileage for motorcycles?

3. What are the popular models; engine size? _____

4. What is the projected growth rate in use and ownership?

C. Non-motor Vehicles

1. Describe the dominant non-motorized vehicles and forms of transport. What are they used for?
Approximately how many various vehicles are in use?

Mode	0-1/4	1/4 - 1/2	1/2 - 3/4	3/4 - 1
bus	_____	_____	_____	_____
train	_____	_____	_____	_____
auto or truck	_____	_____	_____	_____
farm vehicle	_____	_____	_____	_____
animal (or animal and cart)	_____	_____	_____	_____
foot	_____	_____	_____	_____
bicycle	_____	_____	_____	_____
other (name other and comment)	_____			

What modes do members of upper income households use for making trips, and what fraction of upper income households make trips by which mode?

Mode	0-1/4	1/4 - 1/2	1/2 - 3/4	3/4 - 1
bus	_____	_____	_____	_____
train	_____	_____	_____	_____
auto or truck	_____	_____	_____	_____
farm vehicle	_____	_____	_____	_____
animal (or animal and cart)	_____	_____	_____	_____
foot	_____	_____	_____	_____
bicycle	_____	_____	_____	_____
other (name other and comment)	_____			

Type of Vehicle

Village Number

Questionnaire Number

Bullock Cart Use

Other Animal Drawn Vehicle

Cycle

Bus

Dorry

Tractor

Scooter or Motorcycle

Car

Trip: Purpose - Number - Distance

Purpose (code)

No of Trips (cart)

Distance (cart)

No. of animals owned

No. of hired animals used

No. of trips (Truck/Tractor)

2. Are these vehicles produced locally or imported?
Elaborate.

3. How affordable are these vehicles to the average household? What percentage of households owns a vehicle?

4. What are the trends in non-motor transport?

II. RAIL TRANSPORT

1. Generally describe the usage of the train system in the country. How important is it as a means of transport for passengers and freight? How extensive is the rail system?

2. What is the annual:

(a) Passenger mileage _____

Freight mileage _____ tonnage

(b) Fuel consumption:

	1965	1977	1985
Diesel (barrels)			
Coal (tons)			
Electricity (kwh)			

3. Are there plans for significant additions in rail service, track mileage, or equipment stock?

III. BOATS AND SHIPPING

1. Generally describe the shipping transport industry.
Is it a major passenger transportation mode or pre-
dominantly for freight?

2. What are the annual fuel use statistics for the major
boat lines?

	1965	1977	Projected 1985
Diesel			
Fuel Oil			

3. What is the approximate level of service provided?
(ton-miles, passenger-miles or boat-miles).

4. Is sailing a major component of the commercial marine
traffic?

5. What trends or development plans exist for future
marine shipping and passenger service?

IV. AIR TRANSPORT

1. Is there a national airlines? What service is provided
by carriers from other nations?

2. How much fuel is consumed annually by scheduled commercial air carriers?

1965 1977 Projected 1985

3. How many private planes are registered in the country?
How much fuel is sold to small plane owners annually?

4. How many passengers fly on routes:
to other nations? _____
within the nation? _____
on an annual basis? _____

5. What are the current plans to expand air service, purchase new planes, or introduce new air routes in the future?

6. How important is air service for:
-- international travel?
-- domestic travel?
-- import/export of goods?
-- domestic trade and distribution of commercial goods?

V. TRANSPORTATION FACILITIES

Describe the transportation infrastructure and facilities currently existing and planned for the nation:

1. Roads

	1965	Distances Km 1977	Projected 1985
Suitable for motor transport:			
Suitable for non-motorised transport only:			
Served by ferries:			
2. Railroad Mileage:			

3. Marine Transport

	Name	Annual Tonnage
Major Navigable Rivers		
Major Harbors		

5. If available, attach maps of the different transportation networks, schedules, lists of facilities, data on passenger use, prices, freight moved, etc.

OUTPUT 7

TO MEASURE ENERGY CONSUMPTION IN COMMERCIAL AND GOVERNMENT BUILDINGS AND VEHICLES

The following questions refer to a Macro-Analysis.

Commercial Sector Energy Use

1. What kinds of commercial buildings (e.g., shops, hotels) are major users of electricity and other purchased fuels? Describe the major uses of fuels (i.e., lighting, air-conditioning, food preparation, etc.) in these buildings and which fuels they use.

2. Hotels:

- a. About how many large tourist hotels are there in the country? _____
- b. Where are they located? _____

- c. Are most air-conditioned? _____
- d. Well-lighted? _____
- e. Are they major users of electricity in the country? _____

3. Large Retail Stores

- a. About how many new department stores or arcades have been built recently? _____
- b. Which cities are they located in? _____

- c. Are they air-conditioned? ___ Yes ___ No
- d. Are they heated? ___ Yes ___ No

If so, what fuels are used?

Electricity _____

Gas/LPG _____

Fuel Oil _____

Other _____

e. Do you anticipate further construction of large, modern retail stores? ___ Yes ___ No
If so, how many?

4. Small stores, shops and cafes

a. Do small shop owners have access to electricity and pipeline gas for lighting, cooking, heating and cooling?
(Check one or more blanks.)

	<u>Electricity</u>	<u>Gas</u>
Very few in country	_____	_____
Some in urban areas	_____	_____
Many in urban areas	_____	_____
Some in towns and villages	_____	_____
Many in towns and villeges	_____	_____
Virtually all in the country	_____	_____

b. What are the principal uses of gas and electricity by small shop owners? (Check as many as apply.)

	<u>Electricity</u>	<u>Gas</u>
Lighting	_____	_____
Heating	_____	_____
Cooling	_____	_____
Food Preparation	_____	_____
Food Storage	_____	_____

c. What other fuels are used by small shop owners (i.e., firewood, kerosene, residues, dung, etc.)? (Check one or more blanks.)

	<u>Kerosene</u>	<u>Firewood</u>	<u>Other</u>
Used by very few	_____	_____	_____
Some in cities	_____	_____	_____
Many in cities	_____	_____	_____
Some in towns & villages	_____	_____	_____
Many in towns & villages	_____	_____	_____
Virtually all in country	_____	_____	_____

d. What trends have been observed in substituting commercial fuels for traditional fuels used by small shop owners?

5. Government and Commercial Office Buildings

- a. Have many new office buildings been recently built in major cities? _____
Which cities? _____

About how many during the past few years? _____

How large do they tend to be (in either floor space or height)? _____

- b. Are most buildings for government offices or private business? _____
- c. Are most business occupants domestic companies or foreign/multi-national corporations? _____

- d. Are most office buildings:

	Yes	No
Air-conditioned?	—	—
Well-lighted?	—	—
Insulated?	—	—
Designed with passive solar features?	—	—

Fuel Use Statistics

If statistics on fuel consumption, sales of energy-consuming appliances, or energy sales are available, either attach them separately or use them to fill out the table below. Information for this table may be obtained from interviews with host country officials or businessmen.

- a. What fraction of businesses in urban and rural areas employ different fuel types for various end-uses?

Use Table 6a to summarize estimates of the fraction of each business class using a given fuel source for lighting, heat, etc.

- b. Estimate the typical size and number of commercial establishments in each category.

	<u>Est. number</u>	<u>Typical size</u>
Tourist hotels	_____	_____ rooms
Large retail stores	_____	_____ floor area
Arcades, Malls	_____	_____ floor area or _____ number of shops
Small shops	_____	_____*

*May be given for nation, for a particular sized town (specify size)

C. Quantitatively estimate the number of establishments in each commercial class that use the level of energy specified below:

	Lighting Level		Interior Climate Control			
	Low	High	Heated	A/C	Fans	None
Tourist Hotels						
Large retail shops						
Small urban shops						
Small village shops						
Urban Office Bldgs.						
Other:						

D. If fuel use records (or utility bills) are available for specific commercial buildings, either attach them or fill out the table below:

Building Type	Name and Location	Energy Use for:				Size
		Year of _____, or		Month of _____		
		Elec.	Gas	Petrol	Other	

(Note: Please tell if these buildings are "typical" for the country, how they are unique, and describe their energy-consuming features below).

TABLE 6a

Percentage of Commercial Sector Using This Fuel Form

	<u>Lighting</u>					<u>Heating/Cooling</u>						
	Elec	Petrol	Gas	Wood	Other	None	Elec	Petrol	Gas	Wood	Other	None
Tourist Hotels												
Large Retail Stores												
Small Shops* Urban												
Rural												
Office Buildings												
Other: _____												

	<u>Cooking</u>					<u>Other: _____</u>				
	Petrol	Gas	Wood	Other	None	Petrol	Gas	Elec	Wood	Other
Tourist Hotels										
Large Retail Stores										
Small Shops* Urban										
Rural										
Office Buildings										
Other _____										

* Include retail stores, cafes, bazaars, services, etc.

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OUTPUT 8

TO IDENTIFY SOCIAL AND CULTURAL RELATIONSHIPS ASSOCIATED WITH
ENERGY CONSUMPTION/SUPPLY PATTERNS

I. DIVISIONS OF LABOR

1. Type of Energy Related Work Tasks
(i.e., cooking, fuel gathering, etc.)

2. Time Spent on Tasks

How often do people eat meals/day?

- 1) 1 _____
2) 2 _____
3) 3 _____
4) more than 2 _____

How often is food cooked/day?

- 1) 1 _____
2) 2 _____
3) 3 _____
4) more than 3 _____
5) 0 _____

What amount of time is spent in cooking each meal each day?

- | | |
|----------------------|--------------|
| 1) less than 1 hour | morning meal |
| 2) 1-2 hours | noon meal |
| 3) 3-5 hours | evening meal |
| 4) more than 5 hours | other |

What time of day is cooking done for each meal?

- | | |
|--------------------------|--------------|
| 1) before sunrise | morning meal |
| 2) early morning | noon meal |
| 3) midday | evening meal |
| 4) early to late evening | other |
| 5) after sunset | |

3. Who Performs Task

Is the harvesting done by individual family?

Yes
No

by cooperative activity?

Yes
No

Who generally collects the water?

mother	<input type="checkbox"/>
father	<input type="checkbox"/>
children	<input type="checkbox"/>
grandparents	<input type="checkbox"/>
other (specify)	<input type="checkbox"/>

Who in the family generally is responsible for procuring the fuels used?

mother

father

children

grandparents

other (Specify)

Who, primarily, does the cooking? which meals? for whom? _____

Who in the household generally is responsible for seeing that the heating needs are met?

mother

father

children

grandparents

other (specify) _____

Firewood Gathering

Particulars	Cropping Season			Off-season		
	Daily	Weekly	Monthly	Daily	Weekly	Monthly
1. Distance of source most frequently visited (kms)						
2. Distance of source less frequently visited (kms)						
3. Frequency of firewood gathering						
4. Time spent in gathering firewood (hrs/day)						
5. Type of firewood gathered	Leaves	Roots	Branches	Leaves	Roots	Branches
6. Labour used for gathering firewood	Mainly for firewood collection	Along with livestock grazing	Along with farm work	Mainly for firewood collection	Along with livestock grazing	Along with farm work
No of men						
No of women						
No of children						
7. Quantity of firewood gathered/period mentioned in (3) above						
No of head loads						
No of mounds						

FOOD CONSUMPTION AND COOKING

Number of non household members regularly provided with food
(permanent members)

Number of feasts celebrated last year

(1) Number of persons per feast

COOKING

Sl No	Type of meal	Time of day when taken	How much time it takes for cooking in your family	Labour involved		Labour for carrying food	
				No Women	No Children (below 10)	Women	Children
1.	Morning Beverage						
2.	Tiffin						
3.	Afternoon Meal						
4.	Afternoon Beverage						
5.	Evening Tiffin						
6.	Night Meal						

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II CONSUMER PREFERENCES

1. Food Types

What kinds of foods are cooked?

	Yes	No
Grains		
Legumes		
Vegetables		
Meats		
Fish		
Fruit		
Other		

2. Cooking Preferences

Approximately what percentage (%) of food that is cooked is:

Approximately what % of food that is cooked is:

grains	<input type="checkbox"/>	1) less than 5%
legumes	<input type="checkbox"/>	2) 5-10%
vegetables	<input type="checkbox"/>	3) 11-20%
meats	<input type="checkbox"/>	4) 21-30%
fish	<input type="checkbox"/>	5) more than 30%

3. Energy Consuming Entertainment Preferences

IV PERCEIVED NEEDS AND PROBLEMS

MACRO-ANALYSIS

Were there major holidays/religious ceremonies during this period?

Yes _____

No _____

How many of each?

1) 0 _____

2) 1-3 _____

3) 4-7 _____

4) more than 7 _____

Religious

Holidays

What effect on the normal course of energy use activities did they have? (Please describe)

1) a greater need for fuel Holiday _____

2) a lesser need for fuel Religious _____
