



सत्यमेव जयते

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**RURAL HOUSE HOLDS WOOD  
CONSUMPTION STUDY  
MEGHALAYA STATE**

**FOREST SURVEY OF INDIA  
NORTHERN ZONE  
SHIMLA  
1989**

## P R E F A C E

Wood is the major forest produce and on its rational use depends the conservation of our forest resources. Wood consumption studies help in planning the developmental activities in the forestry sector at various levels.

The study of household wood consumption in rural Meghalaya was carried out during 1986-87 and 1987-8. The study indicates that in the house hold sector of the rural Meghalaya, the annual consumption of timber is 28 thousand m<sup>3</sup> and of firewood, 964 thousand tonnes.

The staff of the Northern Zone of Forest Survey of India deserves commendation for the work.

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Director  
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## Chapter I

### 1.1 Introduction

The Forest Survey of India, Bhubaneswar Zone, took up the field work of forest inventory of Meghalaya in the year 1985 and 1987. As per the revised directives the 'special study' with particular reference to wood consumption was also to be taken up concurrently with the forest inventory work. Thus the Domestic rural household wood and bamboo consumption study was carried out in Meghalaya alongwith the inventory work. The data for this study was collected by the field crews in forest inventory work.

### 1.2 Objectives

The objectives of the survey are:

- i) To assess the existing usage of wood and bamboo for house construction and to estimate the annual consumption of wood and bamboo for all types of constructional purposes.
- ii) To estimate the domestic consumption of wood for furniture and agricultural implements.
- iii) To indicate the trend of domestic energy consumption (fuel) for cooking, lighting etc.
- iv) To indicate the future trend of use of wood and bamboo in rural areas for construction of houses, furniture, agricultural implements, fuelwood, kerosene oil etc.

### 1.3 General Description of the Area

The survey area consists of all the five districts of Meghalaya. The location map is given on page (i). The survey area lies between 89°-50' to 92°-50' East longitudes and 25°-0' to 26°-10' North latitudes. Plateaus form the main physical features of this region with rolling grass lands interspersed by river valleys. The whole area of the State is full of scenic beauty. The climate of the area is mostly tropical or sub-tropical with a prolonged rainy season which extends over more than six months. The average annual rainfall at Shillong, the capital of Meghalaya, is above 2000 mm. The area receiving world's heaviest rainfall is also located in this State near Cherapunjee with an annual average of 12,163 mm. At Shillong the monthly average of maximum temperature in summers is around 25°C and the monthly average of minimum temperatures in winters is about 9° C. The area and population statistics of the region are given in appendix I.

### 1.4 Socio-economic conditions of the people

While the total geographical area of the State is 22,429 km<sup>2</sup>, the total population as per 1981 census is 13,35,819. The average density of human population in the State is 60 per sq. km. Meghalaya is the homeland of India's three ancient hill communities. The Khasis and Jaintias are held to be remnants of the first Mongolian overflow into India, while Garos are believed to have migrated into Garo hills from Torua province of Tibet.

Agriculture is the mainstay of the people of Meghalaya. Eighty five percent of the State's population lives in rural areas and depends on agricultural produce for their livelihood. Jhumming or shifting cultivation is practised on a large scale especially in Garo hills and is one of the biggest problems to be tackled.

Transport is the main bottleneck in Meghalaya and the State is not connected by railways. Industrially the area is not yet developed. The State is rich in natural resources.

## CHAPTER II

### 2.1 Methodology

The assessment of "rural household wood consumption" covers the consumption of wood and timber by the households, for the following purposes:-

- (a) House construction: New houses, maintenance as well as extension/additions in the existing houses.
- (b) Domestic furniture.
- (c) Agricultural implements.
- (d) Firewood:- For cooking, heating etc. (the consumption of other fuels like kerosene, agricultural waste and cow dung has also been assessed, alongwith firewood consumption.)

### 2.2 Strata

The survey region consists of all the five districts of Meghalaya. The proportion of area under the forests is high and most of the villages are quite near forests. Moreover the major chunks of forests are owned by tribals/villagers. Keeping these considerations in mind no stratification of villages, with respect to the distance from the forests, has been done.

### 2.3 First stage sampling Unit

The villages form the first stage sampling units. To achieve a spatial distribution of villages over the entire region, it was decided to take up 3 villages per toposheet (1:50,000 scale S.O.I. maps). Subsequently however deviations from this had to be allowed in view of the frequent unwillingness of the local tribals to allow survey parties to enter their villages and houses for collection of data.



Finally the survey teams were able to collect data from 52 villages spread over all the districts of Meghalaya.

#### 2.4 Second Stage Sampling Units.

The households form the second stage sampling units. 5 to 10 residential houses were randomly sampled in each of the villages taken up for survey work.

#### 2.5 Maps

The following survey of India topographical sheets on 1:50,000 scale were used to identify the locations of the villages taken up for sampling:-

78 G/14, 78 K/1, 2, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, & 16.

78 O/2, 3, 4, 5, 7, 8, 11, 13, 14, 15, & 16.

83 C/1, 2, 3, 6, 11, & 12.

#### 2.6 Field Data Collection

Field data collection is done by questioning the householders. The forms given in the appendix II are filled up by the investigator. The assessment of the wood consumption as told by the 'house holders' is quantified by the investigator and entered in the forms. A Junior Technical Assistant or a Deputy Ranger works as investigator. A total of 503 households in 52 villages were taken up for the survey.

Note: As per the census figures of 1981, the total rural houses in Meghalaya were 2,09,528 and the total rural households were 2,09,618 i.e. a difference of only 0.04%. Therefore the houses and households have been treated as one for calculation purposes.

CHAPTER III

DATA PROCESSING

3.1 Method of Computation of Field Data.

The data collected in the field, in the prescribed field forms, consisted of number and sizes of various forms of wood used in construction of houses, furniture and agricultural implements. The data on quantity of fire wood were also collected from each unit i.e. house holds. The number and sizes were converted into volume or weight by applying appropriate conversion factors. Similarly, the data was converted to give annual consumption figures.

The village wise information with respect to the houses sampled, number of households in these sampled houses, population of the sampled households as well as the volume of wood used in construction of houses, furniture, agricultural implements and average monthly consumption of fuel in these sampled households is given in table 3.1.1. Table 3.1.2 tabulates the compilation of collected sample data districtwise. The per capita figures of usage of wood and consumption of fuels have been worked out from the data tabulated in 3.1.2 and have been compiled districtwise as well as for the state in table 3.1.3. & 3.1.4.

3.2 Calculation of present usage of wood for house construction.

The grand total of the quantities of wood found to have been used in the house construction of all the households/houses sampled, divided by the total population of the sampled households gives the figure of per capita usage of wood for house construction. This figure multiplied by the total rural population of the region (1981 Census) gives the present (1981) usage of wood, for house construction, in the region.

### 3.3 Calculation of present usage of wood for furniture construction.

The grand total of the consumption of wood for furniture construction, of all the sampled households of the region, divided by the total population of the sampled households gives the per capita usage of wood for construction of furniture. This figure multiplied by the total rural population of the region (1981 Census) gives the present (1981) usage of wood, for furniture construction in the region.

### 3.4 Calculation Present Usage of Wood for Agricultural Implements.

This calculation is also done on the same lines as detailed in paras 3.2 & 3.3 above to obtain the total present (1981) usage of wood, for agricultural implements in the region.

### 3.5 Calculation of the present usage of bamboo for house construction.

The grand total of bamboo (Nos) found to have been used in the house construction, of all the household/houses sampled, divided by the total population of the sampled households gives the assessment of per capita consumption (present usage) of bamboos for house construction. This multiplied by the total rural population (1981 Census) gives the present (1981) usage of bamboos for house construction in the region.

Note: Usage of bamboo has been assessed in Nos of standard size bamboos (i.e. 5 cm girth and 8 metre length).

### 3.6. Calculation of the annual consumption of Firewood, Agricultural Residue, Kerosene and Cow dung.

For assessing the consumption of these fuels, data was collected from all the sampled

15/12/03  
1971 - Popn. Meghalaya

Actual popn. 864529

1981 - Popn.

Actual popn. 1094486

$$\text{Decadal growth rate} = \frac{(1094486 - 864529)}{864529} \times 100 = 26.6\%$$

households. The collected data was then reduced to annual per capita figures on the basis of total population of the sampled households, and finally these per capita figures multiplied by the total rural population (1981 census) provided the assessment of total annual consumption figures of each of these fuels.

3.7 Annual Consumption of wood in house construction.

The annual consumption figures have been obtained, from the figures of present usage calculated on the basis expained in para 3.2, on the basis of following assumptions:.

- (a) The percentage of annual increase in rural houses is same as the percentage of annual increase of the rural population over the decade 1971 to 1981.
- (b) The annual consumption of wood for maintenance and repairs of the existing rural houses is one percent of the total present usage of wood in house construction.

Since there was 26.6 percent decadal increase in the rural population of the region for the period 1971 to 1981, the annual increase in number of houses, as per assumption (a) is 2.66 percent per year. Therefore 5,573 houses are expected to be built every year (base figure 2,09,528 for 1981).

3.7.1 New Construction:

Present usage of wood (1981) per house.	Total present usage (1981)
	= $\frac{\text{Total present usage (1981)}}{\text{Total houses in the rural area (1981)}}$
Annual usage of wood for new houses.	= Usage per house X esti- mated No. of new houses constructed annually.

3.7.2 For Maintenance

Annual requirement of wood for maintenance of existing rural houses. = One percent of the total present (1981) usage of wood, for construction of houses, in the region.

3.8 Annual consumption of wood for making Agricultural implements.

Following assumptions have been used to arrive at the annual consumption figures:

- (a) The average life spans of various agricultural implements like plough, cart etc. are assumed to be varying between 2 years and 10 years and for the purpose of replacement of agricultural implements average life span of 5 years has been assumed for our calculations.
- (b) Increase in the total number of agricultural implements in use is not envisaged as it is assumed that expected increase due to population growth will be offset by the reduction due to the substitution by machines etc.

$$\text{Annual consumption of wood for agricultural implements.} = \frac{\text{Total estimated present usage of wood for agricultural implements}}{\text{Average life span of agricultural implement ( 5 years)}}$$

3.9 Annual consumption of wood for furniture.

The assumptions used to arrive at the annual consumption figures are as under:

- (a) Average life of the furniture is assumed to be 20 years.
- (b) The annual per capita consumption of wood for furniture is assumed to remain constant and therefore the total annual consumption

of wood in the region is assumed to rise proportionately with the population growth.

Present annual consumption of wood for furniture.	=	Total present usage of wood for furniture. Average life span of furniture (20 years).
---	---	--

3.10 Electricity Consumption in Survey Area.

Villagewise details of houses sampled and the monthly consumption of electricity in KWH, recorded for these sampled houses/households, are available in table 3.1.1. The average per capita annual consumption, worked out from this data, when multiplied by the total rural population (1981 census) gives an estimate of the total annual consumption in the region (1981).

As per the statistical hand book of Meghalaya 1982, 868 villages were recorded as electrified in 1981-82 out of a total of 5048 villages (1981 census).

3.11 Annual Consumption of Bamboos in house Construction.

The annual consumption figures have been obtained on the basis of assumptions and calculations explained in para 3.7 (in respect of wood).

3.12. Future projections of Wood and Bamboo Consumptions in the rural households.

Though the usage of wood and bamboo has been assessed in the survey carried out during 1986 to 1988, the figures relating to the total consumption in the region have been arrived at by using population figures of 1981 census. Therefore the future projections have been made for the year 1991 and 2001 assuming that the decadal growth rate of population at 26.6% (for 1971 to 1981) will be applicable for the decades 1981 to 1991 as well as 1991 to 2001, and a proportionate rise in total consumption of wood and bamboo and fuels will take place except in case of wood consumption for agricultural implements (refer para 3.8).

CHAPTER IV

4:1 Results and Analysis.

Using the methods of calculations shown in paras 3.2, 3.3, 3.4 and 3.5, the per capita usage of wood and bamboo and the total present usage for various purposes, worked out for the rural regions of the state of Meghalaya are tabulated below:

Purpose	Per capita usage of wood (m <sup>3</sup> ) and Bamboos (Nos).	Total present (1981) usage of wood (m <sup>3</sup> ) and bamboos (Nos).
House constructions	0.649 m <sup>3</sup> of wood (round equivalent and 69.78 Bamboos	710,847 thousand m <sup>3</sup> (RE) of wood and 76.37 million bamboos
Furniture	0.015 m <sup>3</sup> of wood (RE)	16,563 thousand m <sup>3</sup> of wood (RE)
Agricultural Implements	0.005 m <sup>3</sup> of wood (RE)	5,792 thousand m <sup>3</sup> of wood (RE)
Grand total =		733,202 thousand m <sup>3</sup> (round equivalent) and 76.37 million bamboos.

Notes: The total rural population of the region is 1094486 (1981 census). To convert sawn wood volume into round wood volume, 25% has been added to the sawn volume.

4:2 Annual consumption of wood in house constructions  
 Present usage of wood per house =  $\frac{\text{Total present usage (rural)}}{\text{No. of houses in rural area of Meghalaya}}$   
 =  $\frac{710847 \text{ m}^3}{209528 \text{ (1981 census)}}$   
 = 3.39 m<sup>3</sup> of round wood



Estimated consumption of wood for construction of new houses every year. = Expected decadal growth in  $\frac{\text{number of houses}}{10} \times 3.39$

$$= \frac{26.6 \text{ (decadal growth 1971 to 1981)}}{100} \times \frac{209528}{10} \times 3.39$$

$$= 18894 \text{ m}^3 \text{ (round wood) } \dots\dots (\Lambda)$$

New houses expected to be built every year =  $\frac{209528}{10} \times \frac{26.6}{100} = 5573$

Estimated consumption of wood in the rural region of Meghalaya State for maintenance of existing houses. = 1% of present usage ( in house construction)

$$= \frac{7108 \text{ m}^3}{100} \text{ (RE) } \dots\dots (\text{B})$$

Estimated total annual consumption of wood for house construction and maintenance . = 18894 + 7108 (Λ + B )

$$= 26002 \text{ m}^3 \text{ (RE)}$$

4.3 Annual consumption of Bamboo in house construction

On the basis of similar calculations as in para 4.2, the estimated annual consumption of bamboos for construction of new houses =

New houses expected to be built every year  $\times \frac{\text{Total present(1981) usage of bamboos}}{\text{Total rural houses (1981)}}$

$$= 5573 \times \frac{7637000}{209528}$$

$$= 5573 \times 364$$

$$= 2031280 \text{ bamboos}$$

$$= \underline{2031.28 \text{ thousand bamboos}}$$

Again for maintenance, the estimated consumption of bamboos. = 1% of total present usage

$$= 763.70 \text{ thousand bamboos}$$

Grand Total = 2.795 million bamboos.

4.4 Annual consumption of wood for agricultural implements

As per para 3.8 the estimated annual consumption of wood for agricultural implements

$$\begin{aligned}
 & \text{Total present usage of wood for agricultural implements (Para 4.1)} \\
 = & \text{-----} \\
 & \text{Estimated average life of implements (para 3.8)} \\
 & \text{(Taken as 5 years)} \\
 = & \frac{5792 \text{ m}^3 \text{ (RE)}}{5} = 1158.4 \text{ m}^3 \text{ (RE)}
 \end{aligned}$$

4.5 Annual consumption of wood for furniture

As per para 3.9 the annual consumption of wood, for furniture, is estimated as:

$$\begin{aligned}
 & \text{Total present usage of wood for furniture (Para 4.1)} \\
 = & \text{-----} \\
 & \text{Estimated average life span of furniture - 20 years (Para 3.9)} \\
 = & \frac{16563}{20} = 828.15 \text{ m}^3 \text{ (RE)}
 \end{aligned}$$

4.6 Annual consumption of fuel wood and Kerosene

As per the calculations given in para 3.6 the annual per capita consumption and total annual consumption (based on 1981 census figures) have been worked out for fuel wood and kerosene and are tabulated below:

Type of fuel	Annual per capita consumption	Total annual consumption (1981)
Firewood	$0.712 \times 12$ quintals for cooking $= 8.54 \text{ Q}$ $+ 0.091 \times 3$ for heating $= 0.27 \text{ Q.}$	$9347264$ Qtls for cooking $+ 297312$ Qtls for heating
Total	$= 8.81$ Quintals:	Total $9644576$ Qtls
Kerosene	$0.720 \times 12$ litres for lighting $= 8.63$ litres	$9459559$ litres for lighting

Kerosene is mainly used for lighting purpose only. Use of cowdung or/and agricultural waste as fuels has not been recorded in any of the samples drawn from the rural region of Meghalaya.

#### 4.7 Domestic electricity consumption in the rural region of Meghalaya.

Out of the 52 villages sampled in Meghalaya only 4 were found to be such where domestic consumption of electricity was recorded. The total electricity consumption recorded in the sampled households, in these villages was 527 units (KWH) per month (Table 3.1.1) thus giving an average per capita annual consumption of

$$\frac{527 \times 12}{2899} = 2.18 \text{ KWH for the year}$$

(Total population of sampled households = 2899)

The total annual consumption, on this basis, is estimated at 2387558 units ( 2.18 x rural population (1981) ) i.e. 2.388 million KWH (Units)- for 1981

#### 4.8 Districtwise abstract of per capita usage/Consumption.

The districtwise abstract of per capita consumption of wood (including bamboo) and fuels are given in table 3.1.3 . These figures for the district may be considered indicative only. From this districtwise abstract of figures it can be seen that the per capita usage of wood (round equivalent) for house construction varies from 0.365 m<sup>3</sup> in East Garo to 1.150 m<sup>3</sup> in Jaintia district.

The per capita usage of wood (RE) for furniture varies from 0.007 m<sup>3</sup> in East Garo to 0.036 m<sup>3</sup> in Jaintia and that for agricultural implements, it varies from 0.001 m<sup>3</sup> in West Khasi to 0.011 m<sup>3</sup> in Jaintia and 'West Garo'.

#### 4.9 Future projections of wood, bamboo and fuel consumptions.

The estimates of total present consumption of wood, bamboo and fuels in the rural region of Meghalaya are based upon the census figures of 1981

and these are summarised below:-

WOOD

<u>S.No.</u>	<u>Purpose</u>	<u>Annual Consumption (Round Equivalent)</u>
1.	New house construction	18894 m <sup>3</sup>
2.	House Maintenance	7108 m <sup>3</sup>
3.	Agricultural implements	1158 m <sup>3</sup>
4.	Furniture	828 m <sup>3</sup>

-----  
Total(round equivalent)

Annual wood consumption in the rural households 27,988m<sup>3</sup> say 28000 m<sup>3</sup>

BAMBOO

<u>S.No.</u>	<u>Purpose</u>	<u>Annual consumption of Bamboos (Nos-standard size)</u>
1.	New house construction	2031280 Nos
2.	House maintenance	763700 Nos.

-----  
Total(Bamboos)

2794980 Nos.

FUELS/ELECTRICAL ENERGY

<u>S.No.</u>	<u>Type of Fuel &amp;/ Energy.</u>	<u>Estimated current(1981) Annual consumption.</u>
1.	Firewood	96,44,576 Quintals
2.	Kerosene	94,50,559 Litres
3.	Electricity	23,87,558 KWH.

-----  
The projections for the year 1991 and 2001 have been worked out on the basis explained in para 3.12 and are as under:-

<u>S.No.</u>	<u>Item</u>	<u>Purpose</u>	<u>Estimated Annual consumption</u>	
			<u>1991</u>	<u>2001</u>
1.	WOOD	(a) New house construction	23920 m <sup>3</sup>	30203 m <sup>3</sup>
		(b) House maintenance	8999 m <sup>3</sup>	11393 m <sup>3</sup>
		(c) Agricultural implements	1158 m <sup>3</sup>	1158 m <sup>3</sup>
		(d) Furniture	1048 m <sup>3</sup>	1327 m <sup>3</sup>
Total Round Wood			35125 m <sup>3</sup>	44101 m <sup>3</sup>

S.No.	Item	Purpose	Estimated Annual Consumption.	
			1991	2001
II.	Bamboo	(a) New house construction	25,71,600 Nos	3255646 Nos
		(b) House maintenance	9,66,844 "	122402 "
		<b>Total Bamboos</b>	<b>35,38,444 Nos</b>	<b>4479671 Nos</b>
III.	Fire wood	Heating and Cooking	1,22,10,033 Qtls	15457002 Qtls
IV.	Kerosene	Lighting	1,19,64,408 Ltr.	15146011 Ltr.
V.	Electricity	Lighting	30,22,648 KWH	3826672 KWH.

The above figures can be rounded off and tabulated as under:

S.No.	Items	Estimated annual consumption		
		1981	1991	2001
1.	Total round wood(in 000m <sup>3</sup> )	28	35	44
2.	Total Bamboos (in 000 Nos)	2795	3538	4480
3.	Fire wood (in 000 tonnes)	964	1221	1546
4.	Kerosene (in 000 Kilolitres)	9	12	15
5.	Electricity (in 000 KWH)	2388	3023	3827

CONVERSION FACTORS

1. One cubic metre ( $m^3$ ) = 35.3 cubic ft.
2. One truck load =  $10 m^3$  = 7 Tonnes
3. One tonne =  $1.45 m^3$
4. One metre = 39 inches
5. To convert Sawn material into logs = add 25%
6. To convert pulp into logs = add 60%
7. To convert ply wood into logs = add 50%
8. To convert re-constituted wood = add 60% into logs.

B I B L I O G R A P H Y

1. F.S.I. Dehradun - Operational Manual on wood consumption Survey- March, 1986
2. N.C.A.E.R. - Domestic fuels in India- 1959
3. Director of Census - District Census Hand book, Operations East Khasi Hills Census 1981.

Table No. 3.1.01

Village-wise sampled data for wood and bamboo usage as well as consumption of fuels, in the rural region of Meghalaya.

S.No.	Name of Village	No. of houses sampled	No. of house holds in the sampled houses	Total existing usage of wood in sampled house (m <sup>3</sup> )	Furniture wood (WRE) m <sup>3</sup>	Agricultural implements (WRE) m <sup>3</sup>	Consumption of Fuels						
							Fire wood in Qtls per month	K.Oil in Qtls per month	Char-coal in Qtls per month	Electricity (Units) per month			
1.		3%	4.	5%	6.	7.	8.	9.	10.	11.	12.	13.	14.
1.	Gokulgiri	10	10	63	8,336	3162	0.630	1.278	22.35	1.50	91	-	-
2.	Rongmatchugiri	10	10	47	54,963	6893	-	1.299	41.10	-	26	-	-
3.	Gimigiri	10	10	84	26,851	2745	1.840	1.704	41.40	-	83	-	-
4.	Mauggakgiri	10	10	42	56,638	6056	-	0.630	52.35	-	28	-	-
5.	Ronsakgiri	10	10	40	20,417	3811	0.771	2.166	27.90	-	37	-	-
6.	Rongsalgiri	10	10	46	54,553	5167	0.218	1.795	39.60	-	29	-	-
7.	Thongbolgiri	10	10	44	20,749	2963	0.085	0.044	44.50	-	32	-	-
8.	Debu	10	10	63	22,681	5152	0.083	-	42.90	-	41	-	-
9.	Bawegiri	10	10	49	9,167	21500	-	0.394	41.00	-	42	-	-
10.	Asiladingiri	10	10	50	5,095	13354	0.136	-	32.10	20.00	31	-	-
11.	Neugsot	10	10	68	3,871	11652	-	-	34.40	-	43	-	-
12.	Garobadha	10	10	57	7,369	16800	0.994	0.012	26.90	-	42	-	-
13.	Cherangiri	10	10	46	24,509	2890	1.670	0.055	44.50	-	30	-	-
14.	Wategithan	10	12	60	12,413	3800	0.105	0.069	51.15	-	32	-	-
15.	Daukipara	10	10	54	48,061	5850	0.545	0.115	27.50	-	80	-	-
16.	Rewaksongmong	10	10	66	16,009	7250	0.618	0.113	68.40	-	38	-	-

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
17.	Renigiri	10	10	85	79,327	5965	0.495	1.481	32.95	-	55	-	-
18.	Durebandagiri	10	10	62	37,276	4755	0.140	0.188	35.50	-	79	-	-
19.	Baugsi	10	10	56	18,965	7535	0.944	0.026	28.50	12.90	20	-	-
20.	Baugsi Dogru.	10	10	45	12,347	-	0.568	0.011	25.80	-	41	-	-
21.	Mahadeo	10	10	45	12,812	-	1.961	0.041	43.30	-	50	-	-
22.	Rajasimla	05	05	30	4,867	13200	0.134	0.094	15.50	05.50	30	-	-
23.	Matrang	10	10	44	20,067	6900	0.491	0.082	36.00	06.90	28	-	-
24.	Chibragiri	10	10	65	20,476	6633	3.158	-	54.50	-	44	-	30
25.	Bansangiri	10	10	50	25,869	5963	-	0.525	29.75	-	35	-	-
26.	Maheskhola	10	10	46	10,664	-	1.553	-	33.30	-	42	-	-
27.	Bansali	10	10	42	4,027	5971	0.285	-	39.00	-	40.5	-	-
28.	Rambatgiri	10	10	44	22,357	3783	0.467	-	32.00	-	42	-	-
29.	Rongml	05	05	37	11,015	1014	0.168	-	17.00	14.00	60	-	22
30.	Nongiri	09	09	49	14,802	1920	0.401	0.052	29.50	-	33	-	-
31.	Mawliel	09	09	33	26,754	40	0.054	0.055	29.00	29.00	14.5	-	-
32.	Phlang Kijnshi	10	10	73	60,817	46	-	-	-	-	-	-	-
33.	Pokchara	09	09	58	32,709	1700	3.886	0.024	31.00	6.20	41.5	-	-
34.	Mariem	09	09	50	53,872	85	1.053	0.046	31.50	-	26	-	-
35.	Nongmawmairang	09	11	68	40,992	20	2.727	0.049	42.50	-	5	-	185
36.	Lungumshieh	10	10	88	17,901	2068	-	-	31.00	38.00	245	-	-
37.	Jalang	10	10	54	50,630	1379	0.200	-	29.00	24.00	68	-	-
38.	Rengdim Rongwa.	10	10	55	17,029	728	0.046	0.240	29.60	-	11.5	-	-



1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
39.	Mawden	10	10	55	19,937	2118	0.215	0.231	36.00	25	20	-	-
40.	Nongynglaw	10	10	60	35,212	123	1.355	0.021	45.25	-	23	-	-
41.	Khoingoi	09	09	59	63,524	1106	2.895	0.852	115.50	-	26	-	-
42.	Situng	05	05	32	17,280	1854	0.065	-	66.00	-	10	-	-
43.	Jungria	09	09	76	111,198	1675	3.131	0.948	63.00	49.50	12	-	-
44.	Mawlyndep	10	10	57	106,575	2646	5.783	0.012	49.50	18.00	41	-	-
45.	N.Mawlyndep	10	10	62	129,302	199	-	-	17.30	-	-	-	-
46.	Laiduh	10	10	70	118,916	-	0.049	-	40.40	-	27	-	-
47.	Syntung	10	10	86	77,308	40	0.740	0.473	55.50	-	25	-	-
48.	Mawlyndiar	10	10	53	27,202	-	0.806	0.017	72.60	-	67	-	-
49.	Umtasor	10	11	49	14,336	516	0.027	0.040	35.00	4.60	45	-	-
50.	Mawstntal	10	10	71	18,229	539	0.272	0.140	45.90	7.40	47	-	-
51.	Pomshutea	10	12	54	135,547	1155	1.845	-	28.00	-	27	3.40	290
52.	Mawlong	08	08	57	21,019	1573	0.262	0.019	52.00	-	-	-	-
Grand Total		496	503	2899	1882,842	202294	43,871	15,341	2063,20	262.50	2086	3.40	527

Table No. 3.1.2

Districtwise sampled data for wood and bamboo usage as well as consumption of fuels, in the rural region of Meghalaya.

S.No.	Name of Village	No. of houses sampled	No. of house holds in the sampled houses	Population of the sampled houses	Total existing usage of wood in sampled house holds (m <sup>3</sup> )	Consumption of Fuels				Electricity, (Lighting) per month (Units). kWh.		
						Fire wood in Qtls. per month.	Char-coal in Qtls. per month.	Cooking in Qtls. per month.	Lighting in Qtls. per month.			
1.	Khoingol	09	09	59	63,524	1106	2,695	0.825	115.50	26	-	-
2.	Situng	05	05	32	17,280	1854	0.065	-	66.00	10	-	-
3.	Jungria	09	09	76	111,198	1675	3,131	0.948	63.00	49.50	12	-
Total		23	23	167	192,002	4635	6,091	1,800	244.50	49.50	48	-
<b>I. DIST. JAINTIA</b>												
<b>II. DIST. EAST KHASI</b>												
1.	Mawden	10	10	55	19,937	2118	0.215	0.231	36.00	25.00	20	-
2.	Mawlyndep	10	10	57	106,575	2646	5,783	0.012	49.50	18.00	41	-
3.	Laiduh	10	10	70	118,916	-	0.049	-	40.40	-	27	-
4.	N. Mowlayndep	10	10	62	129,302	199	-	-	44.30	-	-	-
5.	Sytung	10	10	86	77,308	40	0.740	0.473	55.50	-	25	-
6.	Mawlyndiar	10	10	53	27,202	-	0.806	0.017	72.60	-	67	-

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
7.	Umtasar	10	11	49	14.336	516	0.027	0.040	35.00	4.60	45	-	-
8.	Mawstai	10	10	71	18.229	539	0.272	0.140	45.90	7.40	47	-	-
9.	Pomshutai	10	12	54	135.547	1155	1.845	-	28.00	-	27	3.40	290
10.	Mawlong	08	08	57	21.019	1573	0.262	0.019	52.00	-	-	-	-
Total		98	101	614	668.371	8786	9.999	0.932	459.20	55.00	299	3.40	290

III. Distt. WEST KHASI

1.	Nongiri	09	09	49	14.802	1920	0.401	0.052	29.50	-	33	-	-
2.	Mawlieh	09	09	33	26.754	40	0.054	0.055	29.00	29.00	14.5	-	-
3.	Phlang Kynshi	10	10	73	60.817	46	-	-	-	-	-	-	-
4.	Pochara	09	09	58	32.709	1700	3.886	0.024	31.00	6.20	41.5	-	-
5.	Meriem	09	09	50	53.872	85	1.053	0.046	31.50	-	26	-	-
6.	Mongmowinairang	09	11	68	40.992	20	2.727	0.049	42.50	-	5	-	185
7.	Longumshie	10	10	88	17.901	2068	-	-	31.00	38.00	245	-	-
8.	Jalong	10	10	54	50.630	1379	0.200	-	29.00	24.00	68	-	-
9.	Rengdim Rongia	10	10	55	17.029	728	0.046	0.240	29.60	-	11.5	-	-
10.	Nongtynglaw	10	10	60	35.212	123	1.355	0.021	45.25	-	23	-	-
Total		95	97	588	350.718	8109	9.722	0.487	298.35	97.20	467.5	-	185

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
<u>IV. Distt. EAST GARO</u>													
1.	Gokgulgiri	10	10	63	8.336	3162	0.630	1.278	22.35	1.50	91	-	-
2.	Thongbolgiri	10	10	44	20.749	2963	0.085	0.044	44.50	-	32	-	-
3.	Dobu	10	10	63	22.681	5152	0.083	-	42.90	-	41	-	-
4.	Chirangiri	10	10	46	24.509	2890	1.670	0.055	44.50	-	30	-	-
5.	Wategithim	10	12	60	12.413	3800	0.105	0.069	51.15	-	32	-	-
6.	Rangiri	10	10	85	79.327	5965	0.495	1.481	32.95	-	55	-	-
7.	Bangsi	10	10	56	18.965	7535	0.944	0.026	28.50	12.90	20	-	-
8.	Bansi Dogru	10	10	45	12.347	-	0.568	0.011	25.80	-	41	-	-
9.	Raja Simla	05	05	30	4.867	13200	0.134	0.094	15.50	5.50	30	-	-
10.	Matrang	10	10	44	20.067	6900	0.491	0.082	36.00	6.90	28	-	-
11.	Rangml.	05	05	37	11.015	1014	0.168	-	17.00	14.00	60	-	22
12.	Bansumgiri	10	10	50	25.869	5963	-	0.525	29.75	-	35	-	-
13.	Negsat	10	10	68	3.871	11652	-	-	34.40	-	43	-	-
14.	Asiledgiri	10	10	50	5.095	13354	0.136	-	32.10	20.00	31	-	-
Total		130	132	741	270.111	83550	5.509	3.665	457.40	60.80	569	-	22

-22-



(P.V.)

Jut Apati

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
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V. Dist. WEST GARO

1.	Rongm Chagiri	10	10	47	54.963	6893	-	1.299	41.10	-	26	-	-
2.	Gimigiri	10	10	84	26.851	2745	1.840	1.704	41.40	-	83	-	-
3.	Mawggokgiri	10	10	42	56.638	6056	-	0.630	52.35	-	28	-	-
4.	Rongkigiri	10	10	40	20.417	3811	0.771	2.166	27.90	-	37	-	-
5.	Rangsalgiri	10	10	46	54.553	5167	0.218	1.795	39.60	-	29	-	-
6.	Bawegiri	10	10	49	9.167	21500	-	0.394	41.00	-	42	-	-
7.	Garobadha	10	10	57	7.369	16800	0.994	0.012	26.90	-	42	-	-
8.	Dankipara	10	10	54	48.061	5850	0.545	0.115	27.50	-	80	-	-
9.	Rewak Songoang	10	10	66	16.009	7250	0.618	0.113	68.40	-	38	-	-
10.	Durabandagiri	10	10	62	37.276	4755	0.140	0.188	35.50	-	79	-	-
11.	Mahdeo	10	10	45	12.182	-	1.961	0.041	43.30	-	50	-	-
12.	Chbragiri	10	10	65	20.476	6633	3.158	-	54.50	-	44	-	30
13.	Maheshkhola	10	10	46	10.664	-	1.553	-	33.30	-	42	-	-
14.	Ronghatgiri	10	10	44	22.357	3783	0.467	-	32.00	-	42	-	-
15.	Bansali	10	10	42	4.027	5971	0.285	-	39.00	-	40.5	-	-
Total		150	150	789	401.640	97214	12.550	8.457	603.75	-	702.5	-	30

1. 2. (No. of Samples / Villages)

	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
I.	3	23	167	192.002	4635	6.091	1.800	244.50	49.50	48	-	-
II.	10	98	614	668.371	8786	9.999	0.932	459.20	55.00	299	3.40	290
III.	10	95	588	350.718	8109	9.722	0.487	298.35	97.20	467.5	-	185 + 241
IV.	14	130	741	270.111	83550	5.509	3.665	457.40	60.80	569	-	22
V.	15	150	789	401.640	97214	12.550	8.457	603.75	-	702.5	-	30

GRAND TOTAL

Total	52	496	2899	1882.842	202294	43.871	15.341	2063.20	262.50	2086	3.40	527
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(MEGHALAYA)

Table No. 3.1.3

Districtwise - and for the State - abstract of estimated per capita domestic usage of Wood/Bamboo and estimated per capita domestic consumption of fuels in the rural areas of Meghalaya.

Items	Jaintia	East Khasi	West Khasi	East Garo	West Garo	State of Meghalaya m <sup>3</sup>
<b>I. Usage of Wood:</b>						
✓ (a) House construction (in m <sup>3</sup> ) - round-equivalent	1.150	1.089	0.596	0.365	0.509	0.649
✓ (b) Furniture (in m <sup>3</sup> -R.E.)	0.036	0.016	0.017	0.007	0.016	0.015
✓ (c) Agricultural Implements (m <sup>3</sup> -R.E.)	0.011	0.002	0.001	0.005	0.011	0.005
<b>Total domestic usage of wood (m<sup>3</sup>)-R.E.</b>						
	1.197	1.107	0.614	0.377	0.536	0.669
<b>II. Usage of Bamboos:</b>						
(a) House construction (Nos)	27.75	14.31	13.79	112.75	123.21	69.78
<b>III. Consumption of Fuels:</b>						
✓ (a) Firewood for cooking (Qtls. per year).	17.57	8.97	6.09	7.41	9.18	8.54
✓ (b) Firewood for heating (Qtls p.year)	0.89	0.27	0.50	0.25	-	0.27
(c) Kerosene oil (Ltrs P.year) (Mainly for lighting).	3.45	5.84	9.54	9.21	10.68	8.63

Table 3.1.1

Compilation of the sample data of wood and Bamboo usage and consumption of fuels, Districtwise as well, for the State (Meghalaya) for the rural areas.

S.No.	Name of the District	Total No. of houses sampled.	No. of house holds in these sampled houses.	Total population of houses sampled.	Total existing usage of wood in sampled households (m <sup>3</sup> )	Total existing usage of wood in sampled Households (m <sup>3</sup> )	Furniture construction (WRE)	Agriculture implements (WRE)	Total existing usage of Bamboo in house construction.	Consumption of fuels per month.		Total Consumption of fuels per month.
										Fire wood for cooking in house (Qtls)	Fire wood for heating in house (Ltr.)	
1.	Jaintia	23	23	167	192.002	6.091	1.800	0.932	4635	244.50	49.50	48
2.	East Khasi	98	101	614	668.371	9.999	0.932	8786	8786	459.20	55.00	299
3.	West Khasi	95	97	588	350.718	9.722	0.487	8109	8109	298.35	97.20	467.5
4.	East Garo	130	132	741	270.111	5.509	3.665	83550	83550	457.40	60.80	569
5.	West Garo	150	150	789	401.640	12.550	8.457	97214	97214	603.75	-	702.5
Total (Meghalaya)		496	503	2899	1882.842	43.871	15.341	202294	202294	2063.20	262.50	2086.

Note: Consumption of fuels like Coal, Charcoal, Cowdung and agricultural waste has been recorded as nil in all the samples.



A P P E N D I C E S

APPENDIX - I

Districtwise area and human population/Density (1981)

Sl.No.	District	Area in ( km <sup>2</sup> )	Population	Density per (km <sup>2</sup> )
1.	East Khasi Hills	5196	511414	98
2.	West Khasi Hills	5247	161576	31
3.	Jaintia Hills.	3819	156402	41
4.	East Garo Hills	2603	136550	52
5.	West Garo Hills	5564	369877	66
Total		22429	1335819	60

Source:- Statistical Hand Book of Meghalays 1982.

A P P E N D I X - II

( Field forms ) .

DOMESTIC WOOD CONSUMPTION  
( Data collection Form)

District -

Division -

Schedule -A

Name of the owner of the House:

1. S.No. of the stratum/town
2. Name of the village/S.No. of Block
3. S. No. of households
4. Type of Building actually visited as a sample unit. Katcha/Pucca/multi storeyed
5. No. of storeys - total and used for living only (to be filled in if more than one storey)
6. Sl. No. of the building out of the total building to be visited in the village.
7. Ward No. - House No. in Municipal area and cities wherever available.
8. No. of Households living in the household.
9. Total No. of persons living in the house-hold
10. Average annual income of the family  
Nature of occupation (service/cultivation/business)
11. Average plinth area occupied by each house includes verandah covered by roof and floor.
12. a) No. of living rooms -  
b) No. of storage rooms -  
c) No. of common rooms -  
d) other category viz. bath room, latrines, kitchen, cow shed etc.

Camp:

Date:

Signature .....

Name of surveyor

Designation

FORM - VI

OTHER FOREST PRODUCE USED IN THE HOUSE - HOLD

Sl. No.	Item	Quantity kg/year	Source of supply	Rate
1.	Thatch grass			
2.	Fencing Branch wood			
3.	Green manure			
4.	Fencing thorn			
5.	Fodder by lopping			
6.	Fodder grass			
7.	Others			

FORM - I

EXISTING USE OF WOOD FOR HOUSE CONSTRUCTION

Year of construction :

I T E M	No.	Size L x W x thick- ness (Mtrs.)	Quantity of wood used in M <sup>3</sup> sawn wood	Source Forest/ Market	Spp. used	Price unit
1. Doors						
2. Windows						
3. Roof						
		Poles				
		Ballies				
		Beams				
		Rafters				
		Purlin				
		Parata				
		Plankings				
		Rippers				
		Supporters				
4. Ventilators						
5. Flooring						
6. Others						

Note: Doors & windows include the frames and panels.

FORM - II

EXISTING FURNITURE ITEMS

Year of manufacture

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Item	No.	Approximate quantity of sawn wood m <sup>3</sup>	Spp. used	Source supply	Price Unit
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1. CHAIRS

2. TABLES

3. Wooden Almirah

4. COTS

5. OTHERS(specify)

a)

b)

c)

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FORM - III  
AGRI - IMPLEMENT

ITEM	No.	Quantity of wood used m <sup>3</sup>	Source of supply	Sp. used	Price unit
1. Plough					
2. Yoke					
3. Bullock cart					
4. Leveller					
5. Tool handles (axes, scythe spal, etc.)					
6. Winnower					
7. Parsion wheels					
8. Other specify					

FORM - IV  
FUEL CONSUMPTION PER MONTH

Item	Fire wood (kg.)	Agri. waste (kg)	Cow dung (kg)	Elect- ricity (unit)	Gas (ltr)	Char- coal (kg)	Coal (kg)	Kerosene (litre)
1. Cooking								
2. Heating								
3. Light- ing								
Total								
Rate/unit .								



FORM- V

FUEL CONSUMPTION

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Sl. No.	Category	Source of supply
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1. Firewood
2. Agri. Waste
3. Animal dung

Schedule - B (General)

1. Type of equipment used - Ordinary/chula/smoke less chula/  
Biogas
2. Education level of the village.
3. Approach facilities - Katcha Road/Pucca Road
4. Service facilities - Hospital. School, etc.

Camp

Signature

Date