सत्यमेव जयते

For Official Use Only

FOREST RESOURCES SURVEY OF MEGHALAYA STATE

(EAST & WEST KHASI HILLS, JAINTIA HILLS AND EAST & WEST GARO HILLS DISTRICTS)

INVENTORY RESULTS

FOREST SURVEY OF INDIA
NORTHERN ZONE
SHIMLA

1990

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P R E F A C E

This report presents the forest inventory results of Meghalaya State comprising of East Khasi hills, West K[illegible] Jaintia hills, East Garo hills and West Garo hills. [illegible]. Field work in this region was carried out during [illegible]riod 1986 to 1988.

The total geographical area of the state is 22,429 km^2 [illegible] inventory was made over an area of 15,125.25 km^2 which is forested.

Bamboo forms exclusive crop over an area of 664.72 km^2 and occurs as understorey over an area of 2438.00 km^2. The clumps are in very poor shape over an area of 247.01 km^2.

On the basis of predominance of economically important tree species, six forest types have been identified in the area. These are Khasi pine, Teak, Sal, Hardwood mixed with conifers, Upland hardwoods and Mixed Forest types. Amongst these types, the "Teak forest" has been assessed to be having the best average stocking of 143.53 m^3 per hectare. The lowest average stock per hectare is that for " Hardwood mixed with conifers forest" which has only 41.73 m3 stock per hectare. The overall average growing stock per hectare is only 100.71 m^3.

The total growing stock standing in the accessible tree forest area has been assessed at 81.98 million cubic metres.

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It is hoped that the report will be of use to the state forest department and other organisations engaged in forest resource management planning. The inventory was made by the staff of the North Zone of Forest Survey of India who deserve commendation for the work.

Sd. J.B. Lal.
Director
Forest Survey of India
Dehradun

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SUMMARY

1. The forest inventory survey has been carried out in all the five districts of the state of Meghalaya i.e.East khasi hills, West khasi hills, Jaintia hills, East Garo hills and West Garo hills, during 1986 to 1988.

2. The objectives of the survey were to assess the forest resources of the region and changes therein, so as to focus attention on the critical aspects, thereby helping in the development planning.

3. The total geographical area of the state is 22,429 km^2. Of this an area of 16,353 km^2 (72.91%) was under forest in the year 1965 (reference year) as per the toposheets prepared by Survey of India and thematic maps prepared by Forest Survey of India from the aerial photographs. Out of this 16353 km^2 an area of about 1000 km^2 could not be surveyed due to non availability of Survey of India toposheets and another 228 km^2 area was excluded as it is under wildlife sanctuaries/ reserves thus leaving an area of 15125.25 km^2 which has been covered under the present survey.

4. Survey work for forest inventory was takenup over the forest area of 15,125.25 km^2 (1965) and the present (1987) status of this area is summarized below :-

Status	Area (Km^2)	Percentage
(a) Inaccessible area	644.35	4.26
(b) Area permanently diverted to non-forestry uses (1965 to 1987)	2098.31	13.87
(c) Area under degraded barren/ scrub and grass-land	1100.82	7.28
(d) Area under current and last year's shifting cultivation	2476.90	16.38
(e) Area under Bamboo brakes	664.72	4.39
(f) Accessible tree forest area	8140.11	53.82
Total	15,125.25	

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12. The districtwise breakup of the accessible tree forest area alongwith per hectare average stand and stock figures is as under :-

S.No.	District	Area ha.	Vol/ha	Stems/ha
1.	East & West khasi hills	469824	94.851	212.151
2.	Jaintia hills	137704	133.724	254.311
3.	East & West Garo hills	206483	92.018	182.961
	Total (Meghalaya)	814011	100.709	211.874

13. The total growing stock, in the accessible tree forest- area, is assessed at 81.98 million cubic metres corresponding to 172.47 million stems.

Chapter 1

THE BACKGROUND

1.1 Introduction

On the recommendations of National Commission on Agriculture the erstwhile PISFR organisation was converted into Forest Survey of India(FSI) w.e.f. 1-6-1981. The main objectives of FSI were to monitor periodically the changing situation of land and forest resources and to present the data for serving the needs of development planning. The inventory of forest resources was undertaken to provide area and volumetic information on forest land and its resources uding statistically designed methodology which was evolved in consultation with the Central Statistical Organisation(CSO).

After a critical review of the activities of FSI, the Govt. of India has redefined its objectives w.e.f. 30-6-86. The forest inventory activity is required to achieve one of these freshly defined objectives viz "to undertake work in regard to the preparation of forest inventory in selected States/UTs on agency basis".

As per the reorganisation of FSI, w.e.f. 30-6-86, the forest inventory activity is to be confined to the North Eastern region, Haryana, Punjab and Orissa States only and the inventory survey of Meghalaya was taken up accordingly by the Northern Zone at the request of North-East Council.

The State of Meghalaya is a land locked territory of lovely hills with abounding sylvan beauty. The State has been administratively divided into five districts viz. East Khasi hills, West Khasi Hills, East Garo Hills, West Garo Hills, and JaintiaHills. The area under the Khasi Hills and JaintiaHills districts is a plateau interspersed by river valleys, which in the southern portion

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takes the form of ravines. Altitude in this area varies from 100 metres to 1965 metres above MSL and the area is characterised by heavy rainfall, especially in the southern region.

The area of Garo Hills districts also consists of a plateau and drops steeply to the Brahamputra valley in the North and to the plains of Bangladesh in the South and West.

The highest peak in the State is the Shillong peak at 1965 metres. Nokrek in the East Garo Hills district is the highest peak at 1417 metres in Garo hills.

A number of rivers, none of them navigable, drain this mountainous State. Damring, Jira, Bugi Dareng and Simsang flow through Garo Hills. Kynshi, Ummawpa, Umngot, Umiam Mawphalang and Umiam Khwan flow through the Khasi Hills, while Kopli flows through Jaintia Hills.

Though currently the State stands administratively divided into five districts, as mentioned above, but the exact boundaries of only the three erstwhile districts of Khasi Hills, Jaintia Hills and Garo Hills are available on S.O.I. toposheets. Therefore, during our survey work, the data has been collected, processed and compiled separately for each of these three groups of districts.

Though the intention was to cover the entire State of Meghalaya in our inventory survey, an area of about 1000 km^2 was left out due to the non-availability of three relevant S.O.I. toposheets (78 K/3,4 & 78 G/15).

The forest inventory work, in this region was started in October, 1986 and completed in February,8 Therefore the year of survey is taken to be 1987.

1.2 Location and boundaries

The survey area i.e. the whole state of Meghalaya lies between 89°-50' to 92°-50'East longitudes and 25°-0' to 26° -10' North latitudes (see location map enclosed). It is bound on the North by Dhubure, Goalpara, Nowgong, Kamrup and Karbi-Anglong districts and on the East by the Cachar and North Cachar Hills districts of Assam. On the South and West is Bangladesh.

1.3 Climate

The climate of the area is mostly tropical in the lower heights where the state boundry touches Assam or Bangladesh and sub-tropical over most of the pleteau area with a prolonged rainy season which extends over more than six months from April to October. The average annual fainfall at Shillong, the capital of Meghalaya, is about 2000 mm. The area receiving world's heaviest rainfall is located near Cherapunjee. This is a village "Mawsynram" with an annual average of 12,163 mm. The average annual rainfall in selected centres in Meghalaya is tabulated in table No. 1.3.1. The maximum and minimum temperatures-monthwise-recorded at Shillong during 1982,1983 and 1984 are enlisted in table No. 1.3.2.

1.4 Physical features

Plateaus form the main physical features of this region with rolling grass lands interspersed by river valleys. The plateau of Garo Hills slopes down to the Brahamputra valley in the North and drops down towards Bangladesh in the South and West.

The whole area of the State is full of scenic beauty. Waterfalls, lakes, peaks and hills, meadows, valleys and rushing rivers combine to make a rich panorama. A number of rivers/riversystems drain the area, as mentioned in para 1.1 above.

1.5 Socio-economic conditions of the people

While the total geographical area of the State is 22,429 sq.km., the total population as per 1981 census is 13,55819. The average density of human population in the State is 60 per sq. km. The districtwise area, population and density as per 1981 census is tabulated in table No. 1.5.2.

Meghalaya is the homeland of three of India's ancient hill communities. The Khasis and Jaintias are held to be remnant 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. The area under agriculture, in the State is 2,23,756 hectares. Ownership of land - including most of the forest areas - is mainly private i.e. with the local tribals.

Jhumming or shifting cultivation is practised on a large scale especially in Garo Hills an d is one of the biggest problems to be tackled. Coal mining in Jaintia hills also adds substantially to the income of the local populations.

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

1.6 Forests.

Classification of forests into types has been done on the basis of occurance of species. The following forest types have been found in the survey area:-

1. Sal forest	Forests in which Sal trees constitute more than 20% of the stand.
2. Teak forest	Forests in which Teak trees constitute more than 20% of the stand.
3. Bamboo forest	Forests where the crop is almost pure bamboo.
4. Khasipine forest	Forests where Khasipine constitutes more than 50% of the stand.
5. Hardwoods mixed with conifers or Conifers mixed with hardwoods	Forests where the Conifers and the broad leaved species occur more or less in same proportion.
6. Miscellaneous forest	Tree forests which could not be classified into any of the above types.

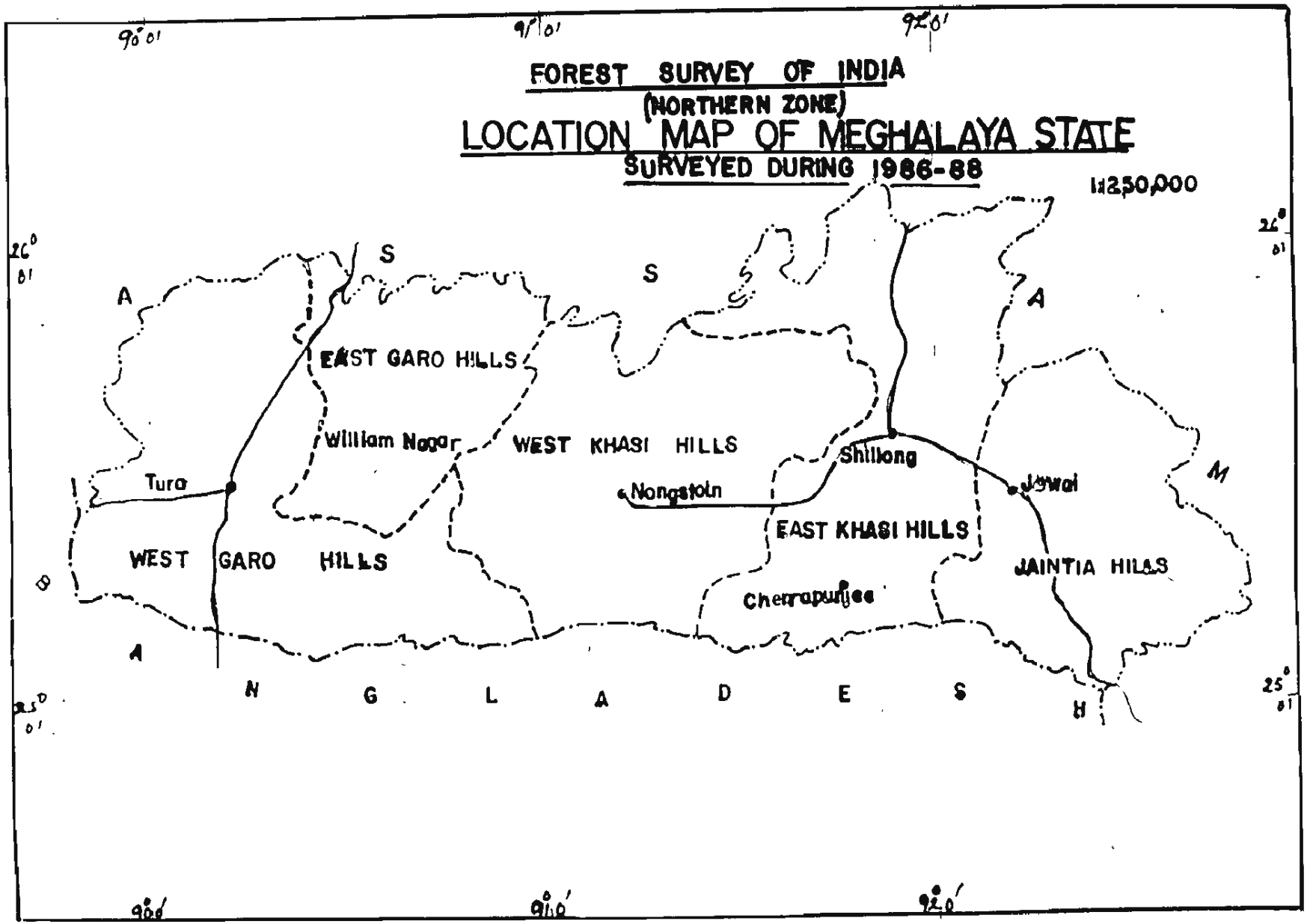
FOREST SURVEY OF INDIA
(NORTHERN ZONE)
LOCATION MAP OF MEGHALAYA STATE
SURVEYED DURING 1986-88
1:250,000
EAST GARO HILLS
William Nagar
WEST KHASI HILLS
Shillong
Nongstoin
Jowai
EAST KHASI HILLS
JAINTIA HILLS
Cherrapunjee
Tura
WEST GARO HILLS
B A N G L A D E S H
A S S A M

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Table No.1.3.1

Districtwise Rainfall data of selected places in survey area

Sl.No.	District	Name of selected places	Rainfall(mm) 1979
1.	East and West Khasi Hills	1. Upper Shillong	2341
		2. Cherrapunjee	12075
		3. Mawsynram	11986 (1977)
2.	Jaintia Hills	1. Rymphum Seed Farm	2275 (1976)
		2. Madan Saphai	5853 (1976)
		3. Jowai	3131 (1975)
3.	East and West Garo Hills	1. Tura	3802 (1977)

Source: Statistical Hand Book of Meghalaya 1982.

Table No. 1.3.2

Minimum and Maximum Temparature of Shillong
(in Centigrade)

Month	1982		1983		1984	
	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
(1)	(2)	(3)	(4)	(5)	(6)	(7)
January	15.7	6.7	13.6	5.2	13.4	4.5
February	16.5	7.1	15.4	5.9	17.2	7.6
March	22.2	11.3	20.1	10.4	22.1	11.3
April	22.2	13.0	23.1	13.1	24.7	14.6
May	24.8	15.6	22.7	15.1	22.7	15.6
June	22.9	17.0	25.0	17.7	23.2	17.8
July	24.3	17.7	24.1	17.8	23.0	17.5
August	24.5	17.7	23.2	17.9	23.9	17.7
September	28.0	16.8	22.8	17.1	21.8	15.9
October	21.6	13.6	22.2	15.4	21.4	14.4
November	17.5	9.4	19.4	10.7	18.8	9.4
December	14.5	6.4	14.8	6.2	15.5	6.7

Source : Statistical Handbook of Meghalaya, 1987.

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Table No. 1.5.1

Districtwise area and human population/Density

Sl.No.	District	Area in (km^2)	Population	Density per (km^2)
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 Meghalaya 1982.

Table No. 1.5.2

Districtwise and categorieswise Livestock population in (000 Nos)

Sl. No.	Categories	DISTRICT East Khasi Hills	West Khasi Hills	Jaintia Hills	East Garo Hills	West Garo Hills	Total
1.	Cattle	116	110	91	72	161	550
2.	Buffaloes	7	4	2	3	13	29
3.	Sheep	8	16	1	-	1	26
4.	Goats	54	39	23	12	58	186
5.	Horses & Ponies	2	5	a	a	a	8
6.	Pigs	71	41	26	24	45	207
7.	Other livestock	6	-	4	-	7	12
	Total Livestock	258	215	147	111	286	1017

NB:- 'a' indicates less than 5 hundred numbers

Source:- Statistical Hand Book of Meghalaya 1982

Chapter - 2

2.1 Design and Methodology of the survey

The 'forest areas' marked on 1:50,000 scale topographic mapsheets-prepared by the Survey of India-were used as the basis of forest inventory. The year of survey and publication, of the maps used in the survey, are given in appendix -I. A set of the available thematic maps, covering only a part of the survey area, prepared from the interpretation of aerial photographs, were also used and a list of these is given in appendix-II. Such areas/patches appearing as 'forests' in these thematic maps-which did not appear as forest areas(green wash) in the relevant S.O.I. toposheets-were transferred onto the S.O.I. toposheets and accounted towards forest area (in addition to the green wash)

2.2 Definition of forest area

The following are treated as 'Forest Areas' for carrying out the forest inventory and for the purpose of this report.

i) All those areas shown in 'green wash' on the survey of India topographic map sheets.

ii) All those areas indicated by dotted line or broken line or a pillar line as 'forest areas' on Survey of India toposheet.

iii) All those areas appearing as forests on the thematic maps-prepared from the interpretation of aerial photographs-though appearing as non forest i.e. without green wash, on the S.O.I. topo mapsheets.

2.3 Sampling design

1:50,000 scale Survey of India topographic sheet was divided into 36 grids of 2½'x2½' of latitudes and longitudes. In each of such grids two sample points were marked. The inventory data was collected from a square plot of 0.1 ha. laid out at each of these sample points.

2.3.1 Method of marking two point cluster in the grid

The length and width of each grid is measured to the first decimal in millimetres. From this length 0.6 mm is deducted. Suppose, the measurable length and width of a grid along its X & Y axis are 83.5 mm and 92.5 mm respectively. After deducting 0.6 mm the reduced length and width are 82.9 mm and 91.9 mm respectively. A three digit random number is selected from the random number table for each axis separately.

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If the selected random numbers are leas than 829 and 919 respectively then they are retained as such otherwise the next random number is considered. Suppose the random numbers selected are 144 and 161 respectively, then the numbers will correspond to 14.4 mm and 16.1 mm lengths along the X and Y axes respectively. To these lengths viz 14.4 mm and 16.1 mm, 0.3 mm is added. Now 14.7 mm and 16.4 mm become the co-ordinates of the first sample point in the grid. Taking SW corner of this grid as origin and measuring 14.7 mm and 16.4 mm along X & Y axis respectively the centre of the first plot is marked. The centre of the first plot is then joined by a straight line to the grid centre. This line is extended on the other side. On this extended line the second point is marked at a distance equal to the distance of the first point from grid centre. This point is the centre of the second plot.

All sample points falling in forest areas are located on the ground. Quantitative data is collected from sample plots and qualitative data from the surroundings of the plot. The co-ordinates of the plot centres inventoried and the relevant data pertaining to these plots is given in Appendix-II.

2.4 Field methodology

The field data is collected by a crew, consisting of one Junior Technical Assistant(crew leader), a deputy Ranger, two to three fieldmen, a Khalasi and unskilled labourers hired locally wherever necessary. The crew leader is provided with a list of sample plots to be surveyed by his crew during the season alongwith a set of toposheets with sample points already marked. A set of measuring instruments viz Silva's compass, Haga/Blume Liess hypsometer, Callipers, measuring tapes and ranging rods etc. are provided.

After deciding the plot and the grid number to be surveyed on a particular day from a camping spot the crew leader reaches a prominent physical feature (also called starting reference point, as near to the sample point as possible) which is depicted on the map and can also be identified on the ground. Usually, the following features are selected as reference point:

i) Benck marks
ii) Triangulation points
iii) Village trijunction points
iv) Bridges and culverts
v) Temples, mosques and churches.

vi) Crossing of rail tract with roads, rivers streams.

vii) Junctions of rivers of streams with roads

viii) Junctions of streams

ix) Junctions of roads

x) Prominent bends in roads, rivers, streams

xi) Ponds and wells

xii) Springs

xiii) Prominent topographical features in hilly region such as spurs, knolls etc.

xiv) Mile stones or kilometer stones.

xv) Boundary pillars (of international, state, district and forest boundaries).

Having located a prominent physical feature (reference point) both on the ground as well as on the map, the distance & bearing of the sample point from this physical feature is measured from the map. The bearing is measured with the help of a protractor or the Silva's compass. At this reference point the crew leader records details of the reference feature used, the bearing distance of the sample point from the reference feature, the name of the camping spot, thetime taken to complete the work etc, in the 'Plot Approach Form'. Information recorded in this form is used in time and cost study for the inventory and helping to relocate the point at a future date. Specimen of this Form is given in Appendix-III. From the reference point crew leader traverses the distance in the direction as measured on the map to reach the sample point. A wooden peg is fixed at this location which is the centre of the sample plot. After reaching the sample point, a square sample plot of 0.1 ha. area with diagonals measuring 44.72 metres in NE-SW & NW-SE directions is laid out on the ground by marking its four corners by pegs. Regeneration data is collected from a plot measuring 4 m x 4 m, and herb-shrub data from a plot of 2 m x 2 m size(see diagram at page9)

After laying out the plot, the crew leader with the help of other crew members collects the inventory data in the following field forms:

i) Plot description form

ii) Plot enumeration Form

iii) Sample tree form

iv) Bamboo enumeration form (clump forming)

v) Bamboo enumeration form (Non clump forming)

vi) Bamboo weight form

vii) Herbs and shrubs data form

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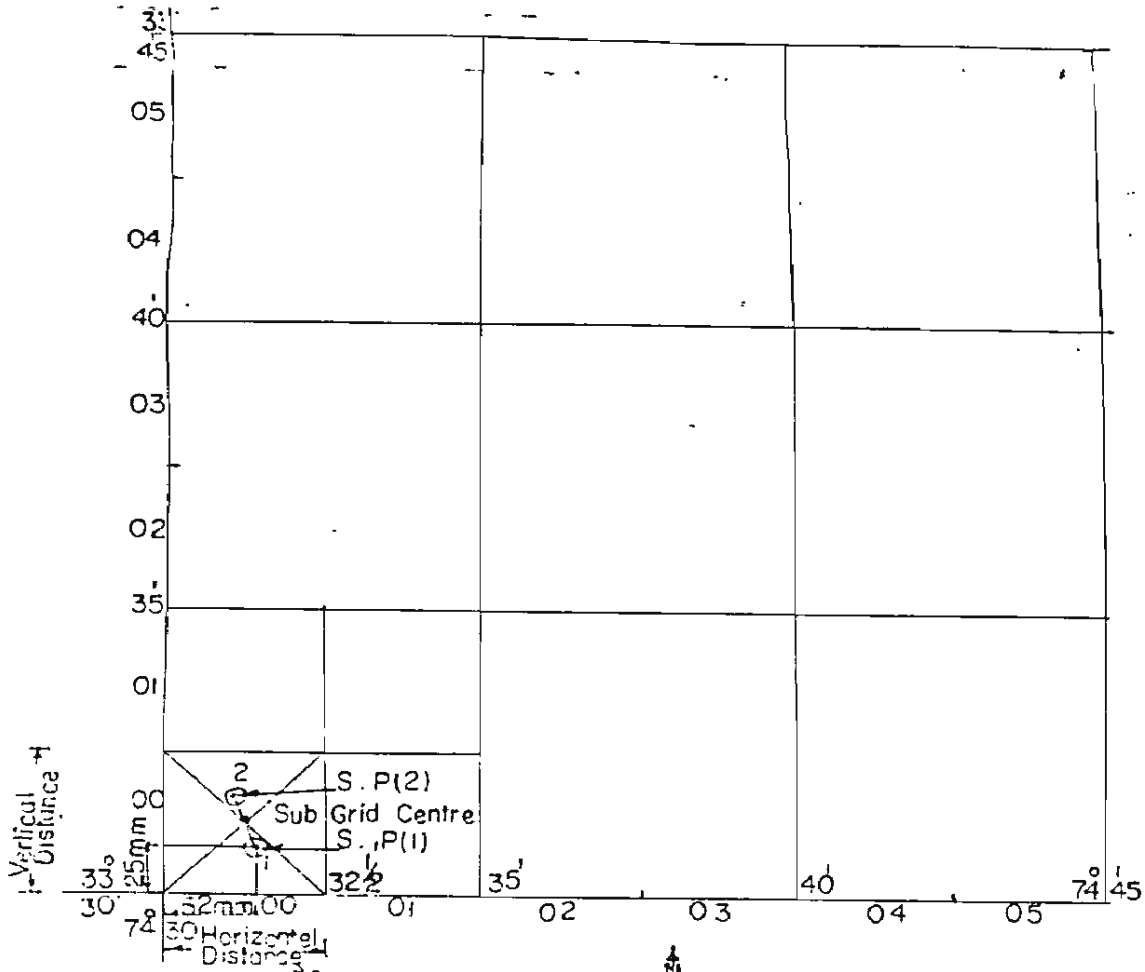
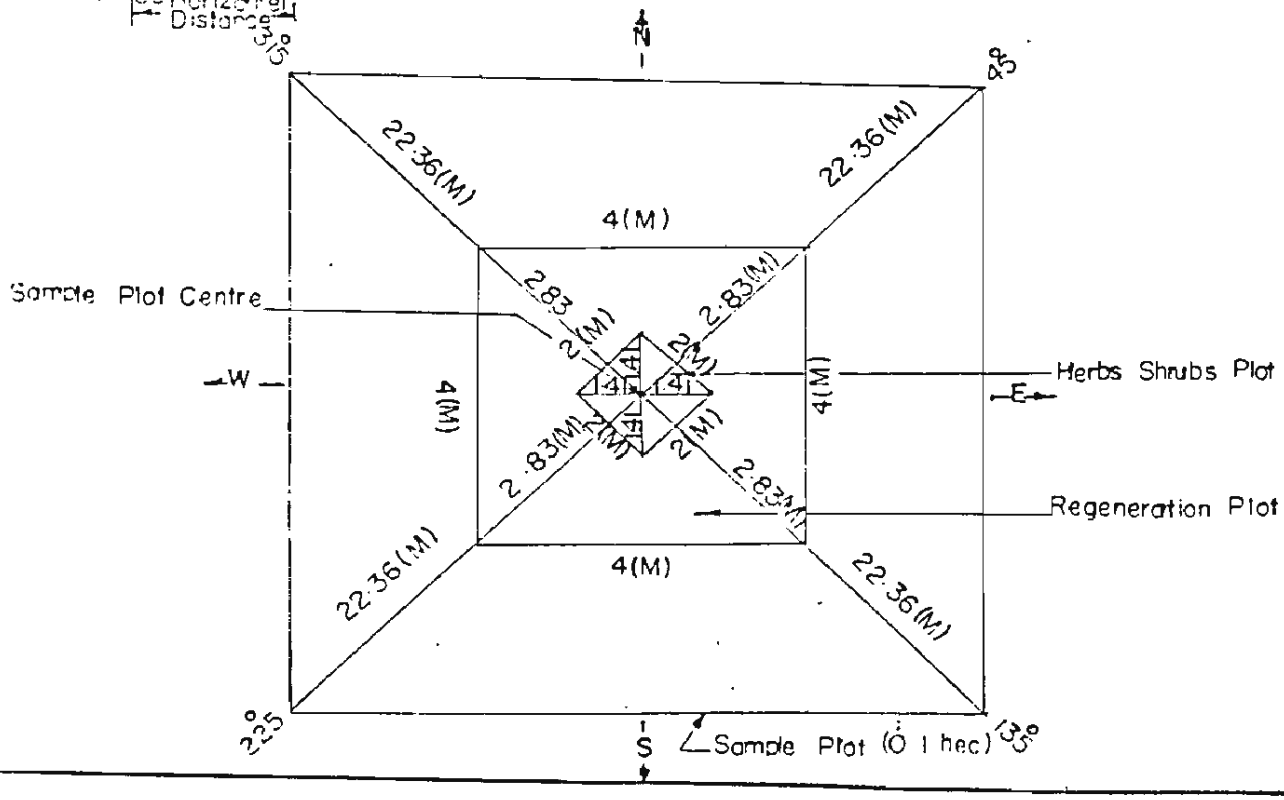
SKETCH SHOWING SAMPLING DESIGN AND LAYOUT OF PLOTS





Facsimile of the above field forms may be found in Appendix-III. They are briefly described below:

(i) Plot description form(PDF)

Qualitative data such as land use, crop composition of tree crop andits density, intensity of erosion in the area, fire and grazing incidence, regeneration status etc. are recorded in this Form. The basis of assessment is occular, by examining a surrounding area of about 2 ha. around the plot centre.

(ii) Plot enumeration Form (PEF)

In this form the trees and bamboo clumps in the sample plot are enumerated and recorded with their species and diameter at breast height.

(iii) Sample tree Form (STF)

The data in this form is collected from the norther quarter of the sample plot. Name of the tree species, its diameter at breast height, twice bark thickness, dominance status, length of the clear bole, and height etc. of each tree enumerated in this quadrant are recorded. The data from this form helps in developing the local volume equations for the species in the survey area. Under bark volume is also derived from the local volume equations with the help of bark thickness data.

(iv) &(v) Bamboo enumeration(clump and non clump variety) Form

These Forms are used wherever bamboo clumps, whether of clump or non-clump forming variety, are encountered in the sample plots. Data such as culms in each clump, their size, maturity condition, length etc are recorded.

(vi) Bamboo weight Form

For determining the co-relation between green and dry weight of the utilizable length of bamboo culm, data on weight are recorded in this Form.

(vii) Herbs and shrubs data Form

In this form names and other details of all identifiable species of herbs and shrubs are recorded In case of species that could not be identified in the field, the number of such species only are noted.

The above is a brief description of the design and given in survey methodology. The details are given in'the Manual of instruction for field inventory' of Forest Survey of India.

Chapter - 3

DATA PROCESSING

3.0 Processing on electronic computer

After the completion of field work, the field forms (i to vii) of the region surveyed are consolidated and sent to the data processing unit of this organisation at Dehradun. The data contained in the field Forms are checked for inconsistencies and coding mistakes. The coded data is then transferred on to punch cards using punching machines. Punching mistakes, are detected with the help of card verifier, and the mistakes, if any, are rectified. The cards are then sorted and loaded onto the computer. A suitable programme is evolved to get the results in the desired format.

3.1 Area computation

The area of 'forest land' on the 1:50,000 scale, topographical maps was calculated using closely spaced dot grid template where one dot represented one hectare. Further distribution of forest area under various classes such as land use, accessible tree forest area, forest types, soil erosion, status, grazing incidence, fire incidence, canopy density classes etc. was arrived at proportionately using ratio estimator. However it may be noted that area tables are based on few sample points and therefore, should be considered as indicative only and used with due caution.

3.2 Volume Estimation

collection of felled tree data by zones, for developing general volume equations, has been discontinued now. However during an earlier inventory survey in Meghalaya in 1974 & 1975 the "general" as well as "local volume equations" were developed using felled tree data and height-diameter relationships. Those volume equations have been adopted for "volume estimation" in the current inventory survey also.

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"General volume equations used in the report are ;

Species code

162 - 400 1. Toona ciliata and Lannea coromandelica

$$V = 0.20577 + 0.00035623\ D^2 + 0.0000181\ D^2H$$

056-327-393 2. Amoora wallichii, Gmelina arborea & Kydia calycin

$$V = 0.0914 + 0.0001527\ D^2 + 0.0000314\ D^2H$$

065 - 628 3. Antho-cephalus cadamba and Schima wallichii

$$V = -0.13718 + 0.019097\ H + 0.000031049\ D^2H$$

General

048-109-251 4. Albizzia species, Bombax ceiba & Duabanga sonneritioides

$$V = -1.5567 + 0.0006182\ D^2 + 0.0000054684\ D^2H + 0.090192\ H$$

536 - 5. Pinus keseyia

$$V = 0.02356 + 0.0004842\ D^2 + 0.00001640\ D^2H$$

634 - 674 6. Shorea robusta & Tectona grandis

$$V = -2.2086 + 0.12879\ H + 0.0000247\ D^2H$$

924 7. Misc.

$$V = -0.63783 + 0.05150\ H + 0.000027956\ D^2H$$

On the basis of the above general volume equations the following local volume equations were derived for Meghalaya survey area.

1. Toona ciliata & Lannea coromandelica

$$V = -1.3910 - 0.14129\ D + 0.001645\ D^2 + 0.90411\sqrt{}$$

2. Amoora wallichii, Gmelina arborea & Kydia calycina

$$V = -0.0087 + 0.003675\ D + 0.0007398\ D^2$$

3. Anthocephalus cadamba and Schima wallichii

$$V = -0.0189 + 0.0008073\ D^2$$

Local

4. Albizzia species, Bombax ceiba and Duabanga sonneritioides

$$V = 0.29208 + 0.00092412\ D^2$$

5. Pinus keseyia

$$V = 0.0232 - 0.011613\ D + 0.0011549\ D^2$$

6. Shorea robusta and Tectona grandis

$$V = -0.09016 + 0.0009828\ D^2$$

Contents

7. Miscellaneous

$$V = -0.081297 + 0.0010659\ D^2$$

Note: All the above local volume equations except for S. No. 6 - are from the earlier Meghalaya inventory report (1979). In respect of S. No. 6 - i.e. 'Sal' and 'Teak' - the local volume equation developed in the inventory report (1981) of Nowgong & Karbianglong has been adopted as the equation of Meghalaya report was giving inflated volumes at lower diameters.

3.3 Stand and stock tables

The volume of each enumerated tree of a species was estimated by substituting its breast height overbark diameter in local volume equation of that species. The volumes converted to per hectare were stored in a tree/plot volume file together with species code, diameter of tree, parameters of plot description form, per hectare volume and stems of the plot. The elements of information stored in the above files were utilised to classify the tree by species and diameter. Estimates of number of stems and volume per hectare and total by species and diameter classes were obtained for different strata viz. district, forest types etc.

3.4 Sampling error

The sample was considered to constitute a sample random of unequal clusters as in many cases only one plot was available from the grid. The sampling error was calculated as follows ;

Let n=Total No. of clusters(grids) in the sample

x_i =The No. of plots in the ith cluster (grid).

Yi =The total of per hectare volume in the ith cluster

$$\bar{x} = \sum_{i=1}^{n} \frac{x_i}{n} = \text{Avg. No. of plots per cluster}$$

$$\hat{R} = \frac{\sum_{i=1}^{n}}{\sum_{i=1}^{n} X_i} = \text{Estimate of average volume per hectare over all clusters.}$$

$$V(\hat{r}) = \frac{1}{n(n-1)\ \bar{x}^{-2}} \left(\sum_{i=1}^{n} Y_i^2 - 2\hat{R} \sum_{i=1}^{n} x_i Y_i + \hat{R}^2 \sum_{i=1}^{n} x_i \right)$$

(Ignoring finite population correction factor)

Estimate of standard error of R

$$S.E. = \sqrt{V(R)}$$

$$S.E.\% = \frac{S.E. \times 100}{\text{Mean}} = \frac{S.E. \times 100}{\hat{R}}$$

The S.E. of the total volume for the region as a whole is calculated by pooling the SES of vol./ha. of districts, using the formula

$$SE(\text{vol.region}) = \sqrt{SE_1^2 . A_1^2 + SE_2^2 . A_2^2 + \ldots\ldots SE_n^2 . A_n^2}$$

Where SE_1 ..... n are SEs of district 1 to n.

and A_1 .....n are areas of districts 1 to n.

$$SE(\text{vol.region})\% = \frac{SE(\text{vol.region}) \times 100}{\text{Total vol. of region}}$$

Chapter - 4

FOREST INVENTORY RESULTS

4.0 In this chapter, the results of forest inventory and the critical aspects of forest resources-as evident therefrom in the survey area-are presented. This is a low intensity survey (0.01 percent). Its results are therefore, reliable and valid for the region as a whole. However, districtwise information of some attributes has also been given which may be considered as indicative only.

4.1 FOREST AREA

Forest area has already been defined in Chapter 2. This is an essential component of forest inventory and is computed from maps. In the present survey SOI topo sheets on 1:50,000 scale formed the basis of inventory survey and as such these were made use of in computing forest area and estimation of growing stock by ground surveys. Within the forest area the demarcated blank areas have been mentioned separately.

The survey area is covered by 54 toposheets of 1:50,000 scale viz:- 78 G/13,14,15, 78 J/8,12, 78 K/1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16, 78 N/12,16, 78 O/1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16, 83 B/4,8, 83 C/1,2,3,4,5,6,7,8, ,10,11,12,15,16 Each of these sheets, alongwith the respective year of survey, has been listed vide appendix I. A number of available thematic maps prepared from the visual interpretation of aerial photographs were also used for identifying forest areas, other than those appearing as greenwash on the toposheets and the sample plots were marked in such areas also. A list of these is given vide appendix II.

The years of survey of most of the S.O.I. toposheets having greenwash are 1961-62 to 1967-68 and the year of photography of most of the aerial photographs is 1964. Therefore 1965 is taken to be the base year for monitoring changes in the forest areas till 1987(year of survey)

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The total forest area (in the base year 1965) - as defined in para 2.2 - identified on the available maps for survey was computed to be 15,353.25 km^2. This, however, does not include the forest area falling in S.O.I. toposheets 78K/3,4 & 78G/15 - due to their nonavailability from Survey of India- which is assessed at about 1000km^2 (from the Atlas). A total of 1684 sample points were marked on the maps in this forest area (15,353 km^2). However 24 of these points were later found to be falling in "Wildlife reserves/sanctuaries" and were, therefore, excluded from the purview of the inventory survey. The breakup of the remaining forest area of 15,125.25 km^2- takenup for survey - districtwise and alongwith the number of sample plots inventoried therein, is given below in table 4.1 .

Table 4.1

Districtwise forest area (in the base year 1965) and number of sample plots inventoried therein .

S.No.	Districts	Forest Area 1965 km^2	No. of sample plots	Weightage of each plot (km^2 per plot)
1.	East & West Khasi Hills	7212.29 ✓	809	8.92
2.	Jaintia Hills	2168.63	263	8.25
3.	East & West Garo Hills	5744.33	587	9.79
Total(Meghalaya)		15125.25	1659	9.12

Distribution of the area, in all the tables that follow, has been worked out on the basis of ratio estimator.

Out of the total geographical area of 22,429 km^2, an area of 16353 km^2 (72.91 %) has been assessed to be under forest in the base year i.e. 1965. (This includes 1000 km^2 of forest area assessed on the basis of greenwash shown on the Atlas as the topographical maps are not available for this area) .

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4.1.1 Distribution of forest area by land use classes

Out of the total forest area of 15,125.25 km^2 (1965) taken up for survey, only 8,140.11 km^2 (53.82%) is now (1987) assessed to be under "accessible tree forest ", 664.72 km^2 (4.39%) is under "Bamboo brakes", 644.39 km^2 (4.26%) is inaccessible, 2476.90 km^2 (16.38%) is under "current and lastyears shifting cultivation", 2098.31 km (13.87%) stands permanently diverted to non forestry usea and 1100.82 km^2 (7.28%) is now under scrub/grassland barren land.

The district wise distribution is given in the following table 4.1.1.

Table No. 4.1.1.

Distribution of forest area (Tree cover shown by greenwash and of demarcated blank on topo-sheets and thematic maps) and number of sample plots inventoried therein by land use.

	East & West Khasi Hills distts.		Jaintia Hills		East & West Garo Hills distts.		Total	
	No. of sample plots	Area (km^2)	No. of sample plots	Area (km^2)	No. of sample plots	Area (km^2)	No. of sample plots	Area (km^2)
01 Tree forest	523	4662.58	167	1377.04	211	2064.83	901	8104.45
02 Plantation	04	35.66	-	-	-	-	04	35.66
03. Bamboo brakes	31	276.37	2	16.49	38	371.86	71	664.72
04. Scrub forest	27	240.71	3	24.74	73	714.37	103	979.82
05. Govt. grass land	02	17.83	6	49.47	1	9.79	9	77.09
06. Barren land	04	35.66	1	8.25	-	-	5	43.91
07. Agricultural land with/without trees in surround	69	615.14	20	164.92	54	528.44	143	1308.50
08. Current and last year's shifting cultivation	74	659.71	21	173.16	168	1644.03	263	2476.90
09. Water bodies.	02	17.83	-	-	-	-	02	17.83
10. Habitation	13	115.89	2	16.49	20	195.72	35	328.10
11. Non forestry plantation	25	222.88	9	74.21	15	146.79	49	443.88
12. Inaccessible	35	312.03	32	263.86	7	68.50	74	644.39
Total	809	7212.29	263	2168.63	587	5744.33	1659	15125.25
(a) Accessible forest area (01 to 06 and 08)	665	5928.52	200	1649.15	491	4804.88	1356	12382.55
(b) Accessible forest area excluding current & last year's shifting cultivation (01 to 06)	591	5268.81	179	1475.99	323	3160.85	1093	9905.65
(c) Accessible tree forest (01 to 02)	527	4698.24	167	1377.04	211	2064.83	905	8140.11
(d) Forest area permanently deverted for other uses(07,09 to 11)	109	971.74	31	255.62	89	870.95	229	2098.31
(e) Forest area degraded to scrub/barren land/grass land (04 to 06)	33	294.20	10	82.46	74	724.16	117	1100.82

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The following conclusions can be drawn from the results tabulated above in table 4.1.1 :-

(a) Out of 15,125,25 km^2 of forest area (1965) takenup for survey, 12,382.55 km^2(81.87%) has been assessed to be under the catogory "Accessible forest area" now (1987) Out of the remaining 2,742.70 km^2(18.13%), 2098.31 km^2 (13.87%) stands permanently diverted to non-forestry uses and 644.39 km^2(4.26%) is inaccessible.

(b) Even out of 12,382,55 km^2 of "accessible forest area", an area of 2476.90 km^2 is under current and last year's shifting cultivation and 1100.82 $km^2$is under scrub/grassland/ barren land thus leaving only 8804.83 km^2 under "Accessible tree forest" and "bamboo brakes" .

(c) The "accessible tree forest" area is 8,140.11 km^2 and accessible area under bamboo forest/brakes is 664.72 km^2. Out of the total accessible tree forest area of 8140.11 km^2, an area of only 35.66 km^2 is under young forestry plantations.

(d) The area under shifting cultivation-current and last year's - has been assessed at 2476.90 km^2. [illegible] an average cycle of 6 years the total area affected by shifting cultivation is assessed at $\frac{2476.90}{} \times 6$ i.e. nearly 7,500 km^2 in the surveyed area.

Note ;The accessible forest area includes those areas which could not be visited but were identified on the basis of vicinity visit. In such cases as many attributes as possible were recorded, on the basis of vicinity visit, and rest of attributes which could not be assessed were clubbed under the category "Unrecorded".

4.1.2 Distribution of accessible forest area by soil depth

Out of the total accessible forest area- excluding area under current and last year's shifting cultivation - of 9,905.65 km^2, 38.15% (3778.77 km^2) has a soil depth of 90 cm or more and only 15.05% (1490.57 Km^2) area has a soil depth of less than 30 cm. The districtwise distribution - by soil depth classes - is given in the following table No.4.1.2.

Table No. 4.1.2

Accessible forest area :9905.65
(Excluding area under current & last year's shifting cultivation

Unit : km^2

Distribution of accessible forest area by soil depth.

S.No.	Soil Depth Class	DISTRICT East & West Khasi Hills distts.	Jaintia Hills	East & West Garo Hills distt.	Total	%
1.	No soil	-	-	-	-	-
2.	Soil depth less than 15 cms.	98.07	49.47	58.72	206.26	2.08
3.	Soil depth 15 cms or more but less than 30 cms.	525.99	288.60	469.72	1284.31	12.97
4.	Soil depth 30 cms or more but less than 90 cms.	1943.48	511.24	1193.88	3648.60	36.83
5.	Soil depth 90 cms or more	2023.72	453.52	1301.53	3778.77	38.15
6.*	Unrecorded	677.55	173.16	137.00	987.71	9.97
	Total	5268.81	1475.99	3160.85	9905.65	100

* Unrecorded relates to those points where information could not be collected.

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4.1.3 Distribution of accessible forest area by soil texture

A high percentage of 50.28% (4980.49 km^2) of th total accessible forest area (excluding current and last year's shifting cultivation) has a "clayey loam" texture followed by 20.26% (2006.78 km^2) having sandy loam texture, 12.84% (1271.30 km^2) having 'loam' texture, 5.93% (587.65 km^2) having "clayey" texture and only 0.72% (71.72 km^2) having "sandy" texture. The districtwise distribution- by soil texture classe - is given below in table No. 4.1.3.

Table No. 4.1.3

Accessible forest area : 9905.65
(Excluding current & last years shifting cultivation)

Distribution of accessible forest area by soil texture.

Unit : km^2

S.No.	Soil texture	DISTRICT East & West Khasi Hills	Jaintia Hills	East & West Garo Hills	Total	%
1.	Clayey	401.18	49.47	137.00	587.65	5.93
2.	Clayey loam	2193.11	742.12	2045.26	4980.49	50.28
3.	Loam	811.27	156.67	303.36	1271.30	12.84
4.	Sandy loam	1150.04	338.08	518.66	2006.78	20.26
5.	Sandy	35.66	16.49	19.57	71.72	0.72
6.	No soil	-	-	-	-	-
7.	*Unrecorded	677.55	173.16	137.00	987.71	9.97
	Total	5268.81	1475.99	3160.85	9905.65	100

* Unrecorded relates to those points where information could not be collected.

4.1.4 Distribution of accessible forest area by soil erosion status

86.56% (8574.79 km^2) of the total accessible forest area (excluding current and last year's shifting cultivation) has almost no soil erosion or slight erosion (only surface erosion present). 2.83% (280.53 km^2) area is having moderate erosion i.e. having small gullies and rills on the top surface of the soil and only 0.63% (62.62 km^2)area is heavily erroded i.e. deep gullies, ravines, land slips etc. The districtwise distribution - by soil erosion status - is given in the following table No. 4.1.4.

Table No. 4.1.4

Accessible forest area =9905.65 (Excluding current & last years shifting cultivation)

Unit = km^2

Distribution of accessible forest area by soil erosion status

S.No.	Erosion Status	DISTRICT East & Wesst Khasi Hills	Jaintia Hills	East & West Garo Hills	Total	%
1.	Mild erosion i.e. no erosion or slight erosion where only surface erosion has taken place.	4386.21	1203.88	2984.70	8574.79	86.57
2.	Moderate erosion ie. where small gullies and rills are formed on the top surface of soil.	160.47	90.70	29.36	280.53	2.83
3.	Heavy erosion i.e. area which has deep gullies ravines, land slips etc.	44.58	8.25	9.79	62.62	0.63
4.	* Unrecorded	677.55	173.16	137.00	987.71	9.97
	Total	5268.81	1475.99	3160.85	9905.65	100

* Unrecorded relates to those points where information could not be collected.

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4.1.5 Distribution of accessible forest area by grazing incidence classes

Only 4.07% (403.25 km^2) of the total accessible forest area (excluding current and last year's shifting cultivation) is suffering from heavy grazing followed by 16.76% (1660.28 km^2) area having a moderate grazing incidence, 39.26% (3889.23 km^2) having light grazing incidence and 29.49% (2921.27 km^2) having no grazing incidence. The districtwise distribution - by grazing incidence classes - is given below in table No. 4.1.5.

Table 4.1.5

Accessible forest area :- 9905.65
(Excluding current & last year's shifting cultivation)

Unit : km^2

Distribution of accessible forest area by grazing incidence classes

S.No.	Grazing incidence	DISTRICT East & West Khasi Hills	Jaintia Hills	East & West Garo Hills	Total	%
1.	Heavy grazing	285.28	49.47	68.50	403.25	4.07
2.	Medium grazing	989.57	181.41	489.30	1660.28	16.76
3.	Light grazing	2005.89	552.46	1330.88	3889.23	39.26
4.	No. grazing	1274.86	511.24	1135.17	2921.27	29.49
5.	* Unrecorded	713.21	181.41	137.00	1031.62	10.42
6.	Total	5268.81	1475.99	3160.85	9905.65	100

* Unrecorded relates to those points where information could not be collected and includes the points falling in "barren land" for which this attribute was not recorded.

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4.1.6 Distribution of accessible forest area by plantation potential

46.48% (4604.44 km^2) of the total accessible forest area (excluding area under current and last years shifting cultivation) doesn't need further stocking by way of plantation. 0.75% (75.01 km^2) area has been assessed as unplantable due to poor soil cover or other adverse conditions and in 42.34% (4194.58 km^2) area there is a scope for undertaking afforestation or augmentation of stocking by plantations. The districtwise distribution - by plantation potential - is given below in table No. 4.1.6.

Table 4.1.6

Accessible forest area : 9905-65
(Excluding current last years & shifting cultivation)
Unit : km^2

Distribution of accessible forest area by plantation potential;

S.No.	Plantation potential	DISTRICT East & West Khasi Hills	Jaintia Hills	East & West Garo Hills	Total	%
1.	Plantable	1889.99	445.27	1859.32	4194.58	42.34
2.	Un-plantable	17.83	8.25	48.93	75.01	00.76
3.	Not applicable	2647.78	841.06	1115.60	4604.44	46.48
4.	* Unrecorded	713.21	181.41	137.00	1031.62	10.42
	Total	5268.81	1475.99	3160.85	9905.65	100

* Unrecorded relates to those points where information could not be collected.

Explanatory note:

Plantation potential was assessed only at those sample points having tree crown cover density of less than 30%. Plantable/unplantable potential was determined by giving due consideration to aspect, soil depth, drainage, crop in surrounding area and other biotic and climate factors. The maximum permissible slope upto which plantation can be raised was kept 40° and minimum soil depth as 20 cms. Sample plots having crown density of 30% or more were catagorised as not applicable since plantation potential of such area, from afforestation point of view, is not of any significance

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4.1.7 Distribution of accessible forest area by fire incidence classes

Incidence of very heavy fire is over an area of only 0.27% (26.75 km^2) of the total accessible forest area (excluding current and last years shifting cultivation) followed by 2.72% (269.12 km^2) area having frequent fires. Most of the area i.e. 86.50% (8578.16 km^2) is either having occassional fires or no fire. The districtwise distribution - by fire incidence classes - is given below in table No. 4.1.7.

Table 4.1.7

Accessible forest area :- 9905.65
(Excluding current last year's & shifting cultivation)
Unit : km^2

Distribution of accessible forest area by fire incidence classes

S.No.	Fire incidence	DISTRICT East & West Khasi Hills	Jaintia Hills	East & West Garo Hills	Total	%
1.	Very heavy	26.75	-	-	26.75	0.27
2.	Frequent	187.21	32.98	48.93	269.12	2.72
3.	Occasional	1970.23	486.50	890.52	3347.25	33.79
4.	No fire	2371.41	775.10	2084.40	5230.91	52.81
5.	* Unrecorded	713.21	181.41	137.00	1031.62	10.41
	Total	5268.81	1475.39	3160.85	9905.65	100

* Unrecorded relates to those points where information could not be collected and includes the points falling in "barren land" for which this attribute was not recorded.

4.1.8 Distribution of accessible tree forest area by size classes

The total accessible tree forest area is is 8140.11 km^2. 1 % of this is under "regeneration size", 39.76% is under "pole crop", 30.81% is under "small timber", 4.74% is under "big timber" and 12.22% is under "mixed size class". The districtwise distribution - by crop size class - is given in the following table No. 4.1.8.

Table 4.1.8

Accessible tree forest area:8140.11
Unit: km^2

Distribution of accessible tree forest area by size class

S.No.	Size class	DISTRICT East & West Khasi Hills	Jaintia Hills	East & West Garo Hills	Total	%
1.	Regeneration	62.41	-	19.57	81.98	1.00
2.	Pole crop	1988.06	494.75	753.52	3236.33	39.76
3.	Small timber	1310.51	346.32	851.38	2508.21	30.81
4.	Big timber	196.13	32.98	156.57	385.68	4.74
5.	Mixed size class	508.16	329.83	156.57	994.56	12.22
6.	* Unrecorded	632.97	173.16	127.22	933.35	11.47
	Total	4698.24	1377.04	2064.83	8140.11	100

* Unrecorded relates to those points where information could not be collected.

Explanatory note:
Regeneration : i.e. crop below 10 cms diameter predominating.
Pole crop : Crop between 10 to less than 20 cms diameter predominating.
Small timber : Crop 20 cms to under 30 cms diameter predominating.
Big timber : Tree with diameter 30 cms. and over predominating.
Mixed size class: Tree crop with no marked domination of any class.

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4.1.9 Distribution of accessible tree forest area by regeneration status.

Only 0.44% (35.66 km^2) of the accessible tree forest area is having "adequate regeneration". 4.13% (336.35 km^2) area is having "inadequate regeneration" and in 83.96% (6834.75 km^2) area the regeneration (of economically important tree species) is "absent". The districtwise distribution - by regeneration status - is given in the following table No. 4.1.9.

Table 4.1.9

Accessible tree forest area:8140.
Unit: km^2

Distribution of accessible tree forest area by regeneration status.

S.No.	Regeneration status	East & West Khasi Hills	Jaintia Hills	East & West Garo Hills	Total	%
1.	Adequate	35.66	-	-	35.66	0.44
2.	Inadequate	231.79	16.49	88.07	336.35	4.13
3.	Absent	3797.82	1167.39	1849.54	6834.75	83.96
	Unrecorded	632.97	173.16	127.22	933.35	11.47
	Total	4698.24	1377.04	2064.83	8140.11	100

Unrecorded relates to those points where information could not be collected.

EXPLANATORY NOTE :

Adequate regeneration: Means where 8 or more than 8 seedlings (having diameter 2 cms to less than 10 cms at ~~breast~~ height) of economically important species were found in a regeneration plot of 16 square meter area.

Inadequate regeneration: Means where less than 8 seedlings (having diameter between 2 cms to less than 10 cms) of economically important species were found in a regeneration plot of 16 sq. meter area.

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4.1.10 Distribution of accessible tree forest area by type of injury to crop.

37.64% of the accessible tree forest area is affected by un-natural/man made injuries and and 3.71% by natural injuries. Injury to crop is absent in 47.18% area. The districtwise distribution - by type of injury to forest crop is given in the following table No. 4.1.10.

Table 4.1..10

Accessible tree forest area : 8140.11
Unit : km^2

Distribution of accessible tree forest area by type of injury of crop.

S. No.	Injuries to crop.	DISTRICT East & West Khasi Hills	Jaintia Hills	East & West Garo Hills	Total	%
1.	Natural	151.56	82.46	68.50	302.52	3.71
2.	Un-natural	1916.74	197.90	949.23	3063.87	37.64
3.	Absent	1996.97	923.52	919.88	3840.37	47.18
4.	*Unrecorded	632.97	173.16	127.22	933.35	11.47
	Total:	4698.24	1377.04	2064.83	8140.11	100

* Unrecorded relates to those points where information could not be collected.

EXPLANATORY NOTE :

Injury to crop was judged by occular estimation in two hectare area around the centre of plot, provided the effected trees formed at least 10% of the crop.

Natural injury: Means injury by wind/snow or flood, climber, lightening, wildlife, borer attack, leaf defoleator or other posts.

Man-made/Un-natural : Means injury by girdling/ illicit felling, scarring/fire, lopping.

4.1.11 Distribution of accessible tree forest area by forest types

The accessible tree forest area of 8140.11 km^2 has been classified into six forest types, on the basis of predominant tree species (refer para 1.6), 81.59% (6641.70 km^2) area bears "Miscellaneous forest type", 10.90% (887.04 km^2) area is under "Khasi pine", 3.76% of (306.18 km^2) area is under "Sal", 2.14% (174.28 km^2) area is under "Hardwood mixed with conifers" 0.84% (68.50 km^2)area is under "Teak" and 0.77% (62.41 km^2) area is under "Upland Hardwoods". The districtwise distribution- of forest types - is given in the following table 4.1.11.

Table 4.1.11

Accessible tree forest area : 8140.11
Unit : km^2

Distribution of accessible tree forest area by forest type

S.No.	Forest types	DISTRICT East & West Khasi Hills	Jaintia Hills	East & West Garo Hills	Total	%
1.	Khasi pine	722.12	164.92	-	887.04	10.90
2.	Teak	-	-	68.50	68.50	0.84
3.	Sal	71.32	-	234.86	306.18	3.76
4.	Hard wood mixed with conifers	124.81	49.47	-	174.28	2.14
5.	Upland hardwood	62.41	-	-	62.41	0.77
6.	Miscellaneous	3717.58	1162.65	1761.47	6641.70	81.59
7.	Total	4698.24	1377.04	2064.83	8140.11	100

4.1.12 Distribution of accessible tree forest area (excluding young forestry plantations) by forest types and canopy density classes.

Out of the total accessible tree forest area of 8140.11 km^2 an area of 35.66 km^2 falls under the land use "plantation" i.e. young forestry plantations. Since the canopy is not formed in these young flantations, the area under these has been excluded while analysing the distribution by canopy density classes and forest types. The districtwise distribution by forest types and canopy density classes- is given in the following table No. 4.1.12.

The overall average canopy density is 43.55% . Out of the total area of 8104.45 km^2, an area of 3697.44 km^2 bears "moderately dense tree forest" (canopy density 30 to 69%), 3036.94 km^2 area bears "open tree forest" (canopy density 5 to 29%) and 1370.07 km^2 area bears "dense tree forest"(canopy density 70% and above).

Table No. 4.1.12

Distribution of accessible tree forest area (excluding plantation) by forest types and canopy density.

AREA : 8104.45 km²

District	Canopy density class	Forest Types: Khasi pine	Teak	Sal	Hard wood mixed with conifers	Upland hard-wood	Mis-cell-aneous	Total	Densit %
East & West Khasi Hills	70% & above	44.58	-	17.83	8.92	8.92	545.81	624.06	
	30 to 69%	374.43	-	35.66	71.32	8.92	1934.57	2424.90	43.2
	5 to 29%	276.36	-	17.83	44.58	35.66	1239.19	1613.62	
Jaintia Hills	70% & above	16.49	-	-	-	-	338.08	354.57	
	30 to 69%	57.72	-	-	41.23	-	527.72	626.67	49.53
	5 To 29 %	90.70	-	-	8.25	-	296.85	395.80	
East & West Garo Hills	70% & above	-	48.93	68.50	-	-	274.01	391.44	
	30 to 69%	-	9.79	88.07	-	-	548.01	645.87	40.
	5 to 29 %	-	9.79	78.29	-	-	939.44	1027.52	
Total	70% & above	61.07	48.93	86.33	8.92	8.92	1155.90	1370.07	
	30 to 69%	432.15	9.79	123.73	112.55	8.92	3010.30	3697.44	
	5 to 29%	367.06	9.79	96.12	52.83	35.66	2475.48	3036.94	
Grand total		860.28	68.51	306.18	174.30	53.50	6641.68	8104.45	
Density %		38.40	70.28	65.23	41.79	33.84	43.79		
Overall density%									43.55

Note: 35.66 km² of tree forest area falls under the land use 'plantation' canopy in such area is not formed i.e. canopy density is below 5 percent. Such area has been omitted from this analysis.

From the above tabulation it can be seen that amongst the forest types, the extent of area bearing dense and moderately dense forest (canopy density 30% and above) is highest for "Miscellaneous type" and is 4166.20 km^2 followed by 493.22 km^2 under "Khasi Pine", 210.06 km^2 under "Sal", 121.47 km^2 under "hardwoods mixed with conifers" 58.72 km^2 under "Teak" and only 17.84 km^2 under "upland hardwoods".

Note : The appendix III incorporates the list of location of centre of sample plots. This list also incorporates the important data relating to each such sample plot like landuse classification, forest type classification, no. of trees enumerated and volume per hectare. This information can be made use of in working out the verification of growing stock with different area stratification or at time intervals to assess the periodic changes.

4.2 Stand and stock tables

Distribution of total stems (000 Nos) and total volume (000m^3) by species and diameter classes, in the accessible tree forest area, is given forest type wise in table nos. IV.2.7 to IV.2.18. The overall position of all the forest types combined is given in table nos. IV.2.19 & IV.2.20.

Distribution of stems per hectare (stand table) and volume per hectare (stock table) by species and dia classes, in accessible tree forest area of the region, is given forest type wise in table nos. IV.2.21 to IV.2.32. The overall position of all the forest types combined is depicted in the stand table no. IV.2.33 and stock table no. IV.2.34. The abstract of forest type wise stand and stock tables is given below :-

Accessible tree forest area :814011 h

Forest type	Total area (ha)	Vol./ha. (m^3/ha)	stems/ha.
Khasi pine	88704	50.451	228.058
Teak	6850	143.534	438.573
Sal	30618	94.600	297.777
Hardwood mixed with conifers	17428	41.734	154.250
Upland hardwood	6241	48.645	141.428
Miscellaneous	664170	109.298	205.596
Total	814011	100.709	211.874

The overall average figure is 211.874 stems per hectare corresponding to 100.709 m^3 per hectare.

4.2.1 Growing stock in forest types and its critical aspects

(i) Khasi pine forest type

It has been assessed that this forest type occurs over an area of 887.04 km^2 out of a total of 8140.11 km^2 of accessible tree forest area thus accounting for 10.90% of the area. The overall average canopy density, in this forest type, is 38.40%. The average growing stock is 50.451 m^3 per hectare (228.058 stems per hectare). Khasi pine (Pinus kesiya) accounts for 80.13 percent of total growing stock (volume) corresponding to 84.69 percent of total stems, in this type.

The remaining growing stock (by volume) comprises of 17.47 percent of "Miscellaneous spp.", 2.17 percent of Schima wallichii and only o.16% and 0.07% of Bombax ceiba and Lannea coromandelica respectively.

(ii) Teak forest type

This type occurs over an area of 68.50 km^2 i.e. only 0.84% of the total accessible tree forest area. The overall average canopy density is 70.28 percent and is highest amongst all the types. The average growing stock per hectare is also highest, amongst the types, and is 143.534 m^3 (438.573 stems per ha). Teak accounts for 57.67 percent of the growing stock by volume and 79.15 percent by no. of stems, in this type.

The proportions of others tree species, by volume, are 33.24% "Misc. spp.", 6.76% "Shorea robusta", 2.25% "Gmelina arborea" and only 0.08% "Schima wallichii."

(iii) Sal forest type

This type occurs over an area of 306.18 km^2 i.e. 3.76 percent of the total accessible tree forest area. The average canopy density is 65.23 percent. Average growing stock is 94.600 m^3 per hectare corresponding to 297.777 stems per hectare. Sal accounts for 55.74 percent of the growing stock by volume and 59.32 percent by number of stems, in this type.

The proportions of other tree species by volume, in this type, are 36.28 percent of "Misc.spp.", 5.52 percent of "Schima wallichii", 1.89 percent of "Lannea coromandelica" and balance 0.57 percent of Bombax ceiba, Toona ciliata and Kydia calycina combined.

(iv) Hardwoods mixed with conifers

This type occurs over an area of 174.28 km^2 i.e. 2.14 percent of the total accessible tree forest area. The average canopy density is 41.79 percent. Average growing stock per hectare is only 41.734 m^3 (154.250 stems) and is lowest amongst the types indentified in this survey.

"Miscellaneous species" account for 60.45 percent of the total growing stock (volume) in this type followed by 35.05 percent of "Pinus kesiya", 3.50 percent of 'Albizzia spp." and 1.00 percent of "Schima wallichii".

(v) Upland Hardwood forest type

Amongst the six forest types, this one occupies the least area of 62.41 km^2 which is only 0.77 percent of the total accessible tree forest area. The average canopy density is also lowest, amongst all the six types, and is only 33.84 percent. Average growing stock per hectare is 48.645 m^3 (141.428 stems)

"Miscellaneous species" account for 97.35 percent of the total growing stock (by volume), in this type. The remaining 2.65 percent is of "Pinus kesiya".

(VI) Miscellaneous forest type

Amongst the six forest types, this one occupies the largest area of 6641.70 km^2 which is 81.59 percent of the total accessible tree forest area. In this type the average canopy density is 43.79 percent. Average growing stock per hectare is 109.298 m^3 (205.596 stems).

While "Miscellaneous species" account for 85.55 percent of the growing stock (volume) in this type, the remaining tree species which account for more than 1% of the growing stock (Vol.) individually are:- "Schima wallichii (7.82%), "Shorea robusta" (1.67%) and "Lannea coromandelica"(1.62%).

For all the forest types combined i.e. over the entire accessible tree forest area, the highest number of stems of a single tree species are that of Pinus kesiya (Khasi pine) and are assessed at 19.13 million stems corresponding to volume of 4.18 million cubic metres. This is followed by "Schima wallichii" assessed at 13.37 million stems (5.94 million cubic metres), "Shorea robusta" at 8.15 million stems (2.89 million cum) and "Tectona grandis" at 3.16 million stems (0.71 million cum)

4.2.2 Analysis of growing stock in districts

The total number of stems in thousand as well as no of stems per hectare and total volume in thousand cubic metres as well as volume per hectare by species and diameter classes, districtwise, is given in tables nos. IV,2.1 to IV,2.6. These tables are given at the end of this chapter. The abstract of these tables is given below :-

Stratum : Meghalaya survey area
Accessible tree forest area: 814011 ha.

S.No.	District	Area (ha)	Vol./ha m^3/ha	stems/ha
1.	East & West Khasi hills	469824	94.851	212.151
2.	Jaintia hills	138704	133.724	254.311
3.	East & West Garo hills	206483	92.018	182.961
	Total	814011	100.709	211.874

The total growing stock standing in the accessible tree forest area is assessed at 81.98 million cum corresponding to 172.47 million stems.

4.3 Bamboo area and Inventory

In the region under survey, the total area under bamboo has been assessed - in the form of bamboo brakes and also as an understorey in the tree forest - to be 3102.72 km^2.

4.3.1 The districtwise distribution of bamboo bearing area - as bamboo brakes or overlapping with the tree forest area - is given below in table 4.3.1.

Table No. 4.3.1

Area unit : km^2

District	Bamboo brakes (Pure Bamboo area)		Overlapping/ mixed bamboo area		Total Bamboo area	
	No. of plots	Area	No. of plots	Area	No. of plots	Area
East & West Khasi Hills	31	276.37	163	1453.15	194	1729.52
Jaintia Hills	2	16.49	15	123.69	17	140.18
East & West Garo Hills	38	371.86	88	861.16	126	1233.02
Total	71	664.72	266	2438.00	337	3102.72

4.3.2 The various bamboo species occuring in the region can be grouped into two categories viz."clump forming" and "non-clump forming". The districtwise distribution of the total bamboo bearing area, into these two categories- is given below in table 4.3.2.

Table No. 4.3.2

Area unit : km^2

District	Clump forming bamboo		Non clump forming bamboo		Total	
	No.of plots	Area	No.of plots	Area	No.of plots	Area
East & West Khasi Hills	186	1658.20	8	71.32	194	1729.52
Jaintia Hills	17	140.18	-	-	17	140.18
East & West Garo Hills	85	831.80	41	401.22	126	1233.02
Total	288	2630.18	49	472.54	337	3102.72

The "non clump forming" bamboo species is mainly Melaconna bambusoides while the remaining species are mainly Dendrocalamus strictus and Dendrocalamus hamiltonii , which form the category "clump forming" bamboo, in this region. Further analysis of these two categories, in respect of the bamboo inventory, has been done separately.

4.3.3 In respect of the bamboo area under "non-clump forming" category, the distribution of total bumber of culms by age and soundness is given below in the table No. 4.3.3.

Table No. 4.3.3

Distribution of total number of culms (in 000) by age and soundness.

Unit : 000 Nos.

S.No.	Age	Green sound culms	Green damaged culms	Dry sound culms	Dry damaged culms	Decayed culms	Total
1.	Current years	96943	5866	-	-	-	102809
2.	One to two years old	138544	14588	-	-	-	153132
3.	Over two years old	45615	2779	-	-	-	48394
4.	Age not classified	-	-	14742	6175	25085	46002
Grand Total		281102	23233	14742	6175	25085	350337

Thus the total number of culms, of non clump forming bamboo, have been assessed at 350.34 million.

4.3.4 Distribution of total number of culms (non clump forming) by culm size class and soundness is given below in table 4.3.4. (excluding current year's culms)

Table No. 4.3.4

Distribution of total number of culms (in 000) by culm size class and soundness (Excluding current year culms).

Unit : 000 nos.

S.No.	Soundness	Culm size class 2 / 5 cms.	5 / 8 cms.	8 + cms.	culm size not classified	Total
1.	Green sound culms	182153	2006	-	-	184159
2.	Green damaged culms	16672	695	-	-	17367
3.	Dry sound culms	14047	695	-	-	14742
4.	Dry damaged culms	6175	-	-	-	6175
5.	Decayed culms	-	-	-	25085	25085
	Total	219047	3396	-	25085	247528
	Equivalent number of sound culms	207624	3049	-	-	210673

The total number of equivalent sound culms (of non clump forming bamboo) have been assessed at 210.67 million (60.13%) .

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4.3.5 In respect of the 2630.18 km^2 area bearing clump forming bamboos, the districtwise distribution of the bamboo area by bamboo site quality classes is given below in table No. 4.3.5.

Table No. 4.3.5

Districtwise distribution of Bamboo area (clump forming category) by quality classes.

Area unit : km^2

No. of plots: 288

S. No	Quality class	East & West Khasi hills S.P.	Area	East & West Garo hills S.P.	Area	Jaintia hills S.P.	Area	Total S.P.	Area
1.	I	132	1176.79	59	577.36	14	115.44	205	1869.59
2.	II	34	303.11	17	166.36	2	16.49	53	485.96
3.	III	16	142.64	8	78.29	1	8.25	25	229.18
4.	IV	4	35.66	1	9.79	-	-	5	45.45
Total		186	1658.20	85	831.80	17	140.18	288	2630.18

BAMBOO

Bamboo quality classes

Bamboo quality class	Description
I	Average culm height 6 metres of more for Dendrocalamus strictus and 14 metres or more for Bambusa arundinnacea.
II	Average culm height 4 metres or more but less than 6 metres for Dendrocalamus strictus and 10 metres or more but less than 14 metres for Bambusa arundinacea.
III	Average culm height of 2 metre or more but less than 4 metres for Dendrocalamus strictus andtwo metres or more but less than 10 metres for Bambusa arundinacea.
IV	Regeneration crop.

4.3.6 Out of a total of 2630.18 km^2 area under clump forming bamboo, an area of 247.01 km^2 has been assessed to be of completely hacked category (i.e. bamboo present but completely hacked) and therefore does not contribute towards the bamboo inventory of the region. The balance area of 2383.17 km^2 is the area solely contributing to the bamboo (clump forming) inventory of the region. Districtwise distribution of bamboo area (clump forming) into "Hacked" and "Non hacked" categories is given below in table No. 4.3.6.

Table No.4.3.6

Districtwise distribution of Bamboo area (clump forming) into "Hacked" and "Non hacked" categories

Area : 2630.18 km^2

No.of plots : 288

S. No.	Districts	Hacked		Non Hacked		Total	
		No.of plots	Area (km^2)	No.of plots	Area (km^2)	No.of plots	Area (km^2)
1.	East & West khasi hills	18	160.47	168	1497.73	186	1658.20
2.	Jaintia hills	1	8.25	16	131.93	17	140.18
3.	East & West Garo hills	8	78.29	77	753.51	85	831.80
4.	Total	27	247.01	261	2383.17	288	2630.18

Note: In respect of the non clump forming bamboo which has been assessed to occur over an area of 47.25 km^2 - whole of this area is contributing towards bamboo inventory as no portion/part of this area is under completely "Hacked" category.

4.3.7 Mean number of clumps per hectare

The qualitywise and clump size classwise distribution of number of clumps per hectare - for the non hacked bamboo (clump forming) area - is given below in table No. 4.3.7.

Table No. 4.3.7

The qualitywise and size classwise distribution of clumps per hectare for non hacked Bamboo area

Unit : clumps/ha.

Bamboo site quality	Clump size class 1	2	3	Total (clumps per ha.)
I	14.948	26.771	32.500	74.219
II	11.667	26.458	23.333	61.458
III	8.125	16.875	15.625	40.625

overall clumps/ha. 68 (68.39)

The overall average figure for the number of clumps per hectare, over the entire non hacked bamboo (clump forming) area of 2383.17 km^2 is 68. Therefore the total number of clumps in this area are assessed at 16.3 million.

* Clump size class	Description	
1.	Small	All clumps with less than 1 metre average diameter.
2.	Medium	Clumps of average diameter between 1 metre to less than 2 metres.
3.	Large	Clumps of average diameter 2 metres and over.

4.3.8 Mean number of culms per clump by clump size classes.

The mean number of culms per clump vary according to the size class of the clump and these have been assessed for the non hacked bamboo area as under :-

Size class	Mean number of culms/clump (rounded to whole numbers)
1.	8
2.	19
3.	36

Further analysis of the total number of culms by age, soundness and culm size classes, given in the following tables, is only in respect of the nonhacked bamboo area of 2383.17 km^2 (clump forming) .

4.3.9 For the non hacked bamboo (clump forming) area, the quality wise distribution of total number of culms (in 000) by age and culm size classes is given in table No. 4.3.9.

The total number of culms - including current years culms and decayed culms - over the entire non hacked bamboo (clump forming) area have been assessed at 416.91 million.

Table No. 4.3.9

Quality wise distribution of total number of culms (in 000) by age and culm size classes.

Bamboo site quality	Current year's culms	One to two seasons old			Over two seasons old			Dry culms			Decayed	Total number of culms
		2/5 cm	5/8 cm	8 + cm	2/5 cm	5/8 cm	8 + cm	2/5 cm	5/8 cm	8 + cm		
I	50,669	28,086	48,148	3,806	32,665	56,687	18,004	19,908	27,367	4,270	25.926	315536
II	16,771	16,020	6,909	3,054	11,314	6,107	500	9,262	5,507	-	10,212	85656
III	3,202	6,503	1,626	-	99	690	-	1,823	985	-	788	15716
Total	70,642	50,609	56,683	6,860	44,078	63.484	18.504	30,993	33,859	4,270	36.926	416908

(416.91 million)

4.3.10 The qualitywise distribution of total number of culms (in 000) - excluding current year's culms and decayed culms - by soundness and culm size classes and also the number of equivalent sound culms, has been tabulated below in table 4.3.10.

Table No. 4.3.10

The qualitywise distribution of total number of culms (excluding current years and decayed culms) (in 000) by culm size classes.

Culm size classes	Bamboo site quality	Green sound	Green damaged	Dry sound	Dry damaged	Total	Total Equivalent sound culms
2 /_ 5	I	46245	14506	5916	13992	80659	66410
	II	21026	6308	3054	6208	36596	30338
	III	5173	1429	838	985	8425	7218
5 /_ 8	I	87552	17284	7253	20113	132202	113504
	II	8961	4055	1302	4205	18523	14393
	III	1577	739	197	788	3301	2538
8 +	I	17644	4167	1389	2880	26080	22557
	II	3304	250	-	-	3554	3429
	III	-	-	-	-	-	-

Thus over the entire non hacked bamboo (clump forming) area, the total number of equivalent sound culms has been assessed at 260.39 million (62.46%)

Note: For working out the number of equivalent sound culms the following criteria has been adopted:

i) Dry culms are treated equal to the green culms.

ii) Decayed culms are considered to contribute nothing to the bamboo inventory.

iii) Each damaged culm is treated equivalent to 1/2 sound culm.

 Meghalaya

4.3.11 Average green wt. and dry wt. of culms - for non clump forming bamboo - and dry weight of bamboo stock

Table No. 4.3.11

culm size class	No. of samples	Average green wt (of utilizable length) Kgs.	Average dry wt (of utilizable length) Kgs.	Number of equivalent sound culms (in 000)	Dry wt of Bamboo stock (Tonne
2 to <5 cm dia	45	4.707	2.812	207624	583838 59.7%
5 to <8 cm	2	11.115	6.641	3049	20249
Total				210673	604087

Note: Average value of driage has been found to be 59.75%, for the samples collected from non-clump forming bamboo.

4.3.12 Average green weight and dry weight of culms- for clump forming bamboo - and dry weight of bamboo stock

Clump forming

Table No. 4.3.12

Bamboo site quality	Culm size class	No. of samples	Av. green wt per culm (utilizable) length Kgs	Av. dry wt (utilizable) length Kgs	Number of equivalent sound culms (in000)	Dry wt of Bamboo stock (Tonnes)
I	2 to <5 cm	74	9.182	5.153	66.410	3,42,211
	5 to <8 cm	116	19.494	10.940	113,504	12,41,734
	8 cm & above	30	39.939	22.414	22,558	5,05,615
II	2 to <5 cm	23	7.102	3.986	30,338	1,20,927
	5 to <8 cm	16	18.080	10.146	14,394	1,46,042
	8 Cm & above	2	40.550	22.757	3,429	78,034
III	2 to <5 Cm	9	4.237	2.378	7,219	17,167
	5 to <8 cm	4	19.963	11.203	2,538	28,433
Total					2,60,390	20,40,173

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4.3.13 Total Bamboo stock in Tonnes

In the non clump forming bamboo area the total number of culms have been assessed at 350.34 million (equivalent sound culms = 210.67 million) having a gross dry weight of 604 thousand tonnes and in the clump forming bamboo area the total number of culms have been assessed at 416.91 million (equivalent sound culms = 260.39 million) having a gross dry weight of 2040 thousand tonnes.

Over the entire region the total stock of bamboo has been assessed at 471 million equivalent sound culms having a gross dry weight of 2644 thousand tonnes.

4.4 Sampling Error

The standard error percent of the assessed growing stock districtwise and forest type wise is given below :-

S.No.	District	Total volume($000m^3$)	S.E. percent
1.	East & West Khasi hills	44563.034	17.82
2.	Jaintia hills	18413.887	24.12
3.	East & West Garo hills	18999.707	9.70
	Total	81976.628	11.33

S.No.	District	Total volume($000m^3$)	S.E. percent
1.	Khasi pine	4475.315	13.59
2.	Teak	983.209	24.87
3.	Sal	2896.476	23.98
4.	Hardwood mixed with conifers	727.324	34.70
5.	Upland hardwood	303.590	81.89
6.	Miscellaneous	72590.714	12.71
	Total	81976.628	11.33

The S.E. percent for whole region is 11.33 percent in respect of the assessed growing stock (volume).

Table No. IV.2.1

Distribution of total stems by species and diameter classes and stems per hectare by dia classes in accessible tree forest area.

District: East & West Khasi hills
Area : 469824 ha.
Unit : 000 stems

SERIAL No.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Albizzia spp.	64.654	-	10.776	10.776	-	-	-	-	86.206	0.09
2.	Anthocephalus cadamba	64.654	43.102	-	-	-	-	-	-	107.756	0.11
3.	Bombax ceiba	138.222	30.809	21.551	-	-	-	-	-	190.582	0.19
4.	Toona ciliata	301.717	86.205	32.327	43.102	10.776	10.776	-	-	484.903	0.49
5.	Gmelina arborea	1336.174	32.327	10.776	10.776	-	10.776	-	-	1400.829	1.41
6.	Kydia calycina	323.268	32.327	10.776	-	-	-	-	-	366.371	0.37
7.	Lannea coromandelica	697.035	226.287	107.756	32.327	10.776	-	-	-	1074.181	1.08
8.	Pinus kesiya (pine)	11296.377	2909.289	472.004	40.067	-	-	9.258	-	14726.995	14.78
9.	Schima wallichii	6556.841	2266.704	752.431	257.097	64.654	43.102	32.327	32.327	10005.483	10.04
10	Shorea robusta	3119.253	646.068	143.416	118.144	30.466	10.776	-	-	4068.123	4.08
11.	Tectona grandis	657.311	118.532	10.776	-	-	-	-	-	786.619	0.79
12.	Miscellaneous spp.	47639.067	11624.789	4023.769	1594.941	672.792	440.625	193.961	183.185	66373.129	66.05
	Total	72194.573	18016.439	5596.358	2107.230	789.464	576.055	235.546	215.512	99671.177	100.
	Stems/ha.	153.665	38.348	11.912	4.483	1.681	1.099	0.502	0.459	212.151	
	%	72.43	18.08	5.61	2.11	0.79	0.52	0.24	0.22	-	100

Table No. IV.2.2

Distribution of total stems by species and diameter classes and stems per hectare by dia classes in accessible tree forest area.

District : Jaintia hills
Area : 137704 ha.
Unit : 000 stems

S.NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Albizzia spp.	19.706	-	9.853	-	8.245	-	-	-	37.804	0.11
2.	Amoora wallichii	68.971	39.412	19.706	9.853	-	-	-	-	137.942	0.39
3.	Anthocaphalus cadamba	9.853	19.706	19.706	-	-	-	9.853	-	59.118	0.17
4.	Bombax ceiba	-	-	9.853	-	-	-	-	-	9.853	0.03
5.	Gmelina arborea	39.412	9.853	-	9.853	19.706	-	-	-	78.824	0.23
6.	Kydia calycina	118.236	29.559	9.853	-	-	-	-	-	157.648	0.45
7.	Lannea coromandelica	78.824	19.706	-	19.706	-	-	-	-	118.236	0.34
8.	Toona ciliata	9.853	19.706	-	-	-	-	-	-	29.559	0.08
9.	Pinus kesiya (pine)	2928.190	1140.036	292.608	16.925	25.170	-	-	-	4402.929	12.57
10.	Schima wallichii	995.149	482.795	216.765	118.236	59.118	39.412	-	9.853	1921.328	5.49
11.	Miscellaneous spp.	20347.631	4531.799	1938.155	688.099	266.030	175.745	49.265	68.971	28065.695	80.14
	Total	24615.825	6292.572	2516.499	862.672	378.269	215.157	59.118	78.824	35018.936	100.0
	Stems/ha.	178.760	45.697	18.276	6.266	2.747	1.562	0.430	0.573	254.311	
	%	70.29	17.97	7.19	2.46	1.08	0.61	0.17	0.23	-	100

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Table No. IV.2.3

Distribution of total stems by species and diameter classes and stems per hectare by dia classes in accessible tree forest area

Distt. East and West Garo Hills
Area: 206483 ha.
Unit: 000 stems

Sr. No.	SPECIES NAME	Diameter Classes(in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Albizzia spp.	42.191	31.643	-	-	-	-	-	-	73.834	0.2
2.	Bombax ceiba	73.072	21.095	21.095	10.548	-	-	-	10.548	136.358	0.4
3.	Toona ciliata	42.191	9.786	21.095	10.548	-	-	-	-	83.620	0.2
4.	Gmelina arborea	232.050	93.405	20.334	31.643	-	42.191	10.548	-	430.171	1.1
5.	Kydia calycina	115.263	31.643	10.548	-	-	-	-	-	157.454	0.4
6.	Lannea coromandelica	336.765	116.025	92.643	62.525	42.191	10.548	-	10.548	671.245	1.8
7.	Schima wallichii	738.983	320.884	156.692	147.668	21.095	31.643	-	30.881	1447.846	3.7
8.	Shorea robusta	2984.914	632.386	188.978	101.663	61.000	70.786	40.667	-	4080.399	10.8
9.	Tectona grandis	1712.500	538.214	107.643	19.571	-	-	-	-	2377.928	6.3
10.	Rest of spr.	19270.815	5262.951	1952.732	890.461	418.099	336.765	94.168	94.168	28320.159	74.9
	Total	25548.744	7058.032	2571.760	1274.632	542.385	491.933	145.383	146.145	37779.014	100.0
	Stems/ha.	123.733	34.181	12.454	6.173	2.626	2.382	0.704	0.708	182.961	
	%	67.63	18.68	6.81	3.37	1.44	1.30	0.38	0.39	-	100

Table No.IV.2.4

Distribution of total volume by species and diameter classes & volume per hectare by dia classes in accessible tree forest area.

Districts: East & West Khasi hills

Area : 469824 ha.
Unit : 000 m^3

Serial No.	Species Name	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Albizzia spp.	31.391	-	12.717	19.887	-	-	-	-	63.995	0.14
2.	Anthocaphalus cadamba	7.338	19.724	-	-	-	-	-	-	27.062	0.06
3.	Bombax ceiba	69.735	29.139	28.063	-	-	-	-	-	126.937	0.28
4.	Toona ciliata	103.743	55.900	30.643	70.315	27.146	45.278	-	-	333.025	0.75
5.	Gmelina arborea	227.651	14.736	9.894	15.632	-	39.461	-	-	307.374	0.69
6.	Kydia calycine	60.791	17.843	11.663	-	-	-	-	-	90.297	0.20
7.	Lannea coromandelica	239.163	144.056	106.053	53.270	28.245	-	-	-	570.787	1.28
8.	Pinus kesiya(pine)	1125.292	1231.240	461.964	76.294	-	-	46.480	-	2941.270	6.60
9.	Schima wallichii	925.577	1082.000	700.696	419.608	144.689	144.096	144.960	224.018	[illegible].644	8.50
10.	Shorea robusta	334.907	302.167	154.820	220.176	88.822	50.921	-	-	1151.813	2.59
11.	Tectona grandis	78.971	55.121	9.873	-	-	-	-	-	143.965	0.32
12.	Miscellaneous spp.	5766.655	6723.369	4833.793	3388.902	2142.326	1894.580	1134.752	9136.488	35020.865	78.59
	Total	8971.214	9675.295	6360.179	4264.084	2431.228	2174.336	1326.192	9360.506	44563.034	100.0
	Vol./ha.	19.095	20.593	13.538	9.075	5.175	4.628	2.823	19.924	94.851	
	%	20.13	21.71	14.27	9.57	5.45	4.88	2.98	21.01	-	100

Table No. IV.2.5

Distribution of total volume by species and diameter classes and volume per hectare by diameter classes in accessible tree forest area.

District : Jaintia Hills
Area : 137704 ha.
Unit : 000^3_m

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10.20	20.30	30.40	40.50	50.60	60.70	70-80	80 +	Total	%
1.	Albizzia spp.	7.977	-	12.794	25.457	-	-			46.228	0.25
2.	Amoora wallichii	18.397	22.507	16.083	14.949	-	-	-	-	71.936	0.39
3.	Anthocaphalus cadamba	2.391	10.835	17.517	-	-	-	50.721	-	81.464	0.44
4.	Bombax ceiba	-	-	14.032	-	-	-	-	-	14.032	0.08
5.	Toona ciliata	2.487	13.098	-	-	-	-	-	-	15.585	0.08
6.	Gmelina arborea	9.206	5.375	-	17.718	50.549	-	-	-	82.848	0.45
7.	Kydia calycina	20.088	17.583	9.572	-	-	-	-	-	47.243	0.25
8.	Lannea coromandelica	30.523	13.688	-	37.938	-	-	-	-	82.149	0.45
9.	Pinus kesiya(pine)	373.333	474.138	292.505	29.567	72.476	-	-	-	1242.019	6.75
10.	Schima wallichii	152.152	242.071	212.013	196.193	139.443	131.885	-	71,601	1145.358	6.22
11.	Miscellaneous spp.	2557.680	2667.225	2327.838	1384.395	828.937	742.301	306.126	4770.523	15585.025	84.64
	Total	3174.234	3466.520	2902.354	1680.760	1116.862	874.186	356.847	4842.124	18413.887	100.0
	Vol./ha.	23.052	25.173	21.078	12.207	8.111	6.349	2.591	35.163	133.724	
	%	17.24	18.82	15.76	9.13	6.06	4.75	1.94	26.30	-	100

Table No. IV.2.6

Distribution of total volume by species and diameter classes and Vol/hectare by diameter in accessible tree forest area

Distt. East & West Garo Hills
Area: 206483 ha.
Unit: 000 m^3

Sr. No.	SPECIES NAME	Diameter classes (In cms) 10.20	20.30	30.40	40.50	50.60	60.70	70.80	80+	Total	%
1.	Albizzia spp.	19.546	27.158	-	-	-	-	-	-	46.704	0.25
2.	Bombax ceiba	39.494	18.102	30.735	19.466	-	-	-	89.208	197.005	1.04
3.	Toona ciliata	18.345	5.820	17.779	16.604	-	-	-	-	58.568	0.31
4.	Gmelina arborea	44.847	52.665	20.344	51.847	-	136.421	45.507	.	351.631	1.85
5.	Kydia calycina	25.449	14.799	8.609	-	-	-	-	-	48.857	0.26
6.	Lannea coromandelica	112.350	65.223	94.301	94.981	100.295	35.998	-	69.974	573.122	3.02
7.	Schima wallichii	109.086	149.435	146.450	230.168	48.774	108.720	-	222.401	1011.033	5.32
8.	Shorea robusta	344.344	314.661	197.504	192.236	171.691	292.018	230.233	-	1742.687	9.17
9.	Tectona grandia	156.704	274.272	104.636	31.367	-	-	-	-	566.979	2.98
10.	Rest of spp.	2509.398	3078.342	2358.527	1804.541	1364.281	1524.173	552.488	1211.371	14403.121	75.80
	Total	3379.563	4000.477	2978.905	2441.209	1681.041	2097.330	828.228	1592.954	18999.707	100.0
	Vol./ha	16.367	19.375	14.428	11.822	8.142	10.158	4.011	7.715	92.018	
	%	17.79	21.06	15.68	12.85	8.85	11.04	0.35	8.38	-	100

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Table No. IV.2.7

Distribution of total stems by species and diameter classes in accessible tree forest area.
(All districts combined)

Forest type Khasi pine
Area : 88704 ha.
Unit : 000 stems

SERIAL No.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Bombax ceiba	-	9.258	-	-	-	-	-	-	9.258	0.05
2.	Lannea coromandelica	9.258	-	-	-	-	-	-	-	9.258	0.05
3.	Pinus kesiya	12894.791	3568.431	624.350	27.196	8.680	-	9.258	-	17132.706	84.69
4.	Schima wallichii	416.608	74.064	-	9.258	-	-	-	-	499.930	2.47
5.	Miscellaneous spp.	1878.818	535.238	118.042	27.774	18.516	-	-	-	2578.388	12.74
	Total	15199.475	4186.991	742.392	64.228	27.196	-	9.258	-	20229.540	100.0

Table No.IV.2.8

Distribution of total stems by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Teak
Area : 6850 ha.
Unit : 000 stems

SERIAL NO. SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1. Gmelina arborea	-	19.571	9.786	-	-	-	-	-	29.357	6.98
2. Schima wallichii	9.786	-	-	-	-	-	-	-	9.786	0.33
3. Shorea robusta	29.357	29.357	-	-	-	9.786	-	-	68.500	2.28
4. Tectona grandis	1712.500	538.214	107.643	19.571	-	-	-	-	2377.928	79.15
5. Miscellaneous spp.	332.714	97.857	39.143	9.786	29.357	-	9.786	-	518.643	17.26
Total	2084.357	684.999	156.572	29.357	29.357	9.786	9.786	-	3004.214	100.0

Table No.IV.2.9

Distribution of total stems by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Sal
Area : 30618 ha.
Unit : 000 stems

STEMS (000)

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Bombax ceiba	18.701	-	-	-	-	-	-	-	18.701	0.21
2.	Toona ciliata	-	9.786	-	-	-	-	-	-	9.786	0.11
3.	Kydia calycina	9.786	-	-	-	-	-	-	-	9.786	0.11
4.	Lannea coromendelica	18.701	-	29.357	9.786	-	-	-	-	57.844	0.63
5.	Schima wallichii	144.175	105.032	28.487	-	-	-	-	9.786	287.480	3.15
6.	Shorea robusta	4205.782	830.672	182.447	102.419	38.272	29.357	19.572	-	5408.521	59.32
7.	Miscellaneous spp.	2674.513	420.126	105.032	77.416	28.487	9.786	-	9.786	3325.146	36.47
	Total	7071.658	1365.616	345.323	189.621	66.759	39.143	19.572	19.572	9117.264	100.0

Table No. IV.2.10

Distribution of total stems by species and diameter classes in accessible tree forest area.

Forest type : Hard wood mixed with conifers
Area : 17428 ha.
Unit : 000 stems

(All districts combined)

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Albizzia spp.	-	-	-	-	8.245	-	-	-	8.245	0.31
2.	Pinus kesiya	827.353	215.505	16.490	8.245	16.490	-	-	-	1084.083	40.33
3.	Schima wallichii	57.605	-	-	-	-	-	-	-	57.605	2.14
4.	Miscellaneous spp.	1234.343	148.300	50.826	27.447	9.601	17.846	-	-	1538.363	57.22
	Total	2169.301	363.805	67.316	35.692	34.336	17.846	-	-	2688.296	100.0

Table No.IV.2.11

Distribution of total stems by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Upland hard wood
Area : 6241 ha.

Stem (000)

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Finus kesiya	26.747	8.916	-	-	-	-	-	-	35.663	4.04
2.	Miscellaneous spp.	552.774	249.640	35.663	8.916	-	-	-	-	846.993	95.96
	Total	579.521	258.556	35.663	8.916	-	-	-	-	882.656	100.0

Table No.IV.2.12

Distribution of total stems by species and diameter classes in accessible tree forest area

(All districts combined)

Forest type: Miscellaneous
Area: 664170 ha.
Unit: 000 stems

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30- 40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Albizzia spp.	126.551	31.643	20.629	10.776	-	-	-	-	189.599	0.14
2.	Amoora wallichii	68.971	39.412	19.706	9.853	-	-	-	-	137.942	0.10
3.	Anthocephalus cadamba	74.507	62.808	19.706	-	-	-	9.853	-	166.874	0.12
4.	Bombax ceiba	192.593	42.646	52.499	10.548	-	-	-	10.548	308.834	0.23
5.	Toona ciliata	353.761	105.911	53.422	53.650	10.776	10.776	-	-	588.296	0.43
6.	Gmelina arborea	1607.636	116.014	21.324	52.272	19.706	52.967	10.548	-	1880.467	1.38
7.	Kydia calycina	546.981	93.529	31.177	-	-	-	-	-	671.687	0.49
8.	Lannea coromendelica	1084.665	362.018	171.042	104.772	52.967	10.548	-	10.548	1796.560	1.32
9.	Pinus kesiya	475.676	256.473	123.772	21.551	-	-	-	-	877.472	0.64
10.	Schima wallichii	7662.799	2891.287	1097.401	513.743	144.867	114.157	32.327	63.275	12519.856	9.17
11.	Shorea robusta	1869.028	418.425	149.947	117.393	53.194	42.419	21.095	-	2671.501	1.96
12.	Tectona grandis	657.311	118.532	10.776	-	-	-	-	-	786.619	0.57
13.	Miscellaneous spp.	80534.351	19968.378	7565.950	3022.162	1270.960	925.503	327.608	336.538	113951.450	83.45
	Total	95254.830	24507.076	9337.351	3916.720	1552.470	1156.370	401.431	420.909	136547.157	100.0

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Table No.IV.2.13

Distribution of total volume by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Khasi pine
Area : 88704 ha.
Unit : 000 m^3

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Bombax ceiba	-	7.230	-	-	-	-	-	-	7.230	0.16
2.	Lannea coromandelica	3.113	-	-	-	-	-	-	-	3.113	0.07
3.	Pinus kesiya	1355.677	1499.519	611.302	49.751	23.018	-	46.480	-	3585.747	80.13
4.	Schima wallichii	53.457	29.490	-	14.295	-	-	-	-	97.242	2.17
5.	Miscellaneous spp.	218.120	310.114	133.589	55.194	64.966	-	-	-	781.983	17.47
	Total	1630.367	1846.353	744.891	119.240	87.984	-	46.480	-	4475.315	100.0

Table No.IV.2.14

Distribution of total volume by species and diameter classes in accessible tree forest area ;
(All districts combined)

Forest type: Teak
Area: 6850 ha.
Unit: 000 m^3

SERIAL No.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70- 80	80 +	Total	%
1.	Gmelina arborea	-	10.373	11.735	-	-	-	-	-	22.108	2.25
2.	Schima wallichii	0.771	-	-	-	-	-	-	-	0.771	0.08
3.	Shorea robusta	5.826	17.088	-	-	-	43.589	-	-	66.503	6.76
4.	Tectona grandis	156.704	274.272	104.636	31.367	-	-	-	-	566.979	57.67
5.	Miscellaneous spp.	52.286	57.747	43.901	16.738	93.512	-	62.664	-	326.848	33.24
	Total	215.587	359.480	160.272	48.105	93.512	43.589	62.664	-	983.209	100.0

Table No. IV.2.15

Distribution of total volume by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Sal
Area : 30618 ha.
Unit : 000 m^3

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Bombax ceiba	9.530	-	-	-	-	-	-	-	9.530	0.33
2.	Toona ciliata	-	5.820	-	-	-	-	-	-	5.820	0.20
3.	Kydia calycina	1.186	-	-	-	-	-	-	-	1.186	0.04
4.	Lannea coromandelica	6.023	-	30.587	18,407	-	-	-	-	55.017	1.89
5.	Schima wallichii	20.284	48,713	32.244	-	-	-	-	58.244	159.485	5.52
6.	Shorea robusta	490.676	403.593	187.061	199.972	102.063	114.312	116.810	-	1614.487	55.74
7.	Miscellaneous spp.	306.472	242.692	130.504	158.867	97.683	41.929	-	72.804	1050.951	36.28
	Total	834.171	700.818	380.396	377.246	199.746	156.242	116.810	131.048	2896.476	100.00

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Table No. IV.2.16

Distribution of total volume by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Hardwood mixed with conifers
Area : 17428 ha.
Unit : $000m^3$

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Albizzia spp.	-	-	-	-	25.457	-	-	-	25.457	3.50
2.	Pinus kesiya	80.791	91.275	18.246	15.165	49.458	-	-	-	254.935	35.05
3.	Schima wallichii	7.282	-	-	-	-	-	-	-	7.282	1.00
4.	Miscellaneous sop.	136.701	83.818	59.303	57.774	26.891	75.163	-	-	439.650	60.45
	Total	224.774	175.093	77.549	72.939	101.806	75.163	-	-	727.324	100.0

Table No. IV.2.17

Distribution of total volume by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Upland hardwood
Area : 6241 ha.
Unit : 000m^3

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Pinus kesiya	3.128	4.918	-	-	-	-	-	-	8.046	2.65
2.	Miscellaneous spp.	84.942	150.488	39.846	20.268	-	-	-	-	295.544	97.35
	Total	88.070	155.406	39.846	20.268	-	-	-	-	303.590	100.0

Table No.IV.2.18

Distribution of total volume by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Miscellaneous
Area : 664170 ha.
Unit : 000m^3

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Albizzia spp.	58.914	27.158	25.511	19.887	-	-	-	-	131.470	0.18
2.	Amoora wallichii	18.397	22.507	16.083	14.949	-	-	-	-	71.936	0.10
3.	Anthocephlus cadamba	9.729	30.559	17.517	-	-	-	50.721	-	108.526	0.15
4.	Bombax ceiba	99.609	40.011	72.830	19.466	-	-	-	89.208	321.214	0.44
5.	Toona ciliata	124.575	68.998	48.442	86.919	27.146	45.278	-	-	401.358	0.56
6.	Gmelina arborea	281.704	62.403	18.503	85.197	50.549	175.882	45.507	-	719.745	0.99
7.	Kydia calycina	105.142	50.225	29.844	-	-	-	-	-	185.211	0.26
8.	Lannea coromandelica	372.900	222.967	169.767	167.782	128.540	35.998	-	69.974	1167.928	1.62
9.	Pinus kesiya	59.029	109.666	124.921	40.945	-	-	-	-	334.561	0.46
10.	Schima wallichii	1105.021	1395.303	1026.915	831.673	328.906	384.701	144.960	469.776	5677.255	7.82
11.	Shorea robusta	182.749	196.147	165.263	212.440	158.450	185.038	113.423	-	1213.510	1.67
12.	Tectona grandis	78.971	55.121	9.873	-	-	-	-	-	143.965	0.20
13.	Miscellaneous spp.	10035.212	11624.077	9113.015	6268.997	4052.492	4043.962	1930.702	15045.379	62114.035	85.55
		12532.042	13905.142	10836.484	7748.255	4746.085	4870.859	2285.313	15664.536	72590.714	100.0

Table No.IV.2.19

Distribution of total stems by species and diameter classes in accessible tree forest area (All districts combined)

Forest type :All forest types
Area :814011 ha.
Unit :000 stems

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Albizzia spp.	126.551	31.643	20.629	10.776	8.245	-	-	-	197.844	0.11
2.	Amoora wallichii	68.971	39.412	19.706	9.853	-	-	-	-	137.942	0.08
3.	Anthocephalus cadamba	74.507	62.808	19.706	-	-	-	9.853	-	166.874	0.10
4.	Bombax ceiba	211.294	51.90 4	52.499	10.548	-	-	-	10.548	336.793	0.20
5.	Toona ciliata	353.761	115.697	53.422	53.650	10.776	10.776	-	-	598.082	0.35
6.	Gmelina arborea	1607.636	135.585	31.110	52.272	19.706	52.967	10.548	-	1909.824	1.11
7.	Kydia calycina	556.767	93.529	31.177	-	-	-	-	-	681.473	0.40
8.	Lannea coromandelica	1112.624	362.018	200.399	114.558	52.967	10.548	-	10.548	1863.662	1.08
9.	Pinus kesiya	14224.567	4049.325	764.612	56.992	25.170	-	9.258	-	19129.924	11.09
10.	Schima wallichii	8290.973	3070.383	1125.888	523.001	144.867	114.157	32.327	73.061	13374.657	7.75
11.	Shorea robusta	6104.167	1278.454	332.394	219.812	91.466	81.562	40.667	-	8148.522	4.72
12.	Tectona grandis	2369.811	656.746	118.419	19.571	-	-	-	-	3164.547	1.83
13.	Miscellaneous spp.	87257.513	21419.539	7914.656	3173.501	1356.921	953.135	337.394	346.324	122758.983	71.18
	Total	122359.142	31367.043	10684.617	4244.534	1710.118	1223.145	440.047	440.481	172469.127	100.0

Table No. IV.2.20

Distribution of total volume by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : All forest type combined
Area : 814011 ha.
Unit : 000m^3

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Albizzia spp.	58.914	27.158	25.511	19.887	25.457	-	-	-	156.927	0.19
2.	Amoora wallichii	18.397	22.507	16.083	14.949	-	-	-	-	71.936	0.09
3.	Anthocephalus cadamba	9.729	30.559	17.517	-	-	-	50.721	-	108.526	0.13
4.	Bombax ceiba	109.229	47.241	72.830	19.466	-	-	-	89.208	337.974	0.41
5.	Toona ciliata	124.575	74.818	48.442	86.919	27.146	45.278	-	-	407.178	0.50
6.	Gmelina arborea	281.704	72.[illegible]	30.238	85.197	50.549	175.882	45.507	-	741.853	0.91
7.	Kydia calycina	106.328	50.225	29.844	-	-	-	-	-	186.397	0.23
8.	Lannea coromandelica	382.036	222.967	2[illegible]0.334	186.18[illegible]	128,540	35.998	-	69.974	1226.058	1.50
9.	Pinus kesiya	1498.625	17[illegible].378	754.469	105.861	72.476	-	46.480	-	4183.289	5.10
10.	Schima wallichii	1186.815	1473.506	1059.159	845.968	328.906	384.701	144.960	518.020	5942.035	7.25
11.	Shorea robusta	679.251	616.8[illegible]	352.324	412.412	260.513	342.939	230.233	-	2894.500	3.53
12.	Tectona grandis	235.675	329.393	114.509	31.367	-	-	-	-	710.944	0.80
13.	Miscellaneous spp.	10833.733	12468.936	9520.158	6577.538	4335.544	4161.054	1993.366	15118.382	65009.011	79.30
	Total	15525.011	17142.252	12241.438	8986.053	5229.131	5145.852	2511.267	15795.584	81976.628	100.0

Table No.IV.2.21

Distribution of stems/ha. by species and diameter classes in accessible tree forest area

(All districts combined)

Forest type : Khasi pine
Area : 88704 ha.
Unit : stems/ha.

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Bombax ceiba	-	0.104	-	-	-	-	-	-	0.104	0.05
2.	Lannea coromandelica	0.104	-	-	-	-	-	-	-	0.104	0.05
3.	Pinus kesiya	145.369	40.229	7.039	0.307	0.098	-	0.104	-	193.146	84.69
4.	Schima wallichii	4.697	0.835	-	0.104	-	-	-	-	5.636	2.47
5.	Miscellaneous spp.	21.181	6.034	1.331	0.313	0.209	-	-	-	29.068	12.74
	Total	171.351	47.202	8.370	0.724	0.307	-	0.104	-	228.058	100.0

Table No. IV.2.22

Distribution of stems/ha. by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Teak
Area : 6850 ha.
Unit : stems/ha.

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Gmelina arborea	-	2.857	1.429	-	-	-	-	-	4.286	0.98
2.	Schima wallichii	1.429	-	-	-	-	-	-	-	1.429	0.33
3.	Shorea robusta	4.286	4.286	-	-	-	1.429	-	-	10.001	2.28
4.	Tectona grandis	250.000	78.571	15.714	2.857	-	-	-	-	347.142	79.15
5.	Miscellaneous spp.	48.571	14.286	5.714	1.429	4.286	-	1.429	-	75.715	17.26
	Total	304.286	100.000	22.857	4.286	4.286	1.429	1.429	-	438.573	100.0

Table No.IV.2.23

Distribution of stems/ha. by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Sal
Area : 30618 ha.
Unit : stems/ha.

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Bombax ceiba	0.611	-	-	-	-	-	-	-	0.611	0.21
2.	Toona ciliata	-	0.320	-	-	-	-	-	-	0.320	0.11
3.	Kydia calycina	0.320	-	-	-	-	-	-	-	0.320	0.11
4.	Lannea coromandelica	0.611	-	0.959	0.320	-	-	-	-	1.890	0.63
5.	Schima wallichii	4.709	3.430	0.930	-	-	-	-	0.320	9.389	3.15
6.	Shorea robusta	137.363	27.131	5.959	3.345	1.250	0.959	0.639	-	176.646	59.32
7.	Miscellaneous spp.	87.351	13.722	3.430	2.528	0.930	0.320	-	0.320	108.601	36.47
	Total	230.965	44.603	11.278	6.193	2.180	1.279	0.639	0.640	297.777	100.0

Table No. IV.2.24

Distribution of stems/ha. by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Hard wood mixed with conifers

Area : 17428 ha.

Unit : stems/ha.

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10- 20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Albizzia spp.	-	-	-	-	0.473	-	-	-	0.473	0.31
2.	Pinus kesiya	47.473	12.365	0.946	0.473	0.946	-	-	-	62.203	40.33
3.	Schima wallichii	3.305	-	-	-	-	-	-	-	3.305	2.14
4.	Miscellaneous spp.	73.694	8.509	2.916	1.575	0.551	1.024	-	-	88.269	57.22
	Total	124.472	20.874	3.862	2.048	1.970	1.024	-	-	154.250	100.0

Table No. IV.2.25

Distribution of stems/ha. by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Up-land hard wood
Area : 6241 ha.
Unit : stems/ha.

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Pinus kesiya	4.286	1.429	-	-	-	-	-	-	5.715	4.04
2.	Miscellaneous spp.	88.571	39.999	5.714	1.429	-	-	-	-	135.713	95.96
	Total	92.857	41.428	5.714	1.429	-	-	-	-	141.428	100.0

Table No. IV.2.26

Distribution of stems/ha. by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Miscellaneous
Area : 664170 ha.
Unit : stems/ha.

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Albizzia spp.	0.191	0.048	0.031	0.016	-	-	-	-	0.286	0.14
2.	Amoora wallichii	0.104	0.059	0.030	0.015	-	-	-	-	0.208	0.10
3.	Anthocaphalus cadamba	0.112	0.095	0.031	-	-	-	0.015	-	0.253	0.12
4.	Bombax ceiba	0.290	0.064	0.079	0.015	-	-	-	0.016	0.465	0.23
5.	Toona ciliata	0.533	0.159	0.080	0.081	0.016	0.016	-	-	0.885	0.43
6.	Gmelina arborea	2.421	0.175	0.032	0.079	0.030	0.080	0.016	-	2.833	1.38
7.	Kydia calycina	0.824	0.141	0.047	-	-	-	-	-	1.012	0.49
8.	Lannea coromandelica	1.633	0.545	0.258	0.158	0.080	0.016	-	0.016	2.706	1.32
9.	Pinus kesiya	0.716	0.386	0.186	0.032	-	-	-	-	1.320	0.64
10.	Schima wallichii	11.537	4.353	1.652	0.774	0.218	0.172	0.049	0.096	18.851	9.17
11.	Shorea robusta	2.814	0.630	0.226	0.177	0.080	0.064	0.032	-	4.023	1.96
12.	Tectona grandis	0.990	0.178	0.016	-	-	-	-	-	1.184	0.57
13.	Miscellaneous spp.	121.256	30.065	11.392	4.550	1.914	1.393	0.493	0.507	171.570	83.45
	Total	143.421	36.898	14.060	5.898	2.338	1.741	0.605	0.635	205.596	100.00

Table No.IV.2.27

Distribution of vol./ha. by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Khasi pine
Area : 88704 ha.
Unit : m^3/ha.

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Bombax ceiba	-	0.082	-	-	-	-	-	-	0.082	0.16
2.	Lannea coromandelica	0.035	-	-	-	-	-	-	-	0.035	0.08
3.	Pinus kesiya	15.283	16.905	6.891	0.561	0.259	-	0.524	-	40.423	80.12
4.	Schima wallichii	0.603	0.332	-	0.161	-	-	-	-	1.096	2.17
5.	Miscellaneous spp.	2.459	3.496	1.506	0.622	0.732	-	-	-	8.815	17.47
	Total	18.380	20.815	8.397	1.344	0.991	-	0.524	-	50.451	100.0

Table No. IV.2.28

Distribution of vol./ha. by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Teak
Area : 6850 ha.
Unit : m^3/ha.

SERIAL No.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Gmelina arborea	-	1.514	1.713	-	-	-	-	-	3.227	2.25
2.	Schima wall-ichii	0.113	-	-	-	-	-	-	-	0.113	0.08
3.	Shorea robusta	0.851	2.495	-	-	-	6.363	-	-	9.709	6.76
4.	Tectona grandis	22.876	40.040	15.275	4.579	-	-	-	-	82.770	57.67
5.	Miscellaneous spp.	7.633	8.430	6.409	2.444	13.651	-	9.148	-	47.715	33.24
	Total	31.473	52.479	23.397	7.023	13.651	6.363	9.148	-	143.534	100.0

Table No. IV.2.29

Distribution of vol./ha. by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Sal
Area : 30618 ha.
Unit : m^3/ha.

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Bombax ceiba	0.311	-	-	-	-	-	-	-	0.311	0.33
2.	Toona ciliata	-	0.190	-	-	-	-	-	-	0.190	0.20
3.	Kydia calycina	0.039	-	-	-	-	-	-	-	0.039	0.04
4.	Lannea coromandelica	0.197	-	0.999	0.601	-	-	-	-	1.797	1.90
5.	Schima wallichii	0.662	1.591	1.053	-	-	-	-	1.902	5.208	5.51
6.	Shorea robusta	16.026	13.182	6.110	6.532	3.333	3.733	3.815	-	52.731	55.74
7.	Miscellaneous spp.	10.010	7.926	4.262	5.189	3.190	1.369	-	2.378	34.324	36.28
	Total	27.245	22.889	12.424	12.322	6.523	5.102	3.815	4.280	94.600	100.0

Table No. IV.2.30

Distribution of vol./ha. by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Hard wood mixed with conifers
Area : 17428 ha.
Unit : m^3 /ha.

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Albizzia spp.	-	-	-	-	1.461	-	-	-	1.461	3.50
2.	Pinus kesiya	4.636	5.237	1.047	0.870	2.838	-	-	-	14.628	35.05
3.	Schima wallichii	0.418	-	-	-	-	-	-	-	0.418	1.00
4.	Miscellaneous spp.	7.844	4.809	3.403	3.315	1.543	4.313	-	-	25.227	60.45
	Total	12.898	10.046	4.450	4.185	5.842	4.313	-	-	41.734	100.0

Table No.IV.2.31

Distribution of vol./ha. by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Up-land hard wood
Area : 6241 ha.
Unit : m^3/ha.

SERIAL No.	species Name	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Pinus kesiya	0.501	0.788	-	-	-	-	-	-	1.289	2.65
2.	Miscellaneous spp.	13.610	24.113	6.385	3.248	-	-	-	-	47.356	97.35
	Total	14.111	24.901	6.385	3.248	-	-	-	-	48.645	100.0

Table No. IV.2.32

Distribution of vol./ha. by species and diameter classes in accessible tree forest area.

(All districts combined)

Forest type : Miscellaneous
Area : 664170 ha.
Unit : m^3/ha.

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Albizzia spp.	0.069	0.041	0.038	0.030	-	-	-	-	0.198	0.18
2.	Amoora wallichii	0.023	0.034	0.024	0.023	-	-	-	-	0.109	0.10
3.	Anthocephalus cadamba	0.015	0.046	0.026	-	-	-	0.076	-	0.163	0.15
4.	Bombax ceiba	0.150	0.060	0.110	0.029	-	-	-	0.134	0.483	0.44
5.	Toona ciliata	0.188	0.104	0.073	0.131	0.041	0.068	-	-	0.605	0.55
6.	Gmelina arborea	0.424	0.094	0.028	0.128	0.076	0.265	0.069	-	1.084	0.99
7.	Kydia calycina	0.158	0.076	0.045	-	-	-	-	-	0.279	0.26
8.	Lannea coromandelica	0.561	0.336	0.258	0.253	0.194	0.054	-	0.105	1.759	1.61
9.	Pinus kesiya	0.089	0.165	0.188	0.062	-	-	-	-	0.504	0.46
10.	Schima wallichii	1.664	2.101	1.546	1.252	0.495	0.579	0.218	0.692	8.547	7.82
11.	Shorea robusta	0.275	0.295	0.249	0.320	0.239	0.279	0.171	-	1.828	1.67
12.	Tectona grandis	0.11[illegible]	0.083	0.015	-	-	-	-	-	0.217	0.20
13.	Miscellaneous spp.	15.109	17.502	13.721	9.439	6.102	6.089	2.907	22.653	93.522	85.57
	Total	18.869	20.937	16.319	11.667	7.147	7.334	3.441	23.584	109.298	100.0

Table No.IV.2.33

Distribution of stems/ha. by species and diameter classes in accessible tree forest area.
(All districts combined)

Forest type : All forest types combined
Area : 814011 ha.
Unit : stems/ha.

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CMS) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Albizzia spp.	0.155	0.039	0.025	0.013	0.010	-	-	-	0.242	0.11
2.	Amoora wallichii	0.085	0.048	0.024	0.012	-	-	-	-	0.169	0.08
3.	Anthocephalus cadamba	0.092	0.077	0.024	-	-	-	0.012	-	0.205	0.10
4.	Bombax ceiba	0.260	0.064	0.064	0.013	-	-	-	0.013	0.414	0.20
5.	Toona ciliata	0.435	0.142	0.066	0.066	0.013	0.013	-	-	0.735	0.35
6.	Gmelina arborea	1.975	0.167	0.038	0.064	0.024	0.065	0.013	-	2.346	1.11
7.	Kesiya calycina	0.684	0.115	0.038	-	-	-	-	-	0.837	0.40
8.	Lannea coromandelica	1.367	0.445	0.246	0.141	0.065	0.013	-	0.013	2.290	1.08
9.	Pinus kesiya	17.475	4.975	0.939	0.170	0.031	-	0.011	-	23.501	11.09
10.	Schima wallichii	10.185	3.772	1.383	0.642	0.178	0.140	0.040	0.090	16.430	7.75
11.	Shorea robusta	7.499	1.571	0.408	0.270	0.112	0.100	0.050	-	10.010	4.72
12.	Tectona grandis	2.011	0.807	0.145	0.024	-	-	-	-	3.887	1.83
13.	Miscellaneous spp.	107.195	26.314	9.723	3.899	1.667	1.171	0.414	0.425	150.808	71.18
	Total	150.318	38.536	13.123	5.214	2.100	1.502	0.540	0.541	211.874	100.0

Table No. IV.2.34

Distribution of vol./ha. by species and diameter classes in accessible tree forest area. (All districts combined)

Forest type : All forest type combined
Area : 814011 ha.
Unit : m^3/ha.

SERIAL NO.	SPECIES NAME	DIAMETER CLASSES (IN CM2) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 +	Total	%
1.	Albizzia spp.	0.072	0.033	0.031	0.024	0.031	-	-	-	0.191	0.19
2.	Amoora wallichii	0.023	0.028	0.020	0.018	-	-	-	-	0.089	0.09
3.	Anticephalus cadamba	0.012	0.038	0.022	-	-	-	0.062	.	0.134	0.13
4.	Bombax ceiba	0.134	0.058	0.069	0.024	-	-	-	0.110	0.415	0.41
5.	Toona ciliata	0.153	0.092	0.060	0.107	0.033	0.056	-	-	0.501	0.50
6.	Gmeline arborea	0.346	0.089	0.037	0.105	0.062	0.216	0.056	-	0.911	0.90
7.	Kydia calycina	0.131	0.062	0.037	-	-	-	-	-	0.230	0.23
8.	Lannea coromendelica	0.469	0.274	0.246	0.229	0.158	0.044	-	0.086	1.506	1.50
9.	Pinus kesiya	1.841	2.095	0.927	0.130	0.089	-	0.057	-	5.139	5.10
10.	Schima wallichii	1.458	1.810	1.301	1.039	0.404	0.473	0.178	0.636	7.299	7.25
11.	Shorea robusta	0.834	0.758	0.433	0.507	0.320	0.421	0.283	-	3.556	3.53
12.	Tectona grandis	0.290	0.405	0.141	0.039	-	-	-	-	0.875	0.87
13.	Miscellaneous spp.	13.309	15.318	11.695	8.081	5.326	5.112	2.449	18.573	79.863	79.30
	Total	19.072	21.060	15.039	10.303	6.423	6.322	3.085	19.405	100.709	100.0

Contents

Appendix -I

Year of survey and publication of survey of India topo Maps used for forest inventory in Meghalaya survey area

Topo Sheet No.	Year of survey	Year of publication
78 G/13	1926	-
78 G/14	-	-
78 G/15	1872-74	-
78 J/8	1970-71	1973
78 J/12	1969-70	1972
78 K/1	1961-62	1973
78 K/2	1961-62	1972
78 K/3	1928-29	-
78 K/4	1928-29	-
78 K/5	1961-62	1969
78 K/6	1961-62	1972
78 K/7	1961-62	1971
78 K/8	-	-
78 K/9	1963-64	1972
78 K/10	1964-65	1976
78 K/11	1964-65	1973
78 K/12	-	-
78 K/13	1963-64	1975
78 K/14	1963-64	1975
78 K/15	1964-65	1972
78 K/16	-	-
78 N/12	1911-12	1944
78 N/16	1912-13	1953
78 O/1	1966-67	1972
78 O/2	1965-66	1972
78 O/3	1966-67	1972
78 O/4	1910-11	-
78 O/5	1966-67	1972
78 O/6	1965-66	1974
78 O/7	1965-66	1972
78 O/8	1910-11	-
78 O/9	1966-67	1975
78 O/10	1965-66	1975

Contents

Map Sheet No.	Year of survey	Year of publication
78 O/11	1965-66	1974
78 O/12	1910-11	-
78 O/13	1966-67	1972
78 O/14	1910-11	1959
78 O/15	1965-66	1975
78 O/16	1910-11	-
83 B/4	1967-68	1974
83 B/8	1965-66	1973
83 C/1	1964-65	1969
83 C/2	1964-65	1972
83 C/3	1965-66	1972
83 C/4	-	-
83 C/5	1964-65	1972
83 C/6	1965-66	1972
83 C/7	1965-66	1972
83 C/8	1919-20	-
83 C/10	1965-66	1975
83 C/11	1965-66	1972
83 C/12	1965-66	1972
83 C/15	1965-66	1972
83 C/16	1965-66	1972

Note: Topo sheet nos 78 K/3,4 and 78 G/15 are not available for use. Their year of survey has been taken from S.O.I Map catalogue Edition 1962

Topo sheet nos 78 N/12, 78 O/4,8,12,14,16 and 83 C/4,8 did not have any greenwash and in respect of sheet nos 78 G/14, 78 K/8,12,16 and 83 C/4 only part of these sheets were available. Therefore year of survey could not be given. As the year of survey is not mentioned in map catalogue even.

Appendix - II

List of the thematic maps, prepared from visual interpretation of Aerial photographs, used for forest inventory of Meghalaya survey area

S.No.	Thematic map number	Period of aerial photograph	Sl. No.	Thematic map number	Period of aerial photograph
1.	78 G/13	Jan,1964	21.	78 O/8	1963-64
2.	78 G/14	Jan,1964	22.	78 O/9	1963-64
3.	78 K/1	Jan,1964	23.	78 O/10	1963-64
4.	78 K/2	Jan,1964	24.	78 O/11	1963-64
5.	78 K/5	Jan,1964	25.	78 O/12	1963-64
6.	78 K/6	Jan,1964	26.	78 O/13	1963-64
7.	78 K/7	Nov.72 to Nov.73	27.	78 O/14	1963-64
8.	78 K/8	Nov.72 to Nov. 73	28.	78 O/15	1963-64
9.	78 K/11	Nov.72 to Nov.73	29.	78 O/16	1963-64
10.	78 K/12	Nov. 72 to Nov. 73	30.	83 B/4	1963-64
11.	78 K/16	Nov. 72 to Nov. 73	31.	83 B/8	1963-64
12.	78 O/2	1963-64	32.	83 C/1	1963-64
13.	78 O/16	1963-64	33.	83 C/2	1963-64
14.	78 O/1	1963-64	34.	83 C/3	1963-64
15.	78 O/2	1963-64	35.	83 C/4	1963-64
16.	78 O/3	1963-64	36.	83 C/6	1963-64
17.	78 O/4	1963-64	37.	83 C/7	1963-64
18.	78 O/5	1963-64	38.	83 C/8	1963-64
19.	78 O/6	1963-64	39.	83 C/11	1963-64
20.	78 O/7	1963-64	40.	83 C/12	1963-64

Appendix - III

LOCATION OF CENTRE OF SAMPLE PLOTS VISITED FOR FOREST INVENTORY

District : EAST & WEST KHASI HILLS

Map sheet coverage : 78 K/13,14,15,16
78 N/12,16
78 O/1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16
83 B/4
83 C/1,2,3,4

Total sheets : 27

Longitude E Latitude N of plot centre (Degree, Minute, Second)	Forest Division code*	Land use code*	Forest type code	No. of trees enumerated in sample plot of .1 ha.	Volume (m^3) in sample plot of .1 ha.
1	2	3	4	5	6
Map sheet No. 78 K/13					
90 58 14 E 25 45 24 N	02	02	20	023	2.625
90 59 20 E 25 47 08 N	02	02	20	026	11.788
Map sheet No. 78 K/14					
90 45 57 E 25 31 04 N	02	03	20	000	-
90 46 30 E 25 32 28 N	02	03	20	000	-
90 48 27 E 25 31 57 N	02	06	-	-	-
90 49 02 E 25 30 33 N	02	03	20	004	11.381
90 52 20 E 25 32 28 N	02	05	12	005	2.186
90 50 17 E 25 30 02 N	02	05	12	001	0.585
90 54 54 E 25 30 15 N	02	03	20	003	0.283

*Codes are explained at the end of the appendix

Contents

1	2	3	4	5	6
90 52 30 E 25 32 15 N	02	05	12	000	-
90 57 16 E 25 31 48 N	02	06	-	-	-
90 55 11 E 25 30 42 N	02	15	-	-	-
90 57 14 E 25 31 48 N	02	03	20	000	-
90 59 45 E 25 30 11 N	02	06	-	-	-
90 49 32 E 25 34 08 N	02	05	12	-	-
90 47 52 E 25 33 12 N	02	05	12	-	-
90 50 01 E 25 34 24 N	02	05	12	000	-
90 52 25 E 25 33 03 N	02	03	20	010	0.464
90 51 03 E 25 32 45 N	02	06	-	-	-
90 51 21 E 25 34 45 N	02	02	20	022	2.731
90 56 12 E 25 33 56 N	02	03	20	003	0.606
90 56 15 E 25 33 25 N	02	02	20	017	1.165
90 57 43 E 25 34 24 N	02	05	12	000	-
90 49 35 E 25 33 06 N	02	03	20	016	3.181
90 51 13 E 25 35 33 N	02	06	-	-	-
90 54 37 E 25 36 43 N	02	02	20	063	9.660
90 52 46 E 25 35 47 N	02	02	20	013	5.023
90 56 21 E 25 36 45 N	02	06	-	-	-
90 56 01 E 25 35 42 N	02	03	20	000	-
90 59 54 E 25 36 59 N	02	02	20	005	0.809
90 57 32 E 25 35 39 N	02	02	20	017	7.004

Contents

1	2	3	4	5	6
90 50 28 E 25 38 17 N	02	06	-	-	-
90 51 56 E 25 39 09 N	02	03	20	009	2.077
90 54 37 E 25 38 06 N	02	01	20	032	29.036
90 52 46 E 25 39 26 N	02	12	-	-	-
90 55 58 E 25 37 45 N	02	15	-	-	-
90 56 28 E 25 39 44 N	02	03	20	006	0.718
90 49 50 E 25 37 45 N	02	02	20	040	7.180
90 57 05 E 25 40 59 N	02	05	12	000	-
90 58 35 E 25 41 05 N	02	03	20	000	-
90 58 50 E 25 41 23 N	02	03	20	001	0.128
90 58 13 E 25 43 45 N	02	03	20	022	2.218
90 59 14 E 25 43 46 N	02	03	20	011	3.466
	Map sheet No. 78 K/15				
90 55 31 E 25 17 26 N	01	-	-	-	-
90 58 21 E 25 17 05 N	01	02	20	008	2.943
90 59 10 E 25 15 25 N	01	06	-	-	-
90 57 13 E 25 19 37 N	01	01	20	-	-
90 55 16 E 25 17 54 N	01	01	20	-	-
90 59 08 E 25 18 25 N	01	01	20	026	3.562
90 58 23 E 25 19 06 N	01	01	20	035	5.579
90 49 49 E 25 22 04 N	02	02	20	-	-

Contents

1	2	3	4	5	6
90 50 49 E 25 22 14 N	01	-	-	-	-
90 51 42 E 25 20 18 N	02	06	-	-	-
90 52 45 E 25 21 59 N	02	02	20	-	-
90 57 22 E 25 21 36 N	01	01	20	-	-
90 59 54 E 25 20 25 N	01	02	20	003	0.317
90 57 36 E 25 22 04 N	02	-	-	-	-
90 46 26 E 25 21 47 N	02	03	20	009	5.756
90 47 42 E 25 23 22 N	02	06	-	-	-
90 49 51 E 25 24 09 N	02	02	20	036	15.727
90 50 45 E 25 23 35 N	02	02	20	057	19.118
90 51 48 E 25 23 56 N	02	03	20	-	-
90 59 11 E 25 23 24 N	02	02	20	-	-
90 58 19 E 25 23 54 N	02	02	20	029	10.877
90 46 35 E 25 27 18 N	02	-	-	-	-
90 45 57 E 25 25 13 N	02	06	-	-	-
90 48 01 E 25 26 04 N	02	02	20	052	20.744
90 49 31 E 25 26 29 N	02	06	-	-	-
90 51 21 E 25 27 18 N	02	06	-	-	-
90 51 09 E 25 25 13 N	02	06	-	-	-
90 53 53 E 25 26 33 N	02	03	20	019	1.484
90 53 39 E 25 25 56 N	01	03	20	007	0.571

Contents

1	2	3	4	5	6
90 57 06 E 25 26 52 N	02	06	-	-	-
90 55 26 E 25 25 40 N	02	02	20	030	6.765
90 59 22 E 25 26 31 N	02	06	-	-	-
90 58 07 E 25 26 01 N	02	03	12	005	0.435
90 45 02 E 25 28 48 N	02	06	-	-	-
90 47 27 E 25 28 33 N	01	01	20	087	18.125
90 47 45 E 25 27 36 N	02	03	20	006	5.615
90 49 42 E 25 29 55 N	01	06	-	-	-
90 51 25 E 25 27 50 N	01	06	-	-	-
90 51 07 E 25 29 42 N	02	06	-	-	-
90 52 40 E 25 28 02 N	02	02	20	033	10.698
90 54 44 E 25 29 29 N	02	06	-	-	-
90 56 29 E 25 29 30 N	01	01	12	012	1.093
90 56 01 E 25 27 58 N	01	02	12	003	0.098
90 58 17 E 25 29 04 N	02	02	20	-	-
90 59 20 E 25 28 24 N	02	06	-	-	-
	Map Sheet No. 78 K/16				
90 58 12 E 25 11 55 N	02	14	-	-	-
90 58 34 E 25 13 56 N	02	01	20	-	-
90 58 57 E 25 13 38 N	02	01	20	-	-
	Map Sheet No. 78 N/12				
91 37 01 E 26 00 18 N	02	02	20	014	4.977

Contents

1	2	3	4	5	6
	Map Sheet No.78 N/16				
91 47 22 E 26 02 29 N	02	02	20	004	1.016
91 45 09 E 26 00 01 N	02	02	20	014	9.135
91 47 38 E 26 01 35 N	02	02	20	018	2.199
91 49 53 E 26 00 54 N	02	15	-	-	-
91 50 22 E 26 01 35 N	02	02	20	035	8.775
91 52 06 E 26 00 56 N	02	14	-	-	-
91 54 49 E 26 00 45 N	02	06	-	-	-
91 52 40 E 26 01 48 N	02	03	20	014	9.782
91 56 11 E 26 00 08 N	02	02	20	037	17.628
91 59 10 E 26 00 23 N	02	-	-	-	-
91 47 29 E 26 02 50 N	02	02	20	004	4.120
91 48 56 E 26 04 17 N	02	02	20	034	16.830
91 48 37 E 26 03 17 N	02	02	20	012	8.368
91 51 06 E 26 04 52 N	02	12	-7	-	-
91 51 22 E 26 02 41 N	02	02	20	004	0.680
91 43 17 E 26 05 02 N	02	02	20	024	7.890
91 50 10 E 26 05 45 N	02	15	-	-	-
	Map Sheet No. 78 O/1				
91 02 17 E 25 46 18 N	02	02	20	020	4.969
91 00 15 E 25 46 11 N	02	06	-	-	-
91 04 06 E 25 46 37 N	02	02	20	017	5.810

Contents

1	2	3	4	5	6
91 03 23 E 25 45 52 N	02	03	20	024	2.573
91 05 13 E 25 45 20 N	02	03	20	018	6.432
91 07 17 E 25 47 02 N	02	05	12	001	0.025
91 08 15 E 25 45 53 N	02	02	20	006	3.731
91 09 15 E 25 46 28 N	02	06	-	-	-
91 10 54 E 25 47 06 N	02	01	20	014	2.111
91 01 15 E 25 47 42 N	02	03	20	024	11.666
91 03 00 E 25 47 45 N	02	03	20	019	4.928
91 05 45 E 25 47 36 N	02	03	20	007	5.572
91 08 20 E 25 48 50 N	02	02	20	013	13.816
91 09 10 E 25 48 37 N	02	03	20	005	3.461
91 10 11 E 25 48 55 N	02	03	20	008	7.429
91 11 22 E 25 50 35 N	02	03	20	005	1.907
	Map Sheet No. 78 O/2				
91 01 56 E 25 32 06 N	02	03	20	009	3.429
91 00 27 E 25 30 23 N	02	06	-	-	-
91 04 25 E 25 30 49 N	02	03	20	013	3.742
91 03 10 E 25 31 39 N	02	03	20	010	0.942
91 05 21 E 25 31 18 N	02	03	20	025	7.333
91 07 21 E 25 31 17 N	02	02	20	020	3.319
91 09 42 E 25 31 42 N	02	11	-	-	-
91 10 41 E 25 31 41 N	02	03	20	014	2.820
91 10 22 E 25 30 35 N	02	03	20	019	2.641

Contents

1	2	3	4	5	6
		Map Sheet No. 78 O/2			
91 13 09 E 25 32 02 N	02	02	16	021	3.529
91 02 20 E 25 31 03 N	02	06	-	-	-
91 00 09 E 25 33 22 N	02	05	12	001	0.781
91 03 10 E 25 33 01 N	02	03	20	002	7.350
91 04 14 E 25 34 31 N	02	01	20	036	3.808
91 06 31 E 25 33 54 N	02	03	20	011	3.572
91 05 57 E 25 33 25 N	02	03	20	000	-
91 08 55 E 25 33 35 N	02	02	20	044	30.321
91 08 51 E 25 33 53 N	02	03	20	002	0.124
91 11 04 E 25 32 36 N	02	11	-	-	-
91 13 09 E 25 34 33 N	02	02	16	056	6.820
91 01 58 E 25 35 28 N	02	02	20	028	1.572
91 00 32 E 25 37 01 N	02	03	20	009	7.159
91 04 38 E 25 36 30 N	02	02	20	019	13.891
91 05 28 E 25 35 47 N	02	03	20	004	1.195
91 06 57 E 25 36 42 N	02	02	20	046	8.436
91 07 42 E 25 36 42 N	02	02	20	036	8.894
91 13 06 E 25 36 52 N	02	03	20	001	0.163
91 01 31 E 25 39 [illegible]7 N	02	02	20	033	27.407
91 01 00 E 25 37 32 N	02	01	20	024	683.946
91 04 37 E 25 38 07 N	02	02	20	022	13.703
91 02 54 E 25 39 47 N	02	02	20	040	7.062

Contents

1	2	3	4	5	6
91 07 20 E 25 39 55 N	02	01	20	049	24.483
91 05 08 E 25 37 32 N	02	02	12	-	-
91 08 26 E 25 39 11 N	02	02	20	034	33.143
91 12 21 E 25 38 01 N	02	02	20	012	1.232
91 10 08 E 25 39 34 N	02	01	20	098	13.326
91 19 34 E 25 38 27 N	02	03	20	031	6.930
91 12 54 E 25 39 00 N	02	02	20	030	5.141
91 01 49 E 25 40 50 N	02	02	20	029	19.988
91 00 40 E 25 41 41 N	02	02	20	025	2.188
91 02 55 E 25 40 36 N	02	02	20	029	22.599
91 04 32 E 25 41 55 N	02	02	20	032	13.439
91 05 10 E 25 40 12 N	02	02	20	022	8.020
91 07 18 E 25 42 15 N	02	02	20	047	11.864
91 08 31 E 25 41 56 N	02	01	20	027	15.353
91 11 25 E 25 42 27 N	02	03	20	032	14.947
91 10 42 E 25 40 02 N	02	02	20	047	26.244
91 12 49 E 25 42 23 N	02	01	20	067	36.542
91 11 21 E 25 42 50 N	02	02	20	006	3.257
91 01 08 E 25 44 37 N	02	12	-	-	-
91 14 54 E 25 43 12 N	02	05	12	000	-
91 02 34 E 25 44 14 N	02	12	-	-	-
91 05 30 E 25 44 33 N	02	02	20	-	-
91 06 56 E 25 42 50 N	02	03	20	040	9.361
91 09 41 E 25 42 46 N	02	06	-	-	-

Contents

1	2	3	4	5	
91 07 46 E 25 44 40 N	02	02	20	042	
91 10 14 E 25 42 51 N	02	06	-	-	
91 13 58 E 25 42 50 N	02	02	20	054	27.8

Map Sheet No. 78 O/3

91 02 06 E 25 15 02 N	02	01	20	058	30.300
91 00 25 E 25 17 28 N	02	01	20	047	41.569
91 04 54 E 25 15 52 N	02	03	20	030	14.766
91 02 34 E 25 16 36 N	02	01	20	028	7.231
91 05 30 E 25 17 08 N	02	03	20	014	2.075
91 07 00 E 25 15 23 N	02	03	20	022	5.984
91 08 26 E 25 15 58 N	02	02	20	019	4.068
91 08 59 E 25 16 24 N	02	01	20	-	-
91 10 41 E 25 17 20 N	02	06	-	-	-
91 11 46 E 25 15 10 N	02	06	-	-	-
91 14 53 E 25 17 27 N	02	-	-	-	-
91 12 38 E 25 15 01 N	02	-	-	-	-
91 00 18 E 25 17 38 N	02	01	20	063	30.131
91 02 18 E 25 14 51 N	02	06	-	-	-
91 04 04 E 25 18 10 N	02	02	20	019	10.898
91 03 26 E 25 19 17 N	02	06	-	-	-
91 05 51 E 25 19 05 N	02	01	20	025	6.751
91 06 40 E 25 18 23 N	02	01	20	-	-
91 08 28 E 25 17 55 N	02	02	20	023	10.[illegible]

Contents

1	2	3	4	5	6
91 08 57 E 25 19 35 N	02	06	-	-	-
91 12 17 E 25 18 05 N	02	-	-	-	-
91 10 02 E 25 19 18 N	02	06	-	-	-
91 14 55 E 25 17 38 N	02	-	-	-	-
91 12 40 E 25 19 53 N	02	04	-	-	-
91 00 54 E 25 20 55 N	02	-	-	-	-
91 01 36 E 25 21 33 N	02	01	20	-	-
91 04 00 E 25 20 23 N	02	-	-	-	-
91 03 28 E 25 22 05 N	02	04	-	-	-
91 06 36 E 25 21 37 N	02	-	-	-	-
91 05 55 E 25 21 03 N	02	05	12	-	-
91 07 45 E 25 21 30 N	02	-	-	-	-
91 07 42 E 25 21 00 N	02	03	20	-	-
91 12 01 E 25 20 41 N	02	04	-	-	-
91 10 25 E 25 21 48 N	02	04	-	-	-
91 13 46 E 25 21 31 N	02	03	20	008	0.691
91 13 24 E 25 20 54 N	02	04	-	-	-
91 01 47 E 25 22 23 N	02	06	-	-	-
91 00 45 E 25 24 52 N	02	03	20	009	0.990
91 02 39 E 25 23 53 N	02	02	20	051	12.043
91 04 49 E 25 23 33 N	02	06	-	-	-
91 04 49 E 25 23 33 N	02	02	20	-	-
91 07 05 E 25 23 57 N	02	06	-	-	-

Contents

1	2	3	4	5	6
91 08 14 E 25 23 34 N	02	04	-	-	-
91 09 11 E 25 23 49 N	02	02	20	049	30.416
91 12 01 E 25 24 22 N	02	03	20	-	-
91 10 27 E 25 23 03 N	02	04	-	-	-
91 13 03 E 25 23 22 N	02	02	20	008	6.137
91 14 35 E 25 24 07 N	02	06	-	-	-
91 01 00 E 25 26 02 N	02	14	-	-	-
91 01 32 E 25 26 30 N	02	06	-	-	-
91 02 44 E 25 27 22 N	02	06	-	-	-
91 04 44 E 25 25 08 N	02	06	-	-	-
91 07 17 E 25 25 43 N	02	02	20	027	8.933
91 05 14 E 25 26 48 N	02	02	20	024	5.894
91 07 43 E 25 26 03 N	02	01	20	091	38.259
91 09 43 E 25 26 25 N	02	-	-	-	-
91 10 04 E 25 26 06 N	02	06	-	-	-
91 12 26 E 25 26 27 N	02	-	-	-	-
91 13 43 E 25 26 15 N	02	-	-	-	-
91 13 50 E 25 26 18 N	02	02	20	-	-
91 02 28 E 25 29 15 N	02	03	20	-	-
91 00 02 E 25 28 13 N	02	06	-	-	-
91 04 00 E 25 28 47 N	02	06	-	-	-
91 03 28 E 25 28 42 N	02	06	-	-	-
91 06 14 E 25 27 40 N	02	06	-	-	-

Contents

1	2	3	4	5	6
91 06 14 E 25 29 48 N	02	02	20	013	10.373
91 08 59 E 25 27 47 N	02	06	-	-	-
91 08 26 E 25 29 45 N	02	03	20	009	2.075
91 11 48 E 25 28 02 N	02	02	20	040	8.653
91 10 42 E 25 29 32 N	02	02	20	038	17.088
91 13 01 E 25 27 37 N	02	02	20	-	-
91 13 26 E 25 29 58 N	02	01	20	043	30.909
	Map Sheet No.78 O/4				
91 00 40 E 25 14 10 N	03	06	-	-	-
91 04 37 E 25 12 53 N	02	01	20	-	-
91 03 02 E 25 14 38 N	03	02	20	035	17.570
91 06 44 E 25 14 35 N	02	06	-	-	-
91 05 56 E 25 12 50 N	03	01	20	053	33.283
91 08 10 E 25 14 11 N	02	03	20	006	1.955
91 09 29 E 25 13 21 N	02	03	20	008	1.178
91 10 07 E 25 13 10 N	02	06	-	-	-
91 12 29 E 25 14 23 N	03	02	20	010	2.194
91 14 02 E 25 13 08 N	02	02	20	032	2.840
91 13 43 E 25 14 25 N	02	06	-	-	-
	Map Sheet No. 78 O/5				
91 18 35 E 25 47 10 N	02	03	20	010	7.625
91 18 58 E 25 45 16 N	02	02	20	029	24.463
91 20 11 E 25 45 28 N	02	02	20	-	-

Contents

1	2	3	4	5	6
91 22 18 E 25 47 04 N	02	02	20	019	10.223
91 24 23 E 25 47 08 N	02	02	20	020	9.770
91 24 04 E 25 45 20 N	02	02	20	022	19.063
91 26 00 E 25 47 04 N	02	02	20	013	5.447
91 26 40 E 25 45 28 N	02	02	20	026	23.756
91 28 22 E 25 46 44 N	02	02	20	060	32.377
91 29 07 E 25 45 44 N	02	06	-	-	-
91 19 02 E 25 47 36 N	02	03	20	008	4.065
91 21 25 E 25 48 00 N	02	03	20	012	5.272
91 21 09 E 25 48 32 N	02	03	20	004	5.639
91 22 58 E 25 47 44 N	02	02	20	015	19.662
91 24 25 E 25 49 48 N	02	02	20	029	9.653
91 26 36 E 25 48 40 N	02	05	12	003	2.073
91 26 00 E 25 48 48 N	02	03	20	008	3.055
91 27 44 E 25 47 58 N	02	05	12	030	3.523
91 29 46 E 25 49 32 N	02	03	20	029	3.588
91 23 34 E 25 50 45 N	02	02	20	023	7.768
91 27 06 E 25 50 20 N	02	02	20	023	11.305
91 29 52 E 25 51 18 N	02	12	-	-	-
91 29 57 E 25 53 30 N	02	03	20	007	6.504

Contents

1	2	3	4	5	6
	Map Sheet No. 78 O/6				
91 15 56 E 25 30 07 N	02	02	20	008	2.930
91 18 34 E 25 31 14 N	02	02	16	046	4.454
91 23 10 E 25 34 38 N	02	02	16	024	8.506
91 16 04 E 25 36 56 N	02	02	16	005	1.642
91 19 43 E 25 36 26 N	02	01	16	028	7.774
91 17 43 E 25 36 05 N	02	01	16	071	16.319
91 29 39 E 25 35 50 N	02	02	16	012	4.204
91 27 49 E 25 36 39 N	02	02	16	002	1.509
91 16 36 E 25 38 26 N	02	02	16	004	0.791
91 15 52 E 25 39 56 N	02	01	20	035	16.126
91 19 19 E 25 38 51 N	02	01	16	113	14.274
91 18 09 E 25 38 38 N	02	02	16	008	0.582
91 20 49 E 25 39 49 N	02	01	16	046	6.428
91 23 37 E 25 38 02 N	02	02	16	005	0.284
91 23 52 E 25 39 31 N	02	02	16	015	2.660
91 27 04 E 25 37 43 N	02	01	20	-	-
91 29 55 E 25 39 52 N	02	15	-	-	-
91 27 35 E 25 37 40 N	02	15	-	-	-
91 15 24 E 25 41 40 N	02	06	-	-	-
91 18 38 E 25 40 35 N	02	11	-	-	-
91 18 52 E 25 41 52 N	02	12	-	-	-

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91 20 27 E 25 40 04 N	02	03	16	001	0.025
91 22 10 E 25 42 28 N	02	02	20	037	18.905
91 24 37 E 25 40 37 N	02	15	-	-	-
91 22 56 E 25 41 53 N	02	02	20	018	9.505
91 26 40 E 25 41 09 N	02	02	20	010	4.676
91 26 00 E 25 41 20 N	02	03	20	016	4.423
91 28 58 E 25 40 26 N	02	02	20	032	17.910
91 28 36 E 25 42 04 N	02	02	08	016	2.603
91 15 08 E 25 44 07 N	02	-	-	-	-
91 17 24 E 25 43 22 N	02	02	20	032	28.446
91 19 38 E 25 43 16 N	02	02	20	029	21.358
91 17 53 E 25 44 16 N	02	03	20	014	14.744
91 21 14 E 25 43 40 N	02	10	-	-	-
91 21 20 E 25 43 52 N	02	03	20	010	7.823
91 23 26 E 25 44 12 N	02	02	20	043	40.980
91 23 42 E 25 43 16 N	02	06	-	-	-
91 27 24 E 25 44 12 N	02	03	08	003	0.572
91 25 06 E 25 43 14 N	02	02	20	009	7.941
91 29 07 E 25 43 44 N	02	10	-	-	-
	Map Sheet No. 78 O/7				
91 16 36 E 25 15 36 N	02	01	20	061	37.385
91 15 56 E 25 16 58 N	02	03	20	-	-
91 19 50 E 25 16 46 N	02	14	-	-	-
91 17 36 E 25 15 40 N	02	01	20	034	

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91 21 08 E 25 16 00 N	02	03	20	000	-
91 21 24 E 25 16 26 N	02	04	-	-	-
91 22 32 E 25 15 46 N	02	02	20	034	17.202
91 24 54 E 25 15 38 N	02	02	20	027	7.401
91 25 46 E 25 16 56 N	02	06	-	-	-
91 25 46 E 25 15 32 N	02	02	20	020	11.043
91 28 11 E 25 16 28 N	02	-	-	-	-
91 29 16 E 25 16 04 N	02	-	-	-	-
91 23 21 E 25 19 08 N	02	02	20	-	-
91 24 08 E 25 18 18 N	02	02	20	049	21.320
91 24 24 E 25 18 52 N	02	02	20	-	-
91 23 08 E 25 18 28 N	02	03	20	000	-
91 26 51 E 25 19 14 N	02	03	20	002	0.255
91 25 38 E 25 18 44 N	02	03	20	000	-
91 27 31 E 25 18 32 N	02	02	20	-	-
91 29 57 E 25 18 52 N	02	01	20	-	-
91 19 52 E 25 20 03 N	02	03	20	028	5.653
91 21 54 E 25 20 32 N	02	02	20	018	2.443
91 20 36 E 25 21 56 N	02	04	-	-	-
91 24 52 E 25 20 14 N	02	01	20	065	10.247
91 22 36 E 25 22 16 N	02	02	20	048	12.703
91 26 04 E 25 21 47 N	02	03	20	002	0.598
91 28 36 E 25 20 48 N	02	02	20	077	12.894

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91 15 04 E 25 24 22 N	02	06	-	-	-
91 19 04 E 25 23 38 N	02	02	20	033	26.395
91 23 05 E 25 24 39 N	02	03	08	000	-
91 17 12 E 25 26 42 N	02	02	08	036	4.811
91 22 16 E 25 26 12 N	02	03	16	006	1.210
91 23 36 E 25 26 56 N	02	03	16	008	2.932
91 27 01 E 25 27 24 N	02	15	-	-	-
91 25 28 E 25 25 06 N	02	02	16	009	3.358
91 27 54 E 25 25 26 N	02	02	16	045	11.414
91 29 40 E 25 27 04 N	02	02	08	051	3.972
91 15 02 E 25 29 54 N	02	02	20	036	10.091
91 22 56 E 25 27 34 N	02	03	16	002	0.207
91 26 44 E 25 28 23 N	02	03	16	009	2.115
91 27 48 E 25 29 49 N	02	02	16	013	3.633
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91 19 55 E 25 12 14 N	02	03	20	002	0.153
91 23 [illegible] E 25 11 [illegible] N	02	03	20	005	2.513
91 27 00 E 25 11 14 N	02	03	20	016	9.331
91 25 32 E 25 11 18 N	02	03	20	010	2.262
91 29 54 E 25 11 25 N	02	14	-	-	-
91 17 25 E 25 14 45 N	02	-	-	-	-

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91 18 38 E 25 13 06 N	02	02	20	040	27.265
91 19 00 E 25 14 24 N	02	-	-	-	-
91 22 25 E 25 14 09 N	02	02	20	-	-
91 20 12 E 25 13 20 N	02	02	20	037	24.039
91 23 58 E 25 14 36 N	02	02	20	047	58.183
91 23 42 E 25 11 51 N	02	02	20	042	12.999
91 27 14 E 25 12 54 N	02	14	-	-	-
91 25 15 E 25 14 35 N	02	02	20	030	32.712
91 28 48 E 25 12 54 N	02	02	20	057	26.828
91 28 51 E 25 14 53 N	02	-	-	-	-
	Map Sheet No. 78 O/9				
91 31 20 E 25 45 41 N	02	02	20	-	-
91 31 12 E 25 46 49 N	02	-	-	-	-
91 33 45 E 25 46 49 N	02	02	20	-	-
91 33 45 E 25 45 41 N	02	02	20	022	13.740
91 37 25 E 25 45 51 N	02	13	-	-	-
91 35 07 E 25 46 36 N	02	02	20	040	14.970
91 38 41 E 25 46 15 N	02	02	20	058	10.683
91 41 47 E 25 46 59 N	02	02	11	032	8.242
91 44 52 E 25 46 59 N	02	02	11	025	6.684
91 31 22 E 25 49 19 N	02	03	20	-	-
91 31 11 E 25 48 25 N	02	12	-	-	-
91 34 23 E 25 48 58 N	02	02	20	007	0.494
91 33 08 E 25 48 27 N	02	02	20	015	3.282

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91 36 17 E 25 49 00 N	02	02	20	-	-
91 36 13 E 25 48 27 N	02	13	-	-	-
91 39 52 E 25 48 43 N	02	12	-	-	-
91 37 38 E 25 48 42 N	02	16	-	-	-
91 42 21 E 25 47 46 N	02	02	20	029	13.757
91 40 07 E 25 49 40 N	02	02	20	033	3.287
91 44 48 E 25 47 41 N	02	02	20	025	12.524
91 42 49 E 25 49 48 N	02	02	20	038	12.245
91 30 28 E 25 51 29 N	02	03	20	-	-
91 32 04 E 25 51 02 N	02	12	-	-	-
91 32 51 E 25 51 44 N	02	12	-	-	-
91 34 35 E 25 50 49 N	02	02	20	023	2.822
91 35 32 E 25 51 23 N	02	12	-	-	-
91 36 58 E 25 51 05 N	02	12	-	-	-
91 38 38 E 25 50 40 N	02	12	-	-	-
91 38 50 E 25 51 51 N	02	12	-	-	-
91 41 51 E 25 50 [illegible] N	02	02	20	025	9.026
91 40 38 E 25 51 38 N	02	01	20	000	-
91 44 52 E 25 50 04 N	02	01	11	066	14.164
91 [illegible] 37 E 25 50 24 N	02	05	12	-	-
91 31 52 E 25 53 19 N	02	13	-	-	-
91 30 37 E 25 54 01 N	02	12	-	-	-
91 34 48 E 25 52 31 N	02	12	-	-	-

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91 32 44 E 25 54 55 N	02	02	20	-	-
91 35 39 E 25 54 31 N	02	12	-	-	-
91 36 52 E 25 52 [illegible] N	02	12	-	-	-
91 39 41 E 25 53 16 N	02	13	-	-	-
91 37 49 E 25 54 13 N	02	12	-	-	-
91 40 15 E 25 52 46 N	02	05	12	001	0.025
91 42 13 E 25 54 42 N	02	12	-	-	-
91 44 44 E 25 53 11 N	02	02	20	052	16.789
91 42 46 E 25 54 34 N	02	02	20	-	-
91 31 16 E 25 56 06 N	02	-	-	-	-
91 31 15 E 25 56 [illegible]	02	-	-	-	-
91 32 3[illegible] E 25 55 1[illegible] N	02	12	-	-	-
91 31 [illegible] E 25 57 03 N	02	12	-	-	-
91 35 49 E 25 57 29 N	02	03	20	012	2.935
91 38 58 E 25 55 05 N	02	03	20	007	4.038
91 44 52 E 25 55 55 N	02	02	20	042	8.266
91 34 54 E 25 59 55 N	02	02	20	045	13.330
91 32 37 E 25 57 39 N	02	02	30	057	6.930
91 36 13 E 25 59 53 N	02	12	-	-	-
91 36 17 E 25 57 35 N	02	03	11	007	3.009
91 37 53 E 25 58 43 N	02	12	-	-	-
91 43 27 E 25 59 09 N	02	02	20	-	-

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91 44 05 E 25 58 19 N	02	02	20	027	7.537
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91 31 31 E 25 33 37 N	02	03	16	000	-
91 32 15 E 25 15 23 N	02	12	-	-	-
91 32 27 E 25 38 44 N	02	06	-	-	-
91 31 24 E 25 41 58 N	02	12	-	-	-
91 31 08 E 25 40 32 N	02	02	16	023	2.124
91 31 15 E 25 44 10 N	02	12	-	-	-
91 34 03 E 25 32 27 N	02	03	16	000	-
91 34 05 E 25 32 36 N	02	03	16	011	0.604
91 33 24 E 25 34 53 N	02	12	-	-	-
91 34 16 E 25 56 08 N	02	12	-	-	-
91 33 14 E 25 36 28 N	02	03	16	000	-
91 32 33 E 25 42 16 N	02	12	-	-	-
91 34 57 E 25 43 20 N	02	12	-	-	-
91 36 54 E 25 30 57 N	02	03	16	033	8.410
91 35 34 E 25 31 33 N	02	03	16	008	2.100
91 36 58 E 25 34 27 N	02	02	16	036	7.766
91 35 54 E 25 35 58 N	02	03	16	015	1.114
91 36 34 E 25 35 59 N	02	02	16	061	13.341
91 36 21 E 25 37 42 N	02	02	16	030	5.517
91 36 43 E 25 40 28 N	02	12	-	-	-

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91 35 46 E 25 42 02 N	02	02	16	024	1.107
91 36 18 E 25 44 23 N	02	02	16	012	4.924
91 36 11 E 25 43 05 N	02	02	16	031	6.576
91 39 34 E 25 30 46 N	02	03	16	012	12.196
91 38 56 E 25 33 12 N	02	03	16	002	1.084
91 38 33 E 25 34 19 N	02	03	16	015	2.179
91 38 50 E 25 35 22 N	02	03	16	023	4.395
91 38 38 E 25 37 08 N	02	03	16	032	6.613
91 38 35 E 25 39 26 N	02	03	16	001	0.410
91 38 54 E 25 38 03 N	02	11	-	-	-
91 38 56 E 25 40 14 N	02	02	16	033	7.959
91 39 37 E 25 42 15 N	02	12	-	-	-
91 38 25 E 25 43 32 N	02	03	20	016	2.866
91 39 14 E 25 43 57 N	02	02	20	008	8.409
91 42 15 E 25 31 48 N	02	07	16	-	-
91 40 13 E 25 30 42 N	02	13	-	-	-
91 40 11 E 25 34 17 N	02	03	16	032	10.363
91 41 17 E 25 36 37 N	02	04	-	-	-
91 41 15 E 25 35 51 N	02	03	16	007	2.458
91 40 13 E 25 37 40 N	02	02	16	021	7.454
91 42 15 E 25 39 30 N	02	12	-	-	-
91 41 28 E 25 40 20 N	02	03	20	004	2.073

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91 41 00 E 25 4[illegible] 11 N	02	03	20	004	1.870
91 41 29 E 25 43 12 N	02	01	20	024	13.490
91 44 55 E 25 30 12 N	02	06	-	-	-
91 42 33 E 25 32 06 N	02	02	16	038	12.097
91 42 59 E 25 33 48 N	02	03	20	005	1.145
91 44 32 E 25 33 41 N	02	01	20	-	-
91 44 33 E 25 36 59 N	02	01	20	-	-
91 42 54 E 25 35 [illegible] N	02	02	20	012	11.157
91 42 57 E 25 38 18 N	02	02	20	-	-
91 44 32 E 25 39 1[illegible] N	02	12	-	-	-
91 42 31 E 25 40 35 N	02	02	20	022	7.260
91 43 11 E 25 44 30 N	02	12	-	-	-
	Map Sheet No. 78 O/11				
91 30 35 E 25 17 05 N	02	01	20	-	-
91 31 52 E 25 15 24 N	02	02	20	013	3.487
91 34 54 E 25 15 08 N	02	04	-	-	-
91 32 35 E 25 17 20 N	02	02	20	-	-
91 36 48 E 25 18 31 N	02	14	-	-	-
91 35 41 E 25 17 57 N	02	02	20	-	-
91 38 07 E 25 17 23 N	02	01	20	075	52.617
91 39 22 E 25 15 05 N	02	02	20	-	-
91 40 16 E 25 17 17 N	02	02	20	-	-

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91 42 44 E 25 15 11 N	02	04	-	-	-
91 31 02 E 25 19 08 N	02	03	20	008	0.478
91 32 35 E 25 17 20 N	02	03	20	000	-
91 32 41 E 25 19 55 N	02	-	-	-	-
91 34 47 E 25 17 36 N	02	04	-	-	-
91 35 53 E 25 18 30 N	02	02	09	011	2.994
91 36 36 E 25 19 01 N	02	03	09	004	1.456
91 38 41 E 25 19 57 N	02	02	20	-	-
91 38 48 E 25 17 33 N	02	02	20	-	-
91 31 54 E 25 20 08 N	02	-	-	-	-
91 32 04 E 25 21 13 N	02	04	-	-	-
91 36 54 E 25 20 24 N	02	01	20	-	-
91 37 53 E 25 22 18 N	02	03	09	003	0.096
91 39 37 E 25 20 10 N	02	03	20	-	-
91 40 25 E 25 22 27 N	02	04	-	-	-
91 42 50 E 25 20 13 N	02	04	-	-	-
91 44 44 E 25 22 19 N	02	02	08	003	0.491
91 32 19 E 25 23 48 N	02	02	08	008	1.352
91 36 52 E 25 22 51 N	02	04	-	-	-
91 35 39 E 25 24 39 N	02	02	16	046	4.426
91 39 40 E 25 24 06 N	02	07	16	-	-
91 40 12 E 25 23 42 N	02	03	08	-	-

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91 43 13 E 25 23 53 N	02	03	09	003	0.380
91 44 17 E 25 23 37 N	02	02	20	007	0.954
91 30 32 E 25 27 07 N	02	02	16	038	6.603
91 31 58 E 25 25 24 N	02	04	-	-	-
91 33 57 E 25 26 15 N	02	03	16	010	3.439
91 33 32 E 25 26 13 N	02	02	16	011	3.581
91 35 16 E 25 25 41 N	02	01	08	050	19.632
91 37 14 E 25 26 51 N	02	02	16	008	0.779
91 44 42 E 25 26 39 N	02	01	09	071	28.646
91 32 07 E 25 29 40 N	02	04	-	-	-
91 35 55 E 25 29 50 N	02	03	16	016	2.430
91 39 27 E 25 27 45 N	02	03	16	011	2.233
91 43 13 E 25 29 31 N	02	07	09	-	-
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91 39 49 E 25 09 37 N	02	14	-	-	-
91 40 36 E 25 09 45 N	02	14	-	-	-
91 30 47 E 25 11 51 N	02	02	20	-	-
91 35 09 E 25 11 35 N	02	05	12	-	-
91 39 00 E 25 12 02 N	02	02	20	-	-
91 30 52 E 25 14 41 N	02	02	20	-	-
91 31 37 E 25 12 47 N	02	02	20	-	-
91 33 15 E 25 13 25 N	02	02	20	037	4.735
91 34 17 E 25 14 06 N	02	03	20	-	-

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91 36 29 E 25 13 25 N	02	01	20	-	-
91 35 59 E 25 14 04 N	02	02	20	-	-
91 39 37 E 25 14 50 N	02	02	20	-	-
91 37 53 E 25 12 39 N	02	01	20	-	-
91 40 09 E 25 13 37 N	02	01	20	-	-
91 42 23 E 25 13 50 N	02	01	20	055	26.575
91 43 00 E 25 14 25 N	02	04	-	-	-
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91 46 38 E 25 45 12 N	02	03	20	005	0.664
91 49 42 E 25 46 10 N	02	02	20	000	-
91 47 58 E 25 46 18 N	02	16	-	-	-
91 50 52 E 25 45 04 N	02	03	11	002	0.651
91 54 17 E 25 47 18 N	02	02	20	002	2.781
91 54 07 E 25 47 16 N	02	12	-	-	-
91 55 43 E 25 47 28 N	02	03	20	002	0.767
91 59 42 E 25 47 09 N	02	02	20	032	10.910
91 46 32 E 25 47 49 N	02	06	-	-	-
91 46 01 E 25 49 42 N	02	01	20	052	25.821
91 49 01 E 25 49 22 N	02	02	11	023	5.726
91 48 28 E 25 48 07 N	02	02	20	051	9.835

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91 50 50 E 25 49 40 N	02	03	20	002	0.051
91 51 39 E 25 47 50 N	02	12	-	-	-
91 53 21 E 25 48 07 N	02	03	20	006	0.629
91 54 00 E 24 49 27 N	02	02	20	002	1.344
91 56 26 E 25 49 37 N	02	03	20	007	3.248
91 55 55 E 25 47 55 N	02	03	20	007	1.328
91 57 46 E 25 48 58 N	02	12	-	-	-
91 45 27 E 25 51 01 N	02	01	11	112	23.499
91 47 02 E 25 51 29 N	02	02	20	029	18.917
91 48 48 E 25 52 10 N	02	02	20	024	68.032
91 48 43 E 25 50 21 N	02	02	11	040	20.746
91 50 40 E 25 51 30 N	02	02	20	036	8.801
91 51 51 E 25 50 59 N	02	03	20	005	1.797
91 53 12 E 25 50 46 N	02	13	-	-	-
91 54 33 E 25 51 43 N	02	15	-	-	-
91 56 50 E 25 51 23 N	02	02	20	014	3.621
91 00 40 E 25 51 09 N	02	03	20	012	1.567
91 57 44 E 25 50 41 N	02	02	20	008	0.758
91 59 25 E 25 51 51 N	02	13	-	-	-
91 45 38 E 25 53 00 N	02	02	20	032	17.836
91 46 53 E 25 54 29 N	02	-	-	-	-
91 49 15 E 25 52 32 N	02	05	12	015	21.603

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91 48 14 E 25 54 47 N	02	05	12	011	3.843
91 50 54 E 25 53 36 N	02	05	12	011	20.537
91 51 39 E 25 53 51 N	02	05	12	003	27.331
91 54 15 E 25 54 32 N	02	13	-	-	-
91 53 12 E 25 53 00 N	02	13	-	-	-
91 56 50 E 25 53 52 N	02	03	20	012	3.224
91 58 18 E 25 52 11 N	02	01	20	039	4.284
91 59 29 E 25 54 33 N	02	02	20	031	5.084
91 45 47 E 25 56 17 N	02	01	20	042	3.595
91 46 42 E 25 56 13 N	02	01	10	076	14.720
91 49 22 E 25 57 00 N	02	02	20	031	29.661
91 48 09 E 25 55 30 N	02	02	20	038	24.837
91 50 45 E 25 50 06 N	02	01	20	044	36.888
91 51 48 E 25 56 27 N	02	01	20	027	17.467
91 54 42 E 25 55 07 N	02	13	-	-	-
91 54 52 E 25 57 31 N	02	05	12	022	6.029
91 57 25 E 25 56 20 N	02	04	-	-	-
91 55 04 E 25 56 20 N	02	03	20	001	8.553
91 58 48 E 25 55 50 N	02	03	20	002	2.282
91 45 59 E 25 59 15 N	02	-	-	-	-
91 46 30 E 25 58 15 N	02	05	12	013	4.871
91 47 36 E 25 58 50 N	02	-	-	-	-
91 49 53 E 25 48 39 N	02	13	-	-	-

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91 51 00 E 25 59 21 N	02	05	12	000	-
91 51 30 E 25 58 23 N	02	05	12	008	0.792
91 52 44 E 25 59 55 N	02	05	12	008	3.270
91 54 44 E 25 57 31 N	02	02	20	034	12.467
91 56 36 E 25 58 41 N	02	03	20	004	0.546
91 55 55 E 25 58 46 N	02	06	-	-	-
91 58 33 E 25 59 50 N	02	02	20	026	3.020
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91 45 08 E 25 31 58 N	02	14	-	-	-
91 57 25 E 25 31 33 N	02	03	08	-	-
91 55 02 E 25 30 56 N	02	02	16	024	3.069
91 57 46 E 25 31 23 N	02	06	-	-	-
91 47 23 E 25 33 53 N	02	02	16	-	-
91 49 39 E 25 33 22 N	02	03	16	000	-
91 47 53 E 25 34 08 N	02	01	16	090	12.755
91 51 28 E 25 32 37 N	02	02	16	051	23.638
91 53 28 E 25 34 47 N	02	02	16	-	-
91 56 02 E 25 32 40 N	02	03	20	-	-
91 59 39 E 25 34 39 N	02	03	16	008	1.162
91 45 09 E 25 37 02 N	02	-	-	-	-
91 49 12 E 25 37 08 N	02	02	16	001	0.188
91 51 23 E 25 35 20 N	02	02	20	-	-
91 50 40 E 25 37 06 N	02	02	20	-	-
91 53 12 E 25 36 58 N	02	02	16	001	0.103

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91 54 14 E 25 35 29 N	02	15	-	-	-
91 56 06 E 25 35 29 N	02	07	16	000	-
91 56 20 E 25 36 58 N	02	03	16	005	0.321
91 58 47 E 25 36 43 N	02	03	16	-	-
91 58 42 E 25 35 45 N	02	15	-	-	-
91 46 15 E 25 37 41 N	02	02	20	021	10.632
91 49 56 E 25 38 10 N	02	02	20	020	2.747
91 47 33 E 25 39 21 N	02	12	-	-	-
91 50 57 E 25 39 16 N	02	03	16	012	4.274
91 51 29 E 25 38 10 N	02	03	20	020	2.677
91 53 33 E 25 37 45 N	02	12	-	-	-
91 49 48 E 25 40 35 N	02	02	20	033	8.607
91 47 45 E 25 41 52 N	02	03	20	041	0.919
91 51 45 E 25 42 06 N	02	03	20	000	-
91 55 25 E 25 42 27 N	02	03	20	000	-
91 46 11 E 25 42 58 N	02	02	20	008	2.104
91 48 08 E 25 42 48 N	02	02	20	011	6.821
91 50 27 E 25 44 16 N	02	03	20	001	0.878
91 52 01 E 25 43 10 N	02	12	-	-	-
91 53 03 E 25 43 02 N	02	12	-	-	-
91 54 30 E 25 44 27 N	02	12	-	-	-
91 56 29 E 25 43 10 N	02	02	20	023	4.518

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91 46 27 E 25 17 11 N	02	03	20	000	-
91 49 50 E 25 16 20 N	02	06	-	-	-
91 47 42 E 25 16 10 N	02	03	20	-	-
91 46 16 E 25 18 36 N	02	04	-	-	-
91 46 12 E 25 18 54 N	02	03	20	003	0.223
91 47 37 E 25 17 38 N	02	14	-	-	-
91 52 10 E 25 19 24 N	02	03	20	014	1.237
91 52 43 E 25 18 00 N	02	-	-	-	-
91 56 16 E 25 18 20 N	02	03	20	024	7.063
91 45 32 E 25 21 21 N	02	03	20	-	-
91 47 47 E 25 21 28 N	02	-	-	-	-
91 50 32 E 25 21 57 N	02	13	-	-	-
91 51 56 E 25 20 29 N	02	14	-	-	-
91 55 50 E 25 21 42 N	02	04	-	-	-
91 56 37 E 25 29 46 N	02	14	-	-	-
91 58 03 E 25 20 46 N	02	02	20	-	-
91 47 16 E 25 24 39 N	02	02	20	-	-
91 49 42 E 25 23 32 N	02	-	-	-	-
91 50 19 E 25 24 03 N	02	02	16	033	2.199
91 52 12 E 25 23 29 N	02	04	-	-	-
91 52 50 E 25 22 47 N	02	03	07	007	0.480
91 55 05 E 25 24 48 N	02	04	-	-	-

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91 57 25 E 25 22 42 N	02	12	-	-	-
91 57 58 E 25 24 10 N	02	03	20	020	2.138
91 46 19 E 25 25 07 N	02	13	-	-	-
91 46 11 E 25 27 24 N	02	02	16	024	7.081
91 52 14 E 25 25 14 N	02	04	-	-	-
91 52 47 E 25 27 16 N	02	12	-	-	-
91 54 44 E 25 25 13 N	02	04	-	-	-
91 56 56 E 25 26 24 N	02	03	20	000	-
91 59 37 E 25 25 12 N	02	03	20	000	-
91 48 35 E 25 28 06 N	02	02	16	025	1.162
91 50 48 E 25 29 44 N	02	02	16	064	10.656
	Map Sheet No. 78 O/16				
91 47 05 E 25 12 26 N	02	14	-	-	-
91 48 58 E 25 12 06 N	02	03	20	017	14.706
91 51 32 E 25 12 16 N	02	14	-	-	-
91 54 20 E 25 11 39 N	02	14	-	-	-
91 57 06 E 25 11 51 N	02	14	-	-	-
91 58 52 E 25 11 32 N	02	14	-	-	-
91 46 32 E 25 13 22 N	02	14	-	-	-
91 48 08 E 25 14 08 N	02	14	-	-	-
91 48 20 E 25 13 37 N	02	14	-	-	-

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91 51 50 E 25 12 39 N	02	03	20	009	1.670
91 53 05 E 25 12 34 N	02	14	-	-	-
91 54 35 E 25 14 56 N	02	15	-	-	-
91 58 42 E 25 14 51 N	02	02	20	035	22.566
91 58 54 E 25 12 38 N	02	14	-	-	-
Map Sheet No. 83 B/4					
92 00 09 E 26 00 22 N	02	01	20	003	1.822
92 02 20 E 26 02 05 N	02	13	-	-	-
92 03 36 E 26 03 16 N	02	06	-	-	-
92 03 54 E 26 01 38 N	02	13	-	-	-
92 05 06 E 26 00 33 N	02	12	-	-	-
92 07 25 E 26 01 55 N	02	02	20	011	1.818
92 07 51 E 26 02 04 N	02	06	-	-	-
92 00 25 E 26 09 33 N	02	03	20	007	0.412
92 00 56 E 26 12 22 N	02	02	20	-	-
92 01 39 E 26 10 05 N	02	02	20	029	13.718
92 02 27 E 26 13 19 N	02	03	20	005	3.845
92 03 43 E 26 09 37 N	02	06	-	-	-
92 04 02 E 26 11 14 N	02	05	12	018	1.898
92 03 31 E 26 11 14 N	02	02	20	037	3.240
92 03 06 E 26 13 03 N	02	02	20	034	16.170

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92 03 34 E 25 45 01 N	02	12	-	-	-
92 03 59 E 25 47 31 N	02	02	20	010	1.738
92 06 35 E 25 46 49 N	02	01	20	028	13.536
92 05 50 E 25 45 41 N	02	02	20	009	3.125
92 08 30 E 25 45 03 N	02	02	20	027	2.971
92 00 47 E 25 49 33 N	02	06	-	-	-
92 01 42 E 25 48 06 N	02	02	20	003	0.987
92 03 40 E 25 48 41 N	02	03	20	004	2.248
92 06 32 E 25 [illegible] 35 N	02	01	12	020	36.463
92 05 54 E 25 49 58 N	02	13	-	-	-
92 01 03 E 25 50 45 N	02	02	20	007	4.519
92 03 42 E 25 51 36 N	02	15	-	-	-
92 03 48 E 25 50 51 N	02	03	20	006	9.283
92 05 51 E 25 51 03 N	02	13	-	-	-
92 06 43 E 25 51 29 N	02	02	20	014	5.055
92 08 42 E 25 51 17 N	02	05	12	001	0.025
92 07 48 E 25 50 46 N	02	02	20	008	2.597
92 10 34 E 25 51 16 N	02	02	20	007	1.146
92 00 52 E 25 53 52 N	02	03	20	005	3.368
92 01 37 E 25 53 36 N	02	13	-	-	-
92 04 02 E 25 53 05 N	02	02	20	-	-
92 0[illegible] 25 E 25 54 25 N	02	01	20	054	8.952
92 06 56 E 25 52 53 N	02	03	20	013	3.428

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92 05 27 E 25 54 37 N	02	02	20	022	3.493
92 08 28 E 25 53 16 N	02	05	12	001	0.099
92 08 55 E 25 54 12 N	02	01	20	010	0.952
92 10 09 E 25 53 08 N	02	02	20	048	5.402
92 01 47 E 25 56 46 N	02	02	20	000	-
92 00 36 E 25 55 44 N	02	02	20	018	17.487
92 03 03 E 25 55 43 N	02	06	-	-	-
92 04 27 E 25 56 46 N	02	06	-	-	-
92 06 19 E 25 56 38 N	02	06	-	-	-
92 06 09 E 25 56 53 N	02	03	20	006	11.874
92 07 52 E 25 55 51 N	02	06	-	-	-
92 00 02 E 25 59 27 N	02	05	12	022	6.254
92 02 28 E 25 58 07 N	02	03	20	005	1.959
92 04 07 E 25 59 57 N	02	13	-	-	-
92 03 26 E 25 57 32 N	02	03	20	001	2.174
92 06 09 E 25 59 42 N	02	06	-	-	-
92 06 19 E 25 57 49 N	02	06	-	-	-
92 08 04 E 25 57 33 N	02	06	-	-	-
92 09 22 E 25 59 55 N	02	03	20	001	0.754
92 10 41 E 25 59 01 N	02	01	20	015	5.595

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92 04 07 E 25 31 54 N	02	03	16	016	4.484
92 06 05 E 25 32 05 N	02	03	16	002	0.913
92 02 07 E 25 33 01 N	02	02	08	010	0.732
92 04 04 E 25 33 59 N	02	02	16	004	0.389
92 05 17 E 25 32 40 N	02	02	16	083	7.879
92 04 16 E 25 35 41 N	02	02	08	008	1.226
92 03 14 E 25 36 51 N	02	03	20	001	0.099
92 06 08 E 25 36 33 N	02	02	08	006	1.095
92 06 22 E 25 35 59 N	02	02	20	007	0.759
92 01 51 E 25 39 49 N	02	02	20	000	-
92 02 59 E 25 38 08 N	02	02	20	000	-
92 05 50 E 25 37 52 N	02	03	20	000	-
92 06 28 E 25 39 40 N	02	03	20	002	0.460
92 08 02 E 25 38 01 N	02	13	-	-	-
92 09 26 E 25 39 30 N	02	02	20	-	-
92 02 07 E 25 40 02 N	02	03	20	002	0.073
92 03 19 E 25 41 14 N	02	13	-	-	-
92 07 05 E 25 42 24 N	02	02	20	005	0.544
92 09 19 E 25 41 28 N	02	02	20	019	2.030
92 08 02 E 25 41 42 N	02	01	20	052	14.008
92 06 47 E 25 43 13 N	02	02	20	-	-
92 05 44 E 25 44 18 N	02	03	20	001	1.799
92 07 54 E 25 44 56 N	02	02	20	009	1.513

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92 00 57 E 25 18 46 N	02	14	-	-	-
92 01 35 E 25 18 42 N	02	02	20	-	-
92 04 42 E 25 15 14 N	02	02	20	-	-
92 06 06 E 25 18 28 N	02	02	20	-	-
92 06 37 E 25 18 46 N	02	02	20	-	-
92 01 51 E 25 20 41 N	02	03	20	000	-
92 00 39 E 25 20 11 N	02	03	20	002	1.237
92 04 06 E 25 20 01 N	02	03	20	000	-
92 03 05 E 25 21 08 N	02	02	20	010	0.984
92 05 25 E 25 20 11 N	02	03	20	-	-
92 01 35 E 25 22 31 N	02	02	20	000	-
92 00 55 E 25 24 58 N	02	03	20	038	5.991
92 02 43 E 25 22 35 N	02	03	20	005	0.793
92 02 15 E 25 26 58 N	02	02	20	012	2.867
92 03 43 E 25 26 52 N	02	03	16	005	1.428
92 01 41 E 25 28 32 N	02	02	16	029	18.619
92 03 20 E 25 29 41 N	02	03	08	010	1.583
92 03 54 E 25 27 46 N	02	02	16	037	11.062
	Map Sheet No. 83 C/4				
92 00 19 E 25 11 45 N	02	14	-	-	-

Total Plots: 809

Contents

District: Jaintia Hills

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Total: 14 Sheets.

Longitude E Latitude N of plot centre (Degree Minute Second)	Forest Division Code*	Land use Code*	Forest type Code	No. of trees enumerated in sample plot of .1 ha.	Volume (m^3) in sample plot of .1 ha.
1	2	3	4	5	6
	Map Sheet No. 78 O/15				
91 59 14 E 25 15 56 N	01	14	-	-	-
	Map Sheet No. 83 C/2				
92 07 32 E 25 30 13 N	01	03	16	010	2.127
92 10 44 E 25 31 19 N	01	02	16	022	6.526
92 14 30 E 25 31 35 N	01	02	16	017	13.100
92 10 29 E 25 33 32 N	01	02	16	008	4.232
92 12 01 E 25 33 56 N	01	01	16	050	13.056
92 13 14 E 25 34 07 N	01	02	16	044	6.891
92 14 17 E 25 33 25 N	01	02	08	017	3.288
92 10 56 E 25 37 46 N	01	02	20	006	0.439
92 11 36 E 25 39 44 N	01	01	20	012	5.715

*Codes are explained at the end of the appendix.

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		Map Sheet No. 83 C/3			
92 00 25 E 25 15 41 N	01	03	20	017	2.453
92 04 33 E 25 15 55 N	01	02	20	022	1.869
92 02 57 E 25 15 09 N	01	02	20	054	438.209
92 05 27 E 25 15 39 N	01	03	20	003	0.196
92 10 08 E 25 17 23 N	01	02	20	004	0.193
92 12 51 E 25 16 34 N	01	-	-	-	-
92 02 51 E 25 18 20 N	01	02	20	027	1.778
92 05 25 E 25 17 48 N	01	03	20	018	5.495
92 11 12 E 25 19 53 N	01	01	20	-	-
92 11 37 E 25 17 33 N	01	01	20	048	8.578
92 13 58 E 25 18 30 N	01	01	20	046	6.896
92 07 11 E 25 22 13 N	01	14	-	-	-
92 08 20 E 25 22 13 N	01	14	-	-	-
92 10 28 E 25 20 19 N	01	02	-	-	-
92 12 08 E 25 22 11 N	01	01	20	050	6.652
92 06 49 E 25 22 52 N	01	02	20	009	3.840
92 08 39 E 25 21 14 N	01	02	16	070	11.831
92 08 31 E 25 27 13 N	01	13	-	-	-
92 08 20 E 25 25 14 N	01	02	20	-	-
92 11 33 E 25 25 46 N	01	14	-	-	-
92 11 12 E 25 26 48 N	01	02	16	028	4.012
92 14 35 E 25 25 19 N	01	03	16	018	6.918

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92 12 55 E 25 27 59 N	01	03	16	014	3.587
92 06 46 E 25 27 31 N	01	02	08	008	8.941
92 08 37 E 25 29 51 N	01	03	16	000	-
92 11 47 E 25 29 45 N	01	03	16	007	1.441
92 10 45 E 25 27 52 N	01	03	08	012	2.613
92 14 54 E 25 29 41 N	01	03	16	011	2.623
92 14 38 E 25 27 44 N	01	15	-	-	-
	Map Sheet No. 83 C/4				
92 03 25 E 25 11 55 N	01	14	-	-	-
92 06 51 E 25 13 28 N	01	14	-	-	-
92 08 23 E 25 11 14 N	01	03	20	010	0.933
92 09 08 E 25 11 14 N	01	14	-	-	-
92 10 10 E 25 10 46 N	01	03	20	015	4.252
92 12 20 E 25 11 42 N	01	03	20	012	1.196
92 14 30 E 25 11 29 N	01	-	-	-	-
92 12 57 E 25 11 02 N	01	01	20	075	30.617
92 00 59 E 25 14 06 N	01	03	20	010	2.186
92 01 30 E 25 13 22 N	01	-	-	-	-
92 03 47 E 25 14 50 N	01	03	20	005	1.198
92 03 42 E 25 12 29 N	01	02	20	076	37.101
92 06 01 E 25 13 04 N	01	02	20	041	6.117

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92 06 26 E 25 14 27 N	01	03	20	-	-
92 09 42 E 25 12 39 N	01	02	20	055	23.504
92 08 00 E 25 14 52 N	01	-	-	-	-
92 10 37 E 25 14 24 N	01	06	-	-	-
92 11 56 E 25 13 06 N	01	03	20	010	1.755
92 13 46 E 25 13 24 N	01	-	-	-	-
92 13 44 E 25 14 07 N	01	-	-	-	-
	Map Sheet No. 83 C/6				
92 15 30 E 25 13 47 N	01	03	16	011	3.822
92 19 55 E 25 31 09 N	01	02	20	-	-
92 17 32 E 25 31 11 N	01	13	-	-	-
92 22 14 E 25 30 26 N	01	02	08	026	11.887
92 24 14 E 25 30 36 N	01	12	-	-	-
92 22 57 E 25 30 25 N	01	01	16	059	13.092
92 27 17 E 25 31 20 N	01	13	-	-	-
92 28 54 E 25 30 34 N	01	02	20	025	11.612
92 16 32 E 25 32 43 N	01	03	20	006	0.836
92 15 58 E 25 34 45 N	01	12	-	-	-
92 18 31 E 25 32 40 N	01	02	20	-	-
92 19 17 E 25 34 50 N	01	13	-	-	-
92 21 32 E 25 33 40 N	01	12	-	-	-
92 20 48 E 25 33 52 N	01	02	08	014	10.347
92 23 11 E 25 34 55 N	01	11	-	-	-

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92 21 32 E 25 32 36 N	01	13	-	-	-
92 25 32 E 25 33 32 N	01	02	20	-	-
92 26 57 E 25 33 59 N	01	13	-	-	-
92 27 38 E 25 34 44 N	01	02	20	024	5.860
92 17 20 E 25 35 02 N	01	13	-	-	-
92 22 22 E 25 35 26 N	01	01	20	013	4.144
92 23 04 E 25 36 56 N	01	13	-	-	-
92 24 19 E 25 35 28 N	01	02	20	033	14.947
92 26 01 E 25 36 48 N	01	13	-	-	-
92 29 08 E 25 35 13 N	01	13	-	.	-
92 28 20 E 25 37 13 N	01	13	-	-	-
92 16 28 E 25 39 17 N	01	12	-	-	-
92 15 59 E 25 38 12 N	01	03	20	005	3.496
92 18 43 E 25 38 36 N	01	02	20	008	3.446
92 18 47 E 25 38 50 N	01	02	20	028	7.257
92 21 12 E 25 38 05 N	01	02	20	017	6.396
92 24 28 E 25 38 18 N	01	13	-	-	-
92 26 53 E 25 39 54 N	01	02	20	022	30.560
92 25 36 E 25 37 31 N	01	01	20	030	37.959
92 27 38 E 25 39 44 N	01	12	-	-	-
92 29 52 E 25 37 44 N	01	02	20	013	25.039

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92 16 22 E 25 41 14 N	01	10	-	-	-
92 16 01 E 25 41 25 N	01	02	20	016	5.055
92 17 40 E 25 41 29 N	01	02	20	024	7.006
92 19 48 E 25 41 01 N	01	02	20	008	1.131
92 20 22 E 25 41 29 N	01	02	20	024	8.007
92 23 04 E 25 40 39 N	01	12	-	-	-
92 26 53 E 25 40 08 N	01	02	20	015	3.743
92 28 05 E 25 43 00 N	01	10	-	-	-
92 26 10 E 25 43 10 N	01	02	20	033	7.978
92 28 11 E 25 42 42 N	01	02	20	030	5.144
	Map Sheet No. 83 C/7				
92 15 07 E 25 15 48 N	01	-	-	-	-
92 16 50 E 25 19 52 N	01	04	-	-	-
92 15 35 E 25 17 39 N	01	03	20	004	0.867
92 16 48 E 25 20 50 N	01	06	-	-	-
92 19 32 E 25 21 24 N	01	02	20	014	8.242
92 17 53 E 25 21 09 N	01	03	20	001	0.025
92 15 46 E 25 21 40 N	01	02	20	049	4.627
92 15 38 E 25 24 14 N	01	03	20	011	1.682
92 16 51 E 25 23 13 N	01	02	20	-	-
92 16 15 E 25 27 07 N	01	06	-	-	-
92 16 15 E 25 25 34 N	01	03	20	008	1.899
92 16 22 E 25 28 16 N	01	03	20	009	2.121

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92 19 27 E 25 24 53 N	01	04	-	-	-
92 18 06 E 25 27 35 N	01	06	-	-	-
92 17 33 E 25 28 11 N	01	03	20	004	0.760
92 20 05 E 25 16 29 N	01	06	-	-	-
92 20 41 E 25 19 30 N	01	06	-	-	-
92 22 19 E 25 22 14 N	01	06	-	-	-
92 21 12 E 25 25 52 N	01	06	-	-	-
92 20 49 E 25 19 47 N	01	02	20	-	-
92 24 44 E 25 15 52 N	01	06	-	-	-
92 22 50 E 25 17 19 N	01	06	-	-	-
92 22 30 E 25 18 34 N	01	06	-	-	-
92 24 20 E 25 20 16 N	01	02	16	097	17.244
92 24 36 E 25 23 35 N	01	02	20	-	-
92 24 13 E 25 29 53 N	01	06	-	-	-
92 27 02 E 25 24 38 N	01	03	16	010	3.839
92 26 35 E 25 27 01 N	01	02	20	021	7.614
92 25 27 E 25 29 06 N	01	03	20	000	-
92 29 22 E 25 19 19 N	01	06	-	-	-
92 29 37 E 25 23 31 N	01	03	16	020	9.407
92 27 50 E 25 23 55 N	01	06	-	-	-
92 28 24 E 25 27 17 N	01	03	20	010	1.650
92 29 01 E 25 25 29 N	01	03	16	-	-
92 28 21 E 25 27 51 N	01	03	20	011	6.526
92 29 10 E 25 29 40 N	01	02	20	016	6.415

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	Map Sheet No. 83 C/8				
92 23 39 E 25 04 53 N	01	06	-	-	-
92 27 00 E 25 04 48 N	01	-	-	-	-
92 25 32 E 25 27 40 N	01	03	20	012	17.442
92 17 11 E 25 05 30 N	01	-	-	-	-
92 15 17 E 25 06 58 N	01	14	-	-	-
92 18 44 E 25 05 38 N	01	-	-	-	-
92 18 44 E 25 06 56 N	01	-	-	-	-
92 22 22 E 25 06 31 N	01	-	-	-	-
92 20 06 E 25 06 01 N	01	-	-	-	-
92 22 57 E 25 05 32 N	01	01	20	-	-
92 24 44 E 25 06 56 N	01	-	-	-	-
92 26 24 E 25 05 26 N	01	-	-	-	-
92 26 12 E 25 07 04 N	01	-	-	-	-
92 28 05 E 26 06 53 N	01	-	-	-	-
92 16 11 E 25 08 17 N	01	02	20	026	3.534
92 16 22 E 25 09 17 N	01	01	20	040	13.922
92 19 35 E 25 08 00 N	01	-	-	-	-
92 17 55 E 25 08 52 N	01	01	20	-	-
92 22 22 E 25 07 47 N	01	-	-	-	-
92 22 18 E 25 09 44 N	01	01	20	030	10.368
92 24 28 E 25 08 00 N	01	01	20	-	-

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92 22 55 E 25 09 25 N	01	02	20	-	-
92 26 02 E 25 08 42 N	01	01	-	-	-
92 26 30 E 25 08 42 N	01	01	-	-	-
92 28 02 E 25 08 18 N	01	01	-	-	-
92 29 31 E 25 09 11 N	01	01	-	-	-
92 16 42 E 25 11 37 N	01	02	20	-	-
92 15 48 E 25 10 55 N	01	01	20	046	16.647
92 18 06 E 25 10 08 N	01	-	-	-	-
92 19 24 E 25 12 22 N	01	-	-	-	-
92 22 11 E 25 10 57 N	01	06	-	-	-
92 20 26 E 25 11 35 N	01	02	20	009	1.155
92 22 57 E 25 10 23 N	01	02	20	018	6.950
92 24 38 E 25 12 09 N	01	06	-	-	-
92 25 34 E 25 11 16 N	01	05	12	021	4.342
92 26 56 E 25 10 14 N	01	06	-	-	-
92 28 38 E 25 11 18 N	01	02	20	035	17.028
92 28 54 E 25 11 14 N	01	02	20	014	9.741
92 16 13 E 25 14 13 N	01	04	-	-	-
92 16 13 E 25 12 43 N	01	02	20	016	1.451
92 17 42 E 25 12 59 N	01	01	20	041	11.506
92 19 48 E 25 14 31 N	01	06	-	-	-
92 21 06 E 25 14 49 N	01	02	20	019	6.336
92 21 26 E 25 12 39 N	01	02	20	023	9.677

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92 23 02 E 25 14 02 N	01	15	-	-	-
92 24 35 E 25 13 27 N	01	06	-	-	-
92 25 26 E 25 13 49 N	01	01	20	015	3.102
92 27 04 E 25 13 42 N	01	06	-	-	-
92 28 23 E 25 13 06 N	01	01	20	061	37.196
92 29 06 E 25 14 27 N	01	01	20	011	23.852
	Map Sheet No. 83 C/10				
92 31 20 E 25 31 00 N	01	02	20	023	6.632
92 34 35 E 25 31 39 N	01	02	20	032	10.277
92 35 58 E 25 31 58 N	01	02	20	019	4.781
92 31 14 E 25 34 45 N	01	01	20	030	7.327
92 34 30 E 25 33 20 N	01	01	20	004	8.432
92 32 58 E 25 34 10 N	01	01	20	016	4.688
92 36 40 E 25 33 38 N	01	03	20	008	1.719
92 37 55 E 25 34 04 N	01	05	12	003	2.308
92 30 21 E 25 35 47 N	01	13	-	-	-
92 31 26 E 25 36 35 N	01	01	20	028	16.524
	Map Sheet No. 83 C/11				
92 31 35 E 25 17 06 N	01	12	-	-	-
92 30 56 E 25 15 23 N	01	01	20	046	5.033
92 33 30 E 25 16 14 N	01	01	20	042	21.188
92 34 00 E 25 16 13 N	01	01	20	032	42.336

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92 35 26 E 25 15 58 N	01	01	20	068	28.063
92 37 02 E 25 16 30 N	01	01	20	051	21.215
92 39 05 E 25 17 25 N	01	02	20	015	3.742
92 40 12 E 25 17 03 N	01	14	-	-	-
92 43 34 E 25 15 47 N	01	02	20	-	-
92 43 53 E 25 16 43 N	01	03	20	010	1.855
92 31 10 E 25 19 13 N	01	03	20	034	4.814
92 31 21 E 25 18 17 N	01	02	20	046	13.543
92 34 14 E 25 18 53 N	01	03	20	003	6.685
92 35 02 E 25 17 36 N	01	02	20	023	16.839
92 39 18 E 25 17 35 N	01	03	20	014	5.943
92 41 42 E 25 19 20 N	01	03	20	012	3.312
92 43 14 E 25 19 47 N	01	03	20	012	2.779
92 32 10 E 25 21 10 N	01	03	20	011	15.034
92 32 35 E 25 30 53 N	01	03	20	004	0.883
92 36 57 E 25 23 56 N	01	02	20	018	6.093
92 38 42 E 25 23 22 N	01	02	20	029	21.546
92 40 53 E 25 22 46 N	01	02	20	016	15.414
92 31 02 E 25 27 14 N	01	03	16	015	7.428
92 31 28 E 25 25 18 N	01	03	20	009	1.921
92 33 58 E 25 25 20 N	01	03	20	007	1.438

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92 33 27 E 25 27 04 N	01	03	20	008	5.311
92 30 10 E 25 29 13 N	01	02	20	019	6.433
92 32 19 E 25 18 14 N	01	02	08	015	6.809
92 32 37 E 25 29 16 N	01	02	20	041	6.761
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92 30 40 E 25 07 08 N	01	-	-	-	-
92 31 52 E 25 09 17 N	01	01	20	049	49.947
92 30 40 E 25 09 32 N	01	-	-	-	-
92 34 32 E 25 08 01 N	01	-	-	-	-
92 32 58 E 25 09 29 N	01	-	-	-	-
92 36 35 E 25 08 47 N	01	-	-	-	-
92 36 12 E 25 08 47 N	01	-	-	-	-
92 39 32 E 25 09 16 N	01	-	-	-	-
92 32 11 E 25 10 10 N	01	02	20	004	0.197
92 30 18 E 25 12 19 N	01	-	-	-	-
92 34 41 E 25 10 49 N	01	01	20	077	43.325
92 32 49 E 25 11 04 N	01	02	20	016	18.174
92 37 08 E 25 11 07 N	01	-	-	-	-
92 35 20 E 25 11 23 N	01	01	20	083	53.739
92 38 56 E 25 11 52 N	01	02	20	007	0.318
92 38 34 E 25 10 41 N	01	01	20	052	35.483
92 40 34 E 25 11 49 N	01	-	-	-	-
92 43 11 E 25 12 20 N	01	10	-	-	-

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92 31 12 E 25 14 10 N	01	-	-	-	-
92 31 19 E 25 13 04 N	01	-	-	-	-
92 34 17 E 25 13 47 N	01	01	20	061	22.764
92 33 45 E 25 13 45 N	01	01	20	021	12.268
92 36 28 E 25 12 51 N	01	-	-	-	-
92 36 03 E 25 14 40 N	01	01	20	046	31.150
92 38 05 E 25 12 58 N	01	02	20	100	60.554
92 39 21 E 25 14 34 N	01	10	-	-	-
92 41 14 E 25 14 18 N	01	10	-	-	-
92 43 17 E 25 13 12 N	01	03	20	016	1.871
92 44 26 E 25 12 56 N	01	01	20	059	22.647
92 43 05 E 25 14 35 N	01	03	20	001	0.570
	Map Sheet No. 83 C/15				
92 46 15 E 25 16 29 N	01	10	-	-	-
	Map Sheet No. 83 C/16				
92 45 09 E 25 13 28 N	01	01	20	069	31.923
92 47 57 E 25 13 12 N	01	02	-	-	-

Total Plots: 263

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District: EAST & WEST GARO HILLS

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78 J/8,12
78 K/1,2,5,6,7,8,9,10,11,12,13,14,15,16
78 O/1

Total: 19 Sheets.

Longitude E Latitude N of plot centre			Forest Division Code*	Land Use Code*	Forest type Code	No. of trees enumerated in sample plot of .1 ha.	Volume(m^3) in sample plot of .1 ha.
Degree	Minute	Second					
1			2	3	4	5	6
			Map Sheet No. 78 G/13				
90 25	48 59	06 E 17 N	03	06	-	-	-
			Map Sheet No. 78 G/14				
90 25	57 32	15 E 13 N	03	03	20	016	7.536
90 25	58 32	07 E 28 N	03	05	12	-	-
90 25	59 25	24 E 02 N	03	15	-	-	-
90 25	56 33	30 E 17 N	03	12	-	-	-
90 25	57 34	56 E 58 N	03	04	-	-	-
90 25	59 38	10 E 12 N	03	03	20	008	8.432
90 25	58 39	21 E 18 N	03	04	-	-	-
90 25	55 42	50 E 24 N	03	04	-	-	-
90 25	59 49	47 E 52 N	03	04	-	-	-
90 25	57 41	45 E 39 N	03	04	-	-	-
90 25	55 44	20 E 03 N	03	04	-	-	-

*Codes are explained at the end of the appendix.

1	2	3	4	5	6
	Map Sheet No. 78 J/8				
90 23 49 E 25 00 12 N	03	13	-	-	-
	Map Sheet No. 78 K/1				
90 00 49 E 25 46 38 N	03	04	-	-	-
90 01 40 E 25 45 50 N	03	13	-	-	-
90 04 33 E 25 46 06 N	03	04	-	-	-
90 0[illegible] 09 E 25 46 21 N	03	03	20	007	5.716
90 06 16 E 25 46 04 N	03	06	-	-	-
90 06 12 E 25 46 24 N	03	03	20	003	9.927
90 08 40 E 25 [illegible] 20 N	03	14	-	-	-
90 08 49 E 25 46 06 N	03	14	-	-	-
90 10 02 E 25 46 24 N	03	06	-	-	-
90 1[illegible] 26 E 25 46 02 N	03	06	-	-	-
90 1[illegible] 22 E 25 46 04 N	03	15	-	-	-
90 14 04 E 25 46 22 N	03	06	-	-	-
90 00 56 E 25 48 35 N	03	04	-	-	-
90 01 32 E 25 48 56 N	03	06	-	-	-
90 02 12 E 25 48 44 N	03	13	-	-	-
90 04 50 E 25 48 44 N	03	04	-	-	-
90 05 [illegible]9 E 25 49 10 N	03	06	-	-	-
90 07 [illegible]8 E 25 47 48 N	03	06	-	-	-
90 09 38 E 25 48 18 N	03	06	-	-	-
90 07 36 E 25 49 14 N	03	06	-	-	-

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90 12 08 E 25 48 02 N	03	06	-	-	-
90 10 22 E 25 49 28 N	03	06	-	-	-
90 13 27 E 25 48 18 N	03	06	-	-	-
90 13 58 E 25 49 14 N	03	06	-	-	-
90 07 06 E 25 51 32 N	03	03	20	005	5.990
90 05 21 E 25 50 54 N	03	01	10	075	14.482
90 08 02 E 25 50 24 N	03	04	-	-	-
90 09 30 E 25 52 04 N	03	03	20	003	8.289
90 10 56 E 25 21 00 N	03	03	20	028	9.162
90 11 32 E 25 51 30 N	03	06	-	-	-
90 13 38 E 25 50 35 N	03	06	-	-	-
90 13 52 E 25 51 53 N	03	15	-	-	-
90 07 08 E 25 54 44 N	03	03	20	002	0.749
90 08 50 E 25 53 42 N	03	03	20	005	0.336
90 08 37 E 25 53 50 N	03	03	20	021	2.220
90 11 38 E 25 53 08 N	03	03	20	005	2.843
90 10 50 E 25 54 21 N	03	06	-	-	-
90 14 25 E 25 54 41 N	03	03	20	006	3.820
90 13 06 E 25 52 46 N	03	04	-	001	4.635
90 09 24 E 25 56 36 N	03	12	-	-	-
90 08 06 E 25 55 54 N	03	01	10	061	25.398
90 11 40 E 25 56 04 N	03	06	-	-	-

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90 00 07 E 25 31 37 N	03	06	-	-	-
90 02 22 E 25 30 56 N	03	06	-	-	-
90 03 05 E 25 31 24 N	03	05	12	003	1.430
90 07 06 E 25 31 06 N	03	05	12	001	0.546
90 05 27 E 25 31 27 N	03	06	-	-	-
90 09 08 E 25 32 09 N	03	04	-	-	-
90 05 29 E 25 30 23 N	03	06	-	-	-
90 10 09 E 25 32 16 N	03	06	-	-	-
90 12 18 E 25 32 44 N	03	04	-	-	-
90 14 37 E 25 30 20 N	03	01	20	-	-
90 12 58 E 25 32 11 N	03	02	20	032	11.806
90 00 38 E 25 32 55 N	03	13	-	-	-
90 04 31 E 25 33 48 N	03	05	12	-	-
90 03 01 E 25 33 46 N	03	06	-	-	-
90 06 03 E 25 34 34 N	03	04	-	-	-
90 07 49 E 25 33 31 N	03	04	-	-	-
90 09 37 E 25 30 25 N	03	02	20	016	5.807
90 11 44 E 25 32 52 N	03	02	20	029	6.752
90 10 46 E 25 34 37 N	03	04	-	-	-
90 13 57 E 25 33 58 N	03	03	20	013	2.003
90 13 30 E 25 30 21 N	03	06	-	-	-
90 01 53 E 25 35 52 N	03	03	20	009	3.490

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90 03 30 E 25 26 40 N	03	04	-	-	-
90 04 00 E 25 35 49 N	03	04	-	-	-
90 06 51 E 25 36 40 N	03	02	20	019	1.457
90 05 38 E 25 35 49 N	03	04	-	-	-
90 08 07 E 25 35 39 N	03	15	-	-	-
90 09 20 E 25 38 05 N	03	03	20	018	14.227
90 11 48 E 25 35 40 N	03	03	20	003	2.930
90 10 45 E 25 36 50 N	03	04	-	-	-
90 12 54 E 25 37 19 N	03	03	20	006	10.844
90 14 35 E 25 35 08 N	03	15	-	-	-
90 01 49 E 25 37 57 N	03	06	-	-	-
90 00 39 E 25 39 38 N	03	06	-	-	-
90 03 10 E 25 39 07 N	03	12	-	-	-
90 04 26 E 25 38 20 N	03	05	12	001	1.371
90 05 15 E 25 38 51 N	03	04	-	-	-
90 06 46 E 25 38 38 N	03	06	-	-	-
90 08 37 E 25 38 07 N	03	03	20	005	0.222
90 08 49 E 25 39 23 N	03	06	-	-	-
90 10 14 E 25 39 12 N	03	02	20	003	3.835
90 12 15 E 25 38 18 N	03	03	20	002	2.806
90 14 44 E 25 38 15 N	03	04	-	-	-
90 12 45 E 25 39 14 N	03	06	-	-	-

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90 03 05 E 25 40 49 N	03	06	-	-	-
90 13 09 E 25 41 21 N	03	15	-	-	-
90 06 28 E 25 42 24 N	03	04	-	-	-
90 08 10 E 25 41 15 N	03	03	20	004	12.272
90 09 13 E 25 41 15 N	03	03	20	029	3.742
90 12 11 E 25 41 06 N	03	06	-	-	-
90 10 14 E 25 41 27 N	03	03	20	002	1.152
90 14 24 E 25 41 56 N	03	03	20	010	3.696
90 13 05 E 25 40 31 N	03	04	-	-	-
90 00 38 E 25 42 52 N	03	06	-	-	-
90 02 56 E 25 44 50 N	03	12	-	-	-
90 04 35 E 25 42 40 N	03	06	-	-	-
90 07 20 E 25 44 19 N	03	04	-	-	-
90 05 07 E 25 43 02 N	03	04	-	-	-
90 07 34 E 25 43 57 N	03	04	-	-	-
90 09 57 E 25 47 [illegible] N	03	06	-	-	-
90 11 38 E 25 13 01 N	03	15	-	-	-
90 10 32 E 25 44 30 N	03	01	20	057	14.369
90 13 27 E 25 [illegible] N	03	05	12	001	1.711
90 10 [illegible] E 25 [illegible] N	03	06	-	-	-

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90 16 25 E 25 46 21 N	03	06	-	-	-
90 16 04 E 25 46 07 N	03	05	12	-	-
90 18 14 E 25 46 04 N	03	14	-	-	-
90 19 14 E 25 46 25 N	03	06	-	-	-
90 22 06 E 25 46 46 N	03	03	20	009	1.320
90 20 26 E 25 45 44 N	03	05	12	001	15.197
90 24 46 E 25 46 21 N	03	06	-	-	-
90 26 49 E 25 45 22 N	03	-	-	-	-
90 28 55 E 25 45 14 N	03	05	12	-	-
90 28 32 E 25 47 17 N	03	03	20	001	0.585
90 17 15 E 25 48 47 N	03	01	12	-	-
90 15 12 E 25 48 13 N	03	06	-	-	-
90 19 10 E 25 48 51 N	03	04	-	-	-
90 18 23 E 25 48 39 N	03	03	20	004	8.646
90 21 37 E 25 49 11 N	03	02	20	031	4.783
90 20 51 E 25 48 21 N	03	03	20	008	8.498
90 22 38 E 25 47 57 N	03	05	12	-	-
90 24 50 E 25 49 36 N	03	06	-	-	-
90 25 03 E 25 48 57 N	03	02	20	016	9.520
90 27 26 E 25 48 32 N	03	05	12	009	6.753

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90 27 41 E 25 48 34 N	03	05	12	010	2.351
90 29 49 E 25 48 57 N	03	05	12	006	4.879
90 15 22 E 25 52 11 N	03	06	-	-	-
90 17 08 E 25 50 18 N	03	03	20	014	4.618
90 19 29 E 25 50 34 N	03	06	-	-	-
90 18 03 E 25 51 56 N	03	06	-	-	-
90 21 23 E 25 50 14 N	03	06	-	-	-
90 21 03 E 25 51 23 N	03	02	20	026	19.258
90 22 53 E 25 51 08 N	03	06	-	-	-
90 24 37 E 25 51 23 N	03	06	-	-	-
90 27 11 E 25 50 54 N	03	06	-	-	-
90 25 17 E 25 51 39 N	03	06	-	-	-
90 15 44 E 25 53 33 N	03	06	-	-	-
90 16 47 E 25 53 58 N	03	03	20	013	19.837
90 19 22 E 25 52 43 N	03	06	-	-	-
90 21 26 E 25 54 05 N	03	15	-	-	-
90 21 03 E 25 53 29 N	03	03	20	001	0.585
90 22 58 E 25 54 44 N	03	06	-	-	-
90 25 06 E 25 54 14 N	03	03	20	004	4.352
90 27 22 E 25 53 18 N	03	03	20	005	0.727
90 28 03 E 25 54 10 N	03	14	-	-	-
90 29 24 E 25 53 21 N	03	03	20	012	27.644
90 16 43 E 25 57 27 N	03	02	11	025	6.785

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90 15 49 E 25 55 04 N	03	03	11	001	0.121
90 19 51 E 25 55 45 N	03	03	20	001	0.389
90 17 40 E 25 56 47 N	03	14	-	-	-
90 20 03 E 25 55 37 N	03	03	20	002	0.609
90 22 27 E 25 56 53 N	03	06	-	-	-
90 23 03 E 25 56 48 N	03	13	-	-	-
90 25 00 E 25 55 43 N	03	06	-	-	-
90 27 25 E 25 56 45 N	03	03	20	004	5.929
90 28 09 E 25 55 14 N	03	12	-	-	-
90 29 20 E 25 57 18 N	03	06	-	-	-
90 20 24 E 25 57 49 N	03	04	-	-	-
90 22 03 E 25 59 53 N	03	06	-	-	-
90 24 09 E 25 58 15 N	03	03	20	006	1.364
90 23 20 E 25 59 20 N	03	06	-	-	-
90 26 42 E 25 57 43 N	03	06	-	-	-
90 28 03 E 25 58 53 N	03	12	-	-	-
90 29 27 E 25 58 50 N	03	03	20	-	-
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90 16 23 E 25 31 05 N	03	04	-	-	-
90 16 06 E 25 31 21 N	03	03	20	016	3.788
90 18 35 E 25 30 42 N	03	04	-	-	-
90 18 55 E 25 30 22 N	03	04	-	-	-

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90 22 16 E 25 32 07 N	03	04	-	-	-
90 20 10 E 25 30 21 N	03	01	20	-	-
90 23 37 E 25 32 15 N	03	01	20	-	-
90 23 44 E 25 30 14 N	03	04	-	-	-
90 26 19 E 25 30 39 N	03	04	-	-	-
90 26 11 E 25 32 10 N	03	15	-	-	-
90 29 04 E 25 31 05 N	03	15	-	-	-
90 28 30 E 25 31 21 N	03	04	-	-	-
90 15 10 E 25 34 07 N	03	02	20	011	15.077
90 19 54 E 25 34 12 N	03	04	-	-	-
90 16 28 E 25 33 12 N	03	03	20	002	0.633
90 20 19 E 25 34 01 N	03	04	-	-	-
90 23 12 E 25 32 34 N	03	01	20	-	-
90 21 06 E 25 34 50 N	03	12	-	-	-
90 25 52 E 25 32 33 N	03	13	-	-	-
90 26 35 E 25 34 53 N	03	04	-	-	-
90 28 03 E 25 34 55 N	03	04	-	-	-
90 29 27 E 25 32 31 N	03	04	-	-	-
90 16 13 E 25 36 00 N	03	-	-	-	-
90 16 15 E 25 36 24 N	03	04	-	-	-
90 18 22 E 25 35 08 N	03	04	-	-	-
90 19 04 E 25 37 25 N	03	03	20	005	2.111

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90 21 42 E 25 35 55 N	03	04	-	-	-
90 24 31 E 25 36 57 N	03	04	-	-	-
90 22 48 E 25 35 05 N	03	03	20	006	25.115
90 26 49 E 25 35 40 N	03	04	-	-	-
90 25 39 E 25 36 50 N	03	12	-	-	-
90 29 43 E 25 36 26 N	03	01	20	047	9.829
90 15 39 E 25 39 50 N	03	05	12	-	-
90 16 51 E 25 37 41 N	03	04	-	-	-
90 18 03 E 25 38 53 N	03	06	-	-	-
90 19 25 E 25 38 41 N	03	04	-	-	-
90 21 06 E 25 38 04 N	03	04	-	-	-
90 22 22 E 25 39 27 N	03	04	-	-	-
90 24 42 E 25 39 24 N	03	13	-	-	-
90 22 43 E 25 38 02 N	03	04	-	-	-
90 26 15 E 25 39 38 N	03	04	-	-	-
90 26 11 E 25 37 47 N	03	04	-	-	-
90 28 21 E 25 38 23 N	03	04	-	-	-
90 29 07 E 25 39 01 N	03	05	12	-	-
90 15 41 E 25 41 26 N	03	04	-	-	-
90 16 47 E 25 41 01 N	03	15	-	-	-
90 17 43 E 25 41 55 N	03	06	-	-	-
90 20 26 E 25 40 04 N	03	02	20	016	4.792
90 23 44 E 25 42 21 N	03	03	20	001	1.371

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90 27 09 E 25 42 10 N	03	13	-	-	-
90 25 21 E 25 40 14 N	03	-	-	-	-
90 28 55 E 25 41 49 N	03	05	12	-	-
90 16 33 E 25 42 54 N	03	13	-	-	-
90 19 13 E 25 44 07 N	03	15	-	-	-
90 18 14 E 25 43 18 N	03	06	-	-	-
90 22 12 E 25 43 58 N	03	05	12	-	-
90 20 16 E 25 43 28 N	03	13	-	-	-
90 24 22 E 25 43 17 N	03	04	-	-	-
90 22 56 E 25 44 12 N	03	06	-	-	-
90 26 06 E 25 44 38 N	03	05	12	011	3.906
90 29 45 E 2 44 30 N	03	06	-	-	-
9 27 41 E 2. 42 59 N	03	04	-	-	-
	Map Sheet No. 78 K/7				
90 32 E 25 7 00 N	03	06	-	-	-
90 .2 16 E 25 20 N	03	06	-	-	-
90 20 E 25 01 N	03	06	-	-	-
90 22 E 25 10 N	03	12	-	-	-
90 2 04 E 25 1 20 N	03	06	-	-	-
90 2 42 E 25 1 02 N	03	02	11	033	10.943
90 28 46 E 25 16 30 N	03	03	20	006	7.257
90 23 06 E 25 17 32 N	03	06	-	-	-
90 26 32 E 25 18 32 N	03	03	20	011	6.092

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90 27 41 E 25 18 20 N	03	06	-	-	-
90 29 44 E 25 19 15 N	03	03	20	018	6.327
90 17 52 E 25 21 44 N	03	12	-	-	-
90 20 34 E 25 22 18 N	03	03	20	020	10.494
90 24 42 E 25 20 32 N	03	06	-	-	-
90 27 24 E 25 20 40 N	03	12	-	-	-
90 25 04 E 25 21 52 N	03	12	-	-	-
90 29 21 E 25 22 24 N	03	06	-	-	-
90 17 20 E 25 24 58 N	03	03	20	003	3.432
90 15 08 E 25 22 32 N	03	06	-	-	-
90 19 35 E 25 24 08 N	03	14	-	-	-
90 22 24 E 25 24 16 N	03	06	-	-	-
90 24 46 E 25 24 26 NN	03	06	-	-	-
90 22 42 E 25 23 04 N	03	06	-	-	-
90 29 28 E 25 23 08 N	03	06	-	-	-
90 28 01 E 25 24 24 N	03	03	20	015	2.449
90 17 28 E 25 26 44 N	03	12	-	-	-
90 15 04 E 25 25 47 N	03	06	-	-	-
90 18 36 E 25 25 56 N	03	14	-	-	-
90 18 52 E 25 26 37 N	03	06	-	-	-
90 21 36 E 25 26 04 N	03	12	-	-	-
90 20 56 E 25 26 26 N	03	06	-	-	-

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90 24 10 E 25 27 16 N	03	01	20	-	-
90 23 19 E 25 25 16 N	03	03	20	025	11.367
90 2[illegible] 36 E 25 2[illegible] 13 N	03	01	20	056	51.231
90 2[illegible] 40 E 25 2[illegible] 36 N	03	06	-	-	-
90 2[illegible] 48 E 25 2[illegible] 54 N	03	02	20	023	3.121
90 2[illegible] 58 E 25 2[illegible] 23 N	03	01	20	-	-
90 [illegible] 32 E 25 2[illegible] 10 N	03	06	-	-	-
90 [illegible] 38 E 25 [illegible] 26 N	03	12	-	-	-
90 [illegible] 48 E 25 [illegible] 04 N	03	01	20	035	45.382
90 [illegible] 00 E 25 [illegible] 48 N	03	06	-	-	-
90 [illegible] 32 E 25 [illegible] 43 N	03	01	20	047	32.431
90 [illegible] 14 E 25 [illegible] 52 N	03	06	-	-	-
90 2[illegible] 16 E 25 2[illegible] 36 N	03	01	20	053	39.829
90 2[illegible] 24 E 25 2[illegible] 52 N	03	06	-	-	-
90 2[illegible] 04 E 25 2[illegible] 40 N	03	01	20	062	31.708
90 2[illegible] 38 E 25 28 56 N	03	06	-	-	-
90 2[illegible] 48 E 25 28 34 N	03	06	-	-	-
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90 20 32 E 25 12 18 N	03	03	20	013	5.083
90 24 5 E 25 12 25 N	03	02	20	026	29.509
90 27 [illegible]5 E 25 11 [illegible]9 N	03	02	20	017	5.304

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90 25 14 E 25 10 53 N	03	06	-	-	-
90 28 46 E 25 10 33 N	03	02	20	022	5.966
90 28 46 E 25 11 53 N	03	06	-	-	-
90 17 11 E 25 13 54 N	03	06	-	-	-
90 18 12 E 25 14 49 N	03	06	-	-	-
90 19 17 E 25 12 45 N	03	01	11	014	2.581
90 21 01 E 25 14 31 N	03	02	20	005	2.403
90 21 30 E 25 12 57 N	03	02	20	005	7.462
90 23 23 E 25 14 10 N	03	15	-	-	-
90 24 06 E 25 13 18 N	03	01	20	046	14.934
90 26 58 E 25 14 22 N	03	02	20	026	20.624
90 25 32 E 25 13 06 N	03	06	-	-	-
90 28 57 E 25 13 27 N	03	14	-	-	-
90 28 32 E 25 19 02 N	03	14	-	-	-
	Map Sheet No. 78 K/9				
90 43 32 E 25 47 39 N	03	03	20	005	1.074
90 49 58 E 25 49 49 N	03	13	-	-	-
90 33 02 E 25 50 28 N	03	13	-	-	-
90 34 28 E 25 52 03 N	03	06	-	-	-
90 38 27 E 25 51 14 N	03	06	-	-	-
90 39 01 E 25 51 15 N	03	06	-	-	-

1	2	3	4	5	6
90 40 30 E 25 50 02 N	03	02	12	001	0.099
90 41 58 E 25 52 28 N	03	03	20	-	-
90 44 10 E 25 50 11 N	03	13	-	-	-
90 43 18 E 25 52 19 N	03	02	20	046	35.947
90 30 55 E 25 52 52 N	03	02	11	032	10.304
90 32 59 E 25 52 42 N	03	02	20	023	3.448
90 34 40 E 25 54 47 N	03	06	-	-	-
90 35 16 E 25 53 34 N	03	14	-	-	-
90 38 09 E 25 52 57 N	03	12	-	-	-
90 39 20 E 25 54 32 N	03	02	20	032	6.406
90 40 37 E 25 54 57 N	03	02	20	025	7.886
90 41 35 E 25 52 32 N	03	05	12	-	-
90 44 14 E 25 54 35 N	03	06	-	-	-
90 43 16 E 25 53 16 N	03	06	-	-	-
90 30 34 E 25 55 14 N	03	02	11	027	5.245
90 31 56 E 25 57 15 N	03	14	-	-	-
90 33 34 E 25 55 34 N	03	12	-	-	-
90 35 05 E 25 57 24 N	03	06	-	-	-
90 41 50 E 25 55 13 N	03	06	-	-	-
90 44 39 E 25 56 45 N	03	06	-	-	-
90 42 51 E 25 55 45 N	03	06	-	-	-

Contents

1	2	3	4	5	6
Map sheet No. 78 K/9					
90 30 07 E 25 45 23 N	03	05	12	013	2.556
90 32 25 E 25 47 08 N	03	05	12	-	-
90 34 17 E 25 47 10 N	03	06	-	-	-
90 33 16 E 25 45 19 N	03	06	-	-	-
90 35 36 E 25 46 24 N	03	06	-	-	-
90 36 56 E 25 46 08 N	03	05	12	-	-
90 37 48 E 25 46 51 N	03	06	-	-	-
90 39 40 E 25 45 41 N	03	06	-	-	-
90 41 36 E 25 45 32 N	03	06	-	-	-
90 40 52 E 25 47 09 N	03	06	-	-	-
90 43 52 E 25 46 24 N	03	03	20	001	16.424
90 43 40 E 45 46 05 N	03	02	20	016	8.802
90 31 45 E 25 49 39 N	03	03	20	007	7.163
90 30 46 E 25 47 50 N	03	05	12	-	-
90 33 59 E 25 47 29 N	03	06	-	-	-
90 33 33 E 25 48 00 N	03	03	20	011	4.447
90 35 57 E 25 49 13 N	03	06	-	-	-

Contents

1	2	3	4	5	6
90 31 36 E 25 48 16 N	03	06	-	-	-
90 3[illegible] 46 E 25 4[illegible] 52 N	03	06	-	-	-
90 [illegible] 42 E 25 [illegible] 39 N	03	12	-	-	-
90 [illegible] 21 E 25 37 N	03	03	20	-	-
90 01 E 25 54 N	03	06	-	-	-

1	2	3	4	5	6
		Map Sheet No. 78 K/10			
90 31 06 E 25 30 19 N	03	04	-	-	-
90 36 51 E 25 32 20 N	03	04	-	-	-
90 38 08 E 25 30 53 N	03	15	-	-	-
90 41 02 E 25 32 00 N	03	04	-	-	-
90 41 20 E 25 30 27 N	03	15	-	-	-
90 42 45 E 25 31 16 N	03	05	12	001	5.142
90 44 47 E 25 30 14 N	03	-	-	-	-
90 31 56 E 25 33 48 N	03	10	-	-	-
90 30 34 E 25 33 43 N	03	04	-	-	-
90 34 58 E 25 32 41 N	03	01	10	041	3.305
90 32 32 E 25 34 50 N	03	06	-	-	-
90 35 30 E 25 34 46 N	03	06	-	-	-
90 36 58 E 25 32 43 N	03	04	-	-	-
90 37 32 E 25 34 43 N	03	04	-	-	-
90 39 51 E 25 32 44 N	03	04	-	-	-
90 40 14 E 25 32 59 N	03	06	-	-	-
90 43 01 E 25 34 35 N	03	03	20	002	0.098
90 44 27 E 25 32 52 N	03	01	20	046	9.873
90 30 34 E 25 37 13 N	03	13	-	-	-
90 39 06 E 25 35 24 N	03	-	-	-	-
90 40 44 E 25 35 04 N	03	06	-	-	-

Contents

1	2	3	4	5	6
90 41 42 E 25 37 23 N	03	02	20	029	8.095
90 35 34 E 25 37 43 N	03	04	-	-	-
90 36 53 E 25 39 42 N	03	01	11	018	13.643
90 39 54 E 25 39 07 N	03	06	-	-	-
90 37 30 E 25 38 20 N	03	06	-	-	-
90 41 54 E 25 37 39 N	03	05	12	021	4.474
90 40 37 E 25 39 40 N	03	06	-	-	-
90 43 01 E 25 38 49 N	03	06	-	-	-
90 44 29 E 25 38 46 N	03	04	-	-	-
90 31 28 E 25 40 39 N	03	14	-	-	-
90 31 19 E 25 41 52 N	03	06	-	-	-
90 32 48 E 25 42 03 N	03	05	12	-	-
90 34 34 E 25 40 27 N	03	04	-	-	-
90 35 16 E 25 41 23 N	03	04	-	-	-
90 37 14 E 25 41 03 N	03	01	20	011	20.475
90 38 14 E 25 40 42 N	03	01	20	049	43.679
90 39 07 E 25 41 45 N	03	04	-	-	-
90 41 24 E 25 41 05 N	03	06	-	-	-
90 41 02 E 25 41 23 N	03	06	-	-	-
90 44 49 E 25 41 04 N	03	06	-	-	-
90 42 41 E 25 40 42 N	03	06	-	-	-
90 31 51 E 25 44 20 N	03	06	-	-	-
90 30 37 E 25 43 07 N	03	05	12	005	2.881

Contents

1	2	3	4	5	6
90 32 47 E 25 42 49 N	03	01	20	013	16.349
90 34 42 E 25 44 37 N	03	06	-	-	-
90 36 11 E 25 44 39 N	03	06	-	-	-
90 36 17 E 25 42 54 N.	03	04	-	-	-
90 39 40 E 25 43 38 N	03	04	-	-	-
90 37 39 E 25 43 .49 N	03	06	-	-	-
90 40 03 E 25 43 33 N	03	04	-	-	-
90 42 25 E 25 43 48 N	03	06	-	-	-
90 43 15 E 25 43 09 N	03	15	-	-	-
90 44 13 E 25 44 20 N	03	06	-	-	-
	Map Sheet No. 78 K/11				
90 30 20 E 25 16 30 N	03	03	20	-	-
90 33 56 E 25 15 56 N	03	02	11	066	24.072
90 33 32 E 25 16 33 N	03	06	-	-	-
90 35 06 E 25 15 36 N	03	03	11	010	1.239
90 37 24 E 25 16 54 N	03	03	20	026	9.984
90 38 16 E 25 17 04 N	03	02	20	031	9.757
90 39 10 E 25 15 26 N	03	06	-	-	-
90 36 54 E 25 19 54 N	03	06	-	-	-
90 31 36 E 25 17 38 N	03	12	-	-	-
90 33 26 E 25 19 44 N	03	06	-	-	-
90 34 01 E 25 17 48 N	03	06	-	-	-
90 35 30 E 25 17 38 N	03	02	20	010	3.226

Contents

1	2	3	4	5	6
90 36 56 E 25 19 54 N	03	01	20	055	22.155
90 39 38 E 25 19 27 N	03	01	10	056	17.898
90 40 08 E 25 19 16 N	03	01	11	101	31.484
90 31 16 E 25 21 40 N	03	03	11	006	0.986
90 31 14 E 25 20 52 N	03	06	-	-	-
90 34 06 E 25 20 58 N	03	03	20	007	2.978
90 33 22 E 25 21 30 N	03	02	11	015	4.279
90 35 18 E 25 21 44 N	03	02	11	022	10.128
90 37 06 E 25 20 42 N	03	02	20	047	24.286
90 39 28 E 25 20 38 N	03	02	20	014	6.292
90 37 56 E 25 21 50 N	03	03	20	003	0.123
90 40 14 E 25 21 06 N	03	15	-	-	-
90 44 41 E 25 22 22 N	03	-	-	-	-
90 30 24 E 25 23 13 N	03	03	11	006	0.932
90 32 04 E 25 24 18 N	03	06	-	-	-
90 34 12 E 25 24 31 N	03	02	11	009	1.513
90 33 16 E 25 22 58 N	03	03	20	009	5.394
90 36 22 E 25 23 27 N	03	12	-	-	-
90 36 04 E 25 23 16 N	03	12	-	-	-
90 39 55 E 25 23 04 N	03	02	20	018	6.136
90 37 33 E 25 24 20 E	03	13	-	-	-
90 41 28 E 25 23 45 N	03	13	-	-	-
90 41 00 E 25 23 45 N	03	13	-	-	-

Contents

1	2	3	4	5	6
90 44 52 E 25 23 21 N	03	06	-	-	-
90 42 33 E 25 24 12 N	03	03	20	-	-
90 30 40 E 25 27 25 N	03	06	-	-	-
90 31 49 E 25 25 08 N	03	03	20	009	1.690
90 34 30 E 25 25 44 N	03	06	-	-	-
90 32 59 E 25 26 44 N	03	06	-	-	-
90 35 18 E 25 27 08 N	03	03	20	006	2.675
90 37 12 E 25 25 20 N	03	12	-	-	-
90 38 30 E 25 26 28 N	03	06	-	-	-
90 38 56 E 25 26 00 N	03	06	-	-	-
90 42 08 E 25 25 19 N	03	13	-	-	-
90 40 18 E 25 27 12 N	03	03	20	-	-
90 42 56 E 25 25 04 N	03	13	-	-	-
90 44 32 E 25 27 26 N	03	13	-	-	-
90 31 12 E 25 29 44 N	03	12	-	-	-
90 31 20 E 25 27 44 N	03	06	-	-	-
90 33 21 E 25 29 36 N	03	06	-	-	-
90 34 08 E 25 27 50 N	03	03	20	005	0.933
90 36 46 E 25 27 56 N	03	02	20	018	20.169
90 39 04 E 25 28 20 N	03	06	-	-	-
90 38 20 E 25 29 08 N	03	15	-	-	-
90 41 34 E 25 27 52 N	03	03	20	008	13.535

Contents

1	2	3	4	5	6
90 40 54 E 25 29 38 N	03	03	20	012	1.141
90 42 56 E 25 29 08 N	03	02	20	-	-
90 44 36 E 25 28 22 N	03	06	-	-	-
	Map Sheet No. 78 K/12				
90 32 06 E 25 11 10 N	03	03	11	003	7.990
90 35 07 E 25 12 03 N	03	-	-	-	-
90 36 21 E 25 11 43 N	03	02	20	033	18.926
90 41 23 E 25 12 20 N	03	01	20	047	16.353
90 43 06 E 25 12 15 N	03	03	20	012	1.249
90 44 25 E 25 10 16 N	03	12	-	-	-
90 30 36 E 25 13 42 N	03	01	11	022	3.169
90 31 56 E 25 13 47 N	03	02	11	035	7.455
90 33 52 E 25 13 05 N	03	06	-	-	-
90 33 41 E 25 13 21 N	03	01	11	025	11.942
90 36 28 E 25 14 25 N	03	06	-	-	-
90 36 05 E 25 13 05 N	03	02	20	029	11.601
90 38 46 E 25 14 35 N	03	06	-	-	-
90 38 44 E 25 12 53 N	03	01	11	063	9.803
90 40 34 E 25 12 40 N	03	01	11	110	11.139
90 41 55 E 25 14 48 N	03	02	20	-	-
90 43 16 E 25 14 05 N	03	02	20	-	-
90 44 10 E 25 13 25 N	03	01	20	018	2.016

Contents

1	2	3	4	5	6
Map Sheet No. 78 K/13					
90 46 22 E 25 45 16 N	03	06	-	-	-
90 48 14 E 25 46 38 N	03	06	-	-	-
90 49 19 E 25 45 52 N	03	12	-	-	-
90 52 22 E 25 46 14 N	03	06	-	-	-
90 50 11 E 25 46 16 N	03	03	20	029	15.222
90 53 47 E 25 47 16 N	03	03	20	009	5.608
90 56 56 E 25 46 14 N	03	12	-	-	-
90 55 50 E 25 46 17 N	03	05	12	003	0.632
90 45 31 E 25 47 38 N	03	02	20	032	9.154
90 47 06 E 25 49 52 N	03	05	12	003	0.641
90 48 36 E 25 49 24 N	03	05	12	-	-
90 48 56 E 25 48 08 N	03	03	20	019	4.234
90 50 42 E 25 47 58 N	03	03	20	012	10.101
90 51 52 E 25 49 35 N	03	06	-	-	-
90 58 33 E 25 47 36 N	03	03	20	015	10.018
90 58 56 E 25 49 56 N	03	15	-	-	-
90 56 04 E 25 49 50 N	03	05	12	-	-
90 56 30 E 25 47 40 N	03	05	12	-	-
90 59 23 E 25 49 46 N	03	12	-	-	-
90 58 05 E 25 47 46 N	03	03	20	006	3.098
90 46 02 E 25 51 28 N	03	02	20	031	23.814

Contents

1	2	3	4	5	6
90 46 51 E 25 51 04 N	03	02	20	025	35.640
90 48 30 E 25 52 14 N	03	05	12	006	1.221
90 49 03 E 25 51 17 N	03	03	20	004	3.575
90 50 50 E 25 50 06 N	03	05	12	-	-
90 51 48 E 25 52 26 N	03	02	20	012	9.281
90 53 58 E 25 52 18 N	03	03	20	006	8.248
90 53 41 E 25 50 13 N	03	05	12	-	-
90 56 50 E 25 50 07 N	03	05	12	005	2.330
90 55 42 E 25 51 34 N	03	05	12	-	-
90 58 20 E 25 52 04 N	03	03	20	005	4.894
90 59 08 E 25 50 28 N	03	03	20	011	6.852
90 46 45 E 25 53 00 N	03	01	10	050	16.205
90 48 51 E 25 53 35 N	03	14	-	-	-
90 48 40 E 25 53 58 N	03	15	-	-	-
90 52 32 E 25 53 35 N	03	03	20	001	1.799
90 52 03 E 25 53 55 N	03	03	20	007	2.525
90 52 48 E 25 52 44 N	03	03	20	026	14.644
90 54 38 E 25 54 47 N	03	03	11	006	7.187
90 56 59 E 25 54 44 N	03	02	20	014	16.507
90 55 30 E 25 52 46 N	03	03	20	003	0.837
90 57 48 E 25 52 52 N	03	02	20	018	20.193
90 59 40 E 25 52 40 N	03	02	10	018	22.993
90 50 28 E 25 56 12 N	03	03	20	015	5.814

Contents

1	2	3	4	5	6
90 52 04 E 25 56 16 N	03	14	-	-	-
90 54 15 E 25 55 34 N	03	03	11	002	7.871
90 57 05 E 25 55 26 N	03	02	11	026	26.860
90 58 00 E 25 55 08 N	03	03	11	002	8.203
	Map Sheet No. 78 K/14				
90 45 54 E 25 32 28 N	03	02	20	-	-
90 46 45 E 25 31 47 N	03	03	20	008	1.807
90 45 20 E 25 36 05 N	03	14	-	-	-
90 47 11 E 25 37 28 N	03	06	-	-	-
90 49 20 E 25 36 52 N	03	03	20	003	0.689
90 51 15 E 25 37 07 N	03	02	20	021	12.661
90 46 46 E 25 38 01 N	03	02	20	009	6.201
90 45 45 E 25 39 29 N	03	02	20	006	0.890
90 47 34 E 25 37 38 N	03	03	20	006	0.194
90 49 56 E 25 39 52 N	03	03	20	-	-
90 47 02 E 25 40 28 N	03	02	20	016	1.331
90 45 25 E 25 41 56 N	03	03	20	006	2.311
90 48 15 E 25 42 17 N	03	03	20	024	15.751
90 49 14 E 25 40 10 N	03	13	-	-	-
90 51 42 E 25 41 44 N	03	06	-	-	-
90 50 47 E 25 40 41 N	03	06	-	-	-
90 53 06 E 25 41 48 N	03	13	-	-	-

Contents

1	2	3	4	5	6
90 54 16 E 25 10 15 N	03	13	-	-	-
90 55 21 E 25 41 30 N	03	03	20	012	15.666
90 47 07 E 25 42 53 N	03	02	20	036	9.302
90 45 23 E 25 44 31 N	03	02	20	011	5.041
90 48 40 E 25 42 44 N	03	02	20	030	5.898
90 48 47 E 25 40 39 N	03	13	-	-	-
90 51 55 E 25 43 37 N	03	06	-	-	-
90 50 34 E 25 43 48 N	03	02	20	011	7.376
90 51 48 E 25 43 25 N	03	06	-	-	-
90 50 37 E 25 43 50 N	03	06	-	-	-
90 56 20 E 25 41 46 N	03	02	20	003	0.363
90 56 05 E 25 42 58 N	03	03	20	017	9.955
	Map Sheet No. 78 K/15				
90 51 46 E 25 17 21 N	03	-	-	-	-
90 46 44 E 25 19 30 N	03	06	-	-	-
90 47 15 E 25 19 37 N	03	06	-	-	-
90 49 58 E 25 17 52 N	03	04	-	-	-
90 46 44 E 25 20 49 N	03	06	-	-	-
90 45 47 E 25 21 42 N	03	06	-	-	-
90 47 42 E 25 20 30 N	03	06	-	-	-

Contents

1	2	3	4	5	6
		Map Sheet No. 78 K/16			
90 45 09 E 25 11 49 N	03	06	-	-	-
90 45 49 E 25 12 20 N	03	01	20	012	11.344
90 52 13 E 25 12 08 N	03	02	20	035	16.178
90 53 59 E 25 12 26 N	03	12	-	-	-
90 57 00 E 25 11 24 N	03	02	20	029	8.877
90 46 35 E 25 13 43 N	03	02	20	-	-
90 45 58 E 25 13 47 N	03	03	20	027	20.548
90 49 49 E 25 14 31 N	03	12	-	-	-
90 47 45 E 25 12 59 N	03	03	20	011	10.547
90 51 19 E 25 13 05 N	03	02	20	022	3.560
90 51 14 E 25 14 27 N	03	01	20	037	22.708
90 52 54 E 25 12 51 N	03	01	20	-	-
90 54 37 E 25 14 42 N	03	01	20	-	-
90 56 37 E 25 13 46 N	03	01	20	041	29.780
90 55 52 E 25 13 46 N	03	01	20	-	-
		Map Sheet No. 78 O/1			
91 00 32 E 25 51 08 N	03	01	20	012	2.753

Total sample Plots = 587

Description of codes for Forest Division
i.e. col.2 of Appendix - II

Code	Forest Division
01	Jaintia Hills
02	Khasi Hills
03	Garo Hills

Description of codes for land use i.e. col. 3 of appendix III

Item		Description
01	Dense tree forests	All lands with a forest cover of trees with canopy density 70% and above (canopy density is defined as the relative completeness of Canopy expressed as percentage taking closed Canopy as 100. Standing in a plot or in area around it observe the tree growth and assess the percentage of the space covered).
02	Moderately Dense tree forests.	All lands with a forest cover of trees. With Canopy density 30% to 69%.
03	Open tree forests	All lands with a Forest cover of trees with Canopy density 5% to 29%
04	Scrub forests	Inferior tree growth chiefly of small or stunted trees. With Canopy density less than 5%.
05	Bamboo brakes	Areas completely covered with Bamboo growth.
	Shifting cultivation (Jhum)	Areas under current as well as last years shifting cultivation will come under this class. The agriculture crop may be standing or may have been harvested.
07	Young plantations of forestry species	This will include young plantations of forestry species in which average stems are above 10 cm. diameter at B.H. and the extent of such plantation is more than 0.5 ha. This will include Farm Forests, Social forestry plantations, Parts of coversion to uniform areas, plantations raised by Forest Development Corporation etc.
08	Trees in line	This will include trees planted along canal banks, along road sides, along railway lines, wind brakes and shelter belts planted under various Social Forestry Schemes.
09	Forest roads etc.	This class will include areas under forest roads, depots, colonies, nurseries and such other forest land used in connection with forest administration.
10	Govt. Grass lands	This will include areas under natural or planted grass lands pastures etc. which are owned by Government.
	Barren lands	This will include areas with exposed surfaces like rock sheets, sand dunes, swamps and areas without any vegetation.

Contents

Code	Item	Description
10	Agricultural land without trees in surround	All lands under cultivation including fallow lands will come under this category. These lands will not have any tree growth along bunds or in their vicinity of 2 ha.
11	Agricultural land with trees in surround	This will include all lands under cultivation including fallow lands which are covered with trees along bunds and in their surround within 2 ha.
14	Non forestry plantations	All lands with tree growth planted primarily for purposes other than forestry such as Cashew, Coffee, gardens, parks, zoos, private grass lands etc.
15	Habitation	This will include village City sites, industrial area, grave yards, grounds, houses, Colonies etc.
16	Water bodies	Land under lakes, water courses etc.
17	Other lands	Lands which cannot be classed under any of the above categories.

Description of codes for Forest type i.e. col. 4 of [illegible]

Code	Crop composition (Forest type)	Description
01	Fir	When Fir constitute more than 50%
02	Spruce	Where Spruce constitute more than 50%
03	Fir-spruce	Where Fir & Spruce both taken together constitute more than 50%
04	Blue-pine (Kail)	Where Blue pine constitute more than 50%
05	Deodar	Where Deodar constitute more than 50%
06	Chir-pine	Where Chir-pine constitute more than 50%
07	Mixed conifers	Where all conifers taken together constitute more than 50%
08	Hardwoods mixed with conifers or conifers mixed with hardwoods	Where the conifers & broad leaved species occur in more or less in same propositions.
09	Upland hardwoods	Broad leaved species constitute more than 50% in the Upper Chir zone above 1500 metre altitude.
		Where Teak constitute more than 20%
11		Where Sal constitute more than 20% (If Sal and Teak are both more than 20% preference to be given to teak)
12	Bamboo forest	Where the crop is of almost pure bamboo.
13	Mangrove	Mangrove forests.
14	Depterocarpus (Gurjan)	Where Gurjan constitute more than 50% in the top canopy.
15	Hollong Mekai Hollong (Depterocarpus macro carpus) Shorea assamica (Mekai)	Where Hollong and Mekai individual or both taken together constitute more than 50%.
16	Khasi pine	Where Khasi pine constitute more than 50%
17	Khair forest	Where Khair trees constitute more than 50%
18	Salai forest	Where Salai constitute more than 50%.
19	Alpine pastures	Alpine pastures.
20	Miscellaneous forest	Forest which could not be classified in any of the above classes.

Appendix IV

Field Forms

Contents

Field. Form 1

PLOT APPROACH FORM

1) Plot Approach Form must be filled in while the journey is in progress.
2) While recording date, it is essential to record month and year also.
3) If a plot is visited on more than one day, a separate form for each visit shall be filled up.

1. State and Code

2. Division and Code

3. District and Code

4. Map-sheet and Code

5. Grid Code

5. (a) Plot No.

6. Crew Leader (name)

7. Name of Camp

8. Time (hrs.) at which Left the camp

9. Distance covered by vehicle (km.)

10. Time taken in journey by vehicle — Hours — Minutes

11. Name of the place up to which journey was performed by vehicle. (describe in brief)

12. Conspicuous features observed during the journey by vehicle (describe in brief)

13. Time at which started on foot

14. Direction and distance covered on foot up to the reference point (km.)

15. Conspicuous features observed during the journey on foot (describe in brief)

16. Time (hrs.) at which arrived at the reference point.

17. Description of the reference point (Describe in details)

18. Compass bearing from reference point to the plot approached for commencing survey (please give the Plot No. also) if any

19. Distance of the plot Centre from reference point (Mtr)

Contents

20. Date and time at which arrived at the Plot	Ist Plot*	2nd Plot*.
21. Time (hrs) of Leaving the Plot	Ist Plot*	2nd Plot*
22. Time (hrs.) at which returned to the Camp.		
23. Compassing done by		
24. Distance measured by		
25. Plots laid out by		
26. Tree Enumeration done by		
27. Height measurements taken by		
28. B T and other measurements taken by		
29. Bamboo enumeration done by		
30. Bamboo Weight taken by		
31. References in the field written by		
32. Remarks		

Signature of the Crew Leader

Dated :

Diagrams etc.

A B

N. B.* *Strike out unwanted one.

Contents

PLOT DESCRIPTION FORM

Field Form 2

Job No.	Card design	Zone	State	District	Forest Division	Map Sheet No.	Gird No.	Plot No.	Legal Status	Land Use
1—3	4—5	6	7—8	9—10	11—12	13—18	19—22	23	24	25—26

Terrain Data						Soil Data							Crop Data											Bamboo Data														
General Topography	SLOPE	Position on Slope	Altitude	Aspect	Rockiness	Humus	Soil Colour	Soil Consistency	Soil Texture	Coarse Fragments	Soil Depth	Soil Erosion	Origin of Stand	Crop. Composition	Canopy Layer or Storey	Top Height	Size Class	Intensity of regeneration	Important Species under registration	Injuries to Crop	Fire Incidence	Grazing Incidence	Presence of weeds	Presence of Grass	Bamboo density	Bamboo quality	Bamboo Flowering	Bamboo regeneration	Plantation Potential	Distance to road	Distance to Mule Path	Distance to River/stream	Kacha road Distance	Pucca road Distance	River distance to market outlet	Obstacles	Plot Status	Status of Forest
27	28-30	31	32 35	36	37	38	39	40	41	42	43	44	45	46-47	48-49	50 51	52	53	54-56	57	58	59	60	61	62	63	64	65	66	67	68	69	70 71	72 74	75 76	77	78	79

Dated.....

Signature of Crew Leader.....

Name of crew Leader .....

PLOT ENUMERATION FORM

Field Form No..3

Job No.	Card design	Map Sheet No.	Grid No.	Plot No.
1—3	4—5	6—11	12—15	16

Total No. of bamboo clums	Total No. of trees
71—73	74—76

Species		Species		Species		Species		Species		Species		Species		Species		Species	
Code	Dia	Code	Dia	Code	Dia	Code	Dia	Code	Dia	Code	Dia	Code	Dia	Code	Dia	Code	Dia
17-19	20-22	23-25	26-28	29-31	32-34	35-37	38-40	41-43	44-46	47-49	50-52	53-55	56-58	59-61	62-64	65-67	68-70

Date .. ..

Signature of Crew Leader..... .. ..

Name of Crew Leader.. .. ..

Field Form No. 4

SAMPLE TREE FORM

Job No.	Card design	Map Sheet No.	Grid No.	Plot N .
1—3	4—5	6—11	12—15	16

Total No. of trees
55—56

SPECIES	Tree Serial No.	Species Code	Dominance	DBH OB (cm)	DBT (mm)	Tree Height (m)	Clear Bole (m)	Condition	Form: Longitudinal	Form: Sectional	SPECIES	Tree Serial No.	Species Code	Dominance	DBH OB (cm)	DBT (mm)	Tree Height (m)	Clear Bole (m)	Condition	Form: Longitudinal	Form: Sectional
	17-18	19-21	22	23-25	26-28	29-30	31-32	33	34	35		36-37	38-40	41	42-44	45-47	48-49	50-51	52	53	54

Date .....

Signature of Crew Leader.....

Name of Crew Leader.....

Field Form 5

BAMBOO EMUNERATION AND CLUMP ANALYSIS FORM

Job No.	Card Design	Map Sheet No.	Grid No / Inter Sectional No	Plot No
1—3	4 5	6—11	12—15	16

Average culm height (in dcm)		Bamboo quality
Upto 1cm top dia	Upto 2cm top dia	
72—74	75—77	78

Species	Species Code	Clump Serial No.	Clump diameter (in cms.)	Clump size class	Green sound culms							Green damaged culms							Dry sound culms			Dry damaged culms			Decayed culms	Total No. of culms
					Current year's	One to two seasons old			Over two seasons old			Current year's	One to two seasons old			Over two seasons old										
						2<5 Cms	5<8 Cms	8 + Cms	2<5 Cms	5<8 Cms	8 + Cms		2<5 Cms	5<8 Cms	8 + Cms	2<5 Cms	5<8 Cms	8 + Cms	2<5 Cms	5<8 Cms	8 + Cms	2<5 Cms	5<8 Cms	8 + Cms		
	17-19	20-22	23-25	26	27—28	29-30	31-32	33-34	35-36	37-38	39-40	41—42	43-44	45-46	47-48	49-50	51-52	53-54	55-56	57-58	59-60	61-62	63-64	65-66	67—68	69—71

Date .....

Signature of Crew Leader .....

Name of Crew Leader .....

Contents

Field Form 6

BAMBOO ENUMERATION FORM (NON CLUMP FORMING)

Job No.	Card Design	Map Sheet No.	Grid No.	Plot No.
1–3	4–5	6 - 11	12–15	16

Species Code	Green sound culms							Green damaged culms							Dry sound culms			Dry damaged culms			Decayed culms	Average culms Ht. (in decimeter)	Total No. of culms
	Current year's	One to two years old			Over two years old			Current year's	One to two year old			Over two years old											
		2<5 Cms	5<8 Cms	8 + Cms	2<5 Cms	5<8 Cms	8 + Cms		2<5 Cms	5<8 Cms	8 + Cms	2<5 Cms	5<8 Cms	8 + Cms	2<5 Cms	5<8 Cms	8 + Cms	2<5 Cms	5<8 Cms	8 + Cms			
17–19	20–22	23-25	26-28	29-30	31-33	34-36	37-38	39-41	42-44	45-47	48-49	50-52	53-55	56-57	58-60	61-62	63-6[illegible]	65-67	68-69	70-71	72-73	74-76	77-80

Date.....

Signature of the Crew Leador.....

Name of the Crew Leader .....

Job Number	Card Design
1–3	4 5

BAMBOO WEIGHT FORM

Map sheet Number	Grid No.	Plot Number
6–11	12–15	16

Field Form No. 7

Species Code			Sample No.	Green Weight of culm																																																Green weight of sub-sample for co-relation with dry weight											
				DIAMETER CLASS																																																											
				2 to under 5 cm																5 to under 8 cm																8 cm and over																											
				Diameter in cm		Total length in dmt			Utilizable length in dmt						Weight in Grams					Diameter in cm		Total length in dmt			Utilizable length in dmt						Weight in Grams					Diameter in cm		Total length in dmt			Utilizable length in dmt						Weight in Grams					Sub-sample culm 2cm & under 5cm dia				Sub-sample culm 5cm & under 8cm dia				Sub-sample culm 8cm and over			
									Upto 1cm top dia			Upto 2cm top dia													Upto 1cm top dia			Upto 2cm top dia													Upto 1cm top dia			Upto 2cm top dia																			
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80

Date ....

Signature of Crew Leader... ....

Name of Crew Leader ... .

HERBS AND SHRUBS DATA FORM

Field Form No. 8

Map Sheet No.....

Grid No.....

Plot No.....

HERBS								SHRUBS										
Name of Species	Total No.	Characteristics			Occurrence		Colour of flower if observed	Name of Spp	Total No.	Avr. Ht.	Pattern of Branching			Occurence		Information on flowers & Fruits	
		Erect	prostrate	Creeping	Grega-rious	Sporadic					Opposite	Alternate	Whorling	Grega-rious	Sporadic	Clour of Flowers	Size of fruit (Small med big)

Date.....

Signature of the Crew Leader.....

Name of the Crew Leader .....