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# REPORT

# ON

# INVENTORY OF FOREST RESOURCES

# OF

# MAYURBHANJ & BALASORE DISTRICTS

# OF

# ORISSA STATE

FOREST SURVEY OF INDIA
CENTRAL ZONE
NAGPUR
1997

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## PREFACE

Forest Survey of India, Central Zone has carried out the forest inventory in Mayurbhanj and Balasore districts of Orissa in the year 1992-93 excluding the Similipal Reserves. For writing the report, it was thought convenient to club both the districts because forest area in Balasore district is negligible i.e. 484.60 $km^2$. The forest of these two districts are covered by Karanjia and Baripada Forest Division. Whereas Karanjia Forest Division falls in Mayurbhanj district, Baripada division comprises of forest areas in both the districts. The total forest area of Mayurbhanj district is 4283.91 $km^2$ and that of Balasore 484.60 $km^2$ reckoning to 41.15 and 0.75% respectively.

The survey reveals that Sal forests extened over 52.49% area whereas Miscellaneous forests cover 47.51%. Total number of stems in these forest areas have been estimated to be 43 million with an average of 180.66 stems per ha. Total standing volume of the forests is found to be 8.8 million cubic metre with an average of 37.14 cubic metre per ha.

Although the survey area is rich in forest resources, it is found that 71% of the area is affected by grazing, regeneraion is inadequate in 41.63% of the forest area and 59.14% of the area is subjected to heavy soil erosion.

The outcome of the report is due to hardwork put in by field staff of Central Zone in collecting the data. The data were collected by the field parties led by S/shri M.K.Madaria, P.R.Singh, R.P. Sao, R.K. Mahobe, P.R.Rawani, S.K. Bajpai, J.S.Kumbhkar, all Junior Technical Assistants under the supervision of S/shri M.D.Singh and B.R. Pandey both Senior Technical Assistants.The field work was carried

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under the direction of Shri S.B.Elkunchwar,IFS, Dy. Director and Shri V.B. Joshi, IFS, Joint Director. The data processing was done by the Forest Survey of India at Dehradun under the guidance of Shri S.K. Chakraborty, Deputy Director,MDMU, Dehradun.

The report has been prepared by Shri M.D. Singh, Senior Technical Assistant, Shri S.B. Elkunchwar, IFS, Deputy Director and Shri Devendra Kumar, IFS, Joint Director, FSI, Central Zone.

Shri D.N. Kadu, Jr.Stenographer and Smt. Gressamma Varghese, Jr.Stenographer have done commandable job in typing this report. Maps and diagrams have been prepared by Shri D.S. Gulkari, Draftsman.

The co-operation and assistance extended by the officers of the Orissa State Forest Department during the survey work is thankfully acknowledged.

It is hoped that the report wil be useful to State Forest Department and other agencies who are engaged in the work of forest conservation and development planning.

(Manjit Singh)
Director,
Forest Survey of India,
Dehradun

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FOREST SURVEY OF INDIA
CENTRAL ZONE, NAGPUR

# ACKNOWLEDGEMENT

This organisation expresses its gratitude and sincere thanks to Conservator of Forests, Angul, Deputy Conservator of Forests, Karanjia, Dy. Conservator of Forests, Baripada and their field staff who provided their valuable co-operation to the field parties of our organisation during the survey work without which it was not possible for them to complete the survey work in stipulated time.

*Devendra Kumar*
*Joint Director*

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## SUMMARY

Inventory of forest resources in Mayurbhanj and Balasore district of Orissa was carried out by Forest Survey of India, Central Zone, Nagpur in the year 1992-93. The salient features of the survey report area as under:

i) 36.58% of the forest area contains dense to moderately dense forest. 22.59% are open forest.

ii) The forest of the district can be classified into two strata namely Sal and Miscellaneous. Sal forest is found to exist in 52.49% of the area whereas Miscellaneous forest covers 47.51% of the area. The sal forest is found more in plains and undulating land whereas Miscellaneous exists predominantly in hilly areas.

iii) 45.70% of the forest area contains hilly terrain, whereas 43% area is flat.

iv) 57.92% of the vegetation exists on gentle slope of below 10% and moderately slope (20 to 60%) contains 40.72% of the vegetation.

v) 39.36% of the vegetation is supported by deep soil whereas medium depth soil supports about 52% of vegetation.

vi) 31.22% of the forest crop is at regeneration stage and 28.51 is pole crop. Only 5.43% of forest crop comes under the category of big timber.

vii) In all 71% of the area is affected by grazing in one or the other way. Around 38% of the forest area is subjected to heavy grazing. In 16% of the area grazing has been noticed to be of moderate intensity and 17% area is subjected to light grazing.

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ix) Regeneration is inadequate in 41.63% of the forest area.

x) 59.14% of the forest area is subjected to heavy soil erosion.

xi) 15% of the forest area is affected by heavy and frequent fire. Occasional fire has been noticed in 37% of the area.

xii) Total no. of stems of the district forest has been found to be about 43 million with an average of 180.66 stems per ha.

xiii) Total standing volume of the forest is 8.8 million cubic metre with an average of 37.14 cubic metre per hectare.

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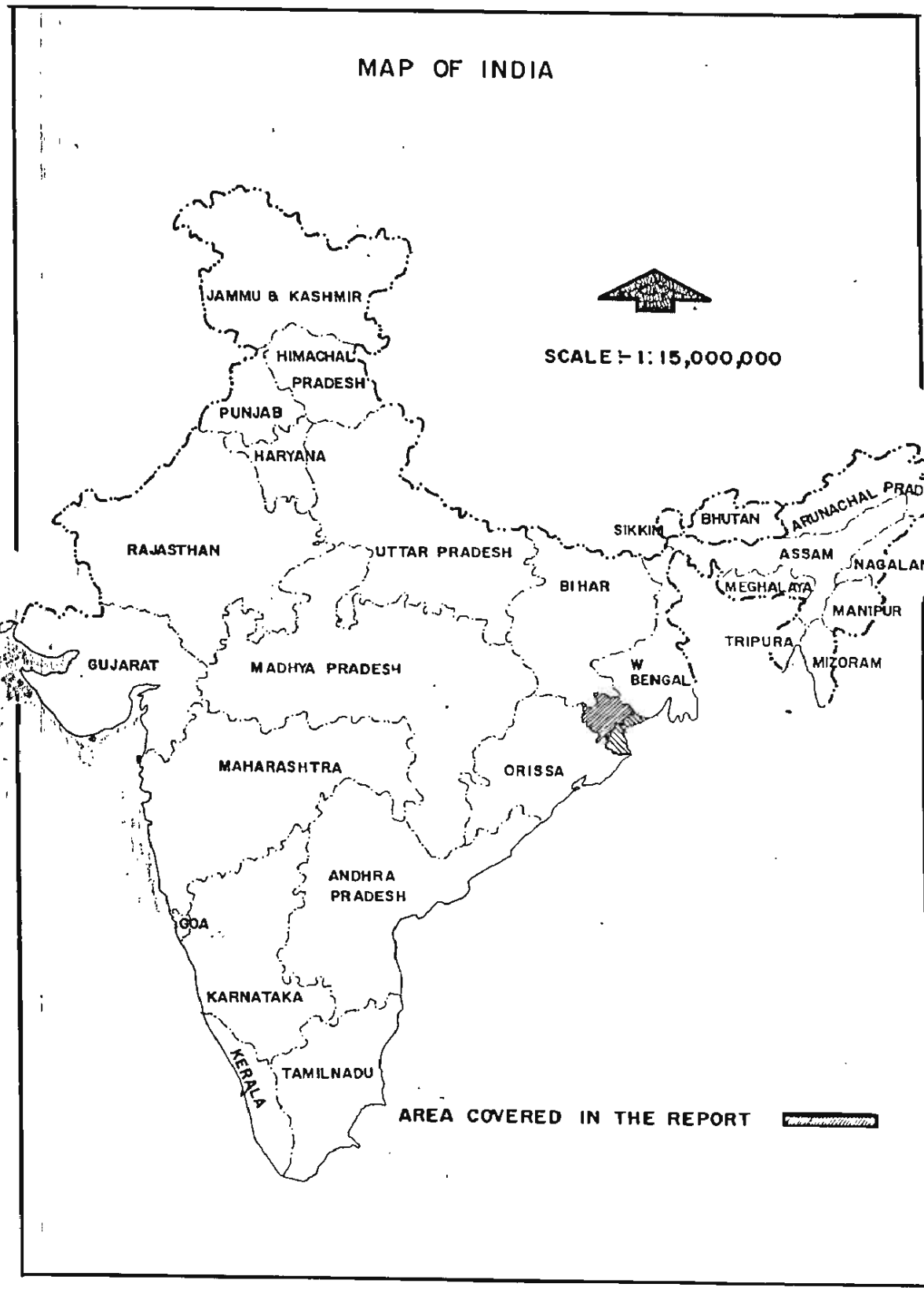
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MAHARASHTRA
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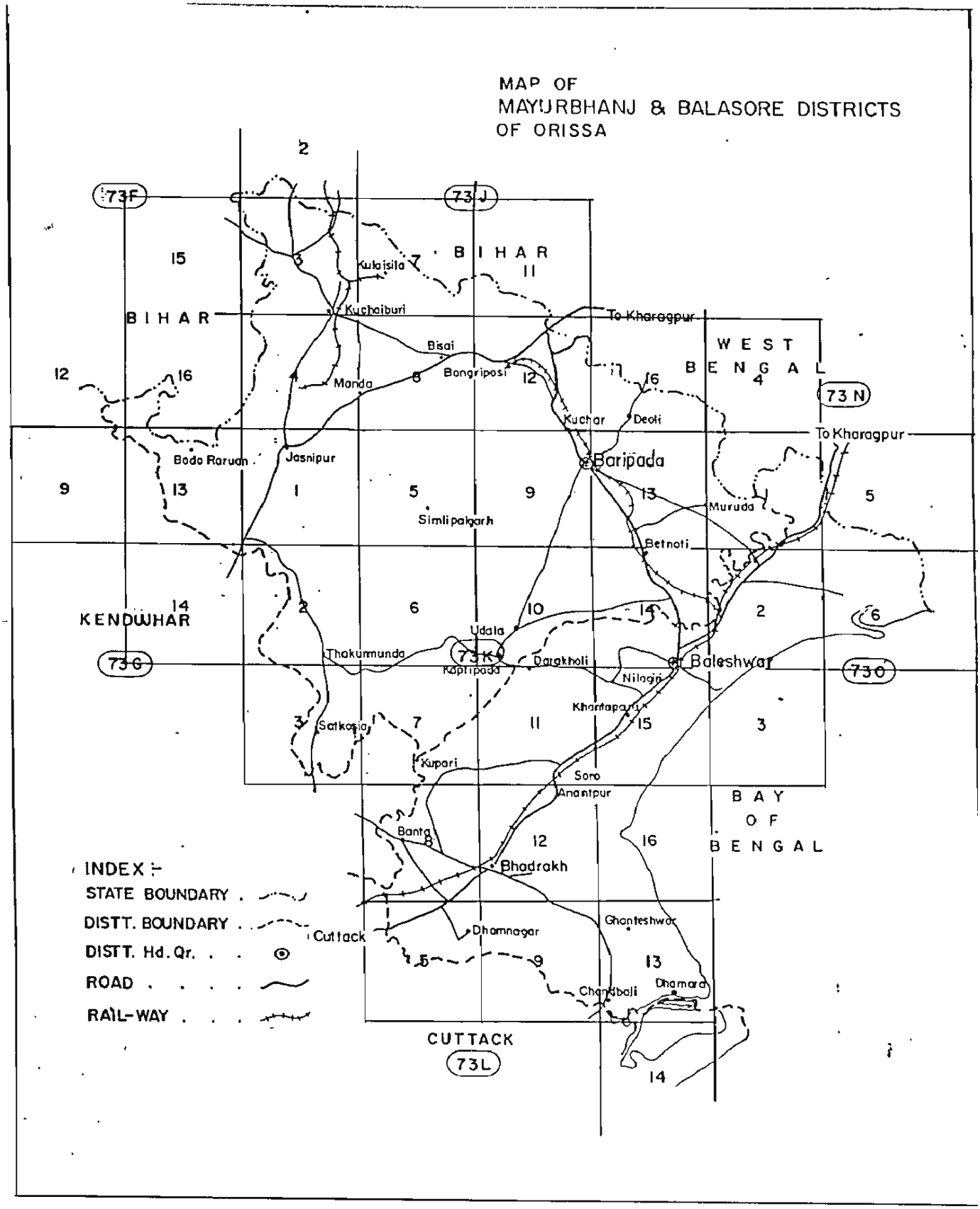
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WEST BENGAL
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## CHAPTER I

## BACKGROUND INFORMATION

1.0 The Forest Survey of India, Central Zone, Nagpur undertook the project of inventory of forest resources in forest area of Mayurbhanj and Balasore district of Orissa in the year 1992 with an objective to collect data regarding forest resources of the district so that data could be utilized by planners at district and national level who are engaged in the work of forest conservation. Under this project data regarding forest crop such as forest composition, tree species, intensity of regeneration, crop injury etc. were to be collected and analysed. The total growing stock of the forest was to be assessed to ascertain the value and productivity of forests of the district. The field work was started in March,1992 and was completed in the year May 1992.

### 1.1 LOCATION OF THE AREA

The survey area consists of forest area of Balasore and Mayurbhanj districts of Orissa excluding Similipal Tiger Reserve. Balasore district lies between $20^{o}$ 45' and $21^{o}$ 55' north latitudes and $86^{o}$ 16' and $87^{o}$ 30' east longitudes. Mayurbhanj district is situated between $21^{o}$ 16' and $22^{o}$ 37' 1/2' north latitudes and $85^{o}$ 40' to $87^{o}$ 10' east longitudes. Baleshwar district is bounded on the north by Mayurbhanj district, on the east by Midnapur district of West Bengal and Bay of Bengal, on the south by Cuttack District and on the west by Keonjhar district. On the north of Mayurbhanj District lies Singbham district of Bihar, on the east is Midnapur district of West Bengal, on the South is Baleshwar district and on the east is Keonjhar district.

### 1.2 ADMINISTRATIVE AND FOREST MANAGEMENT UNITS

The headquarter of Baleshwar and Mayurbhanj district are at Balasore and Baripada respectively. The former consists of 11 tahsils and 3 sub-divisions whereas later has 7 tahsils and 4 sub-divisions. The survey area is comprised of two Forest Divisions namely Karanjia and Baripada. Total

forest area managed by these two Forest Divisions are 2453 sq.km and 2315 sq.km. respectively which includes 304 sq.km area of Simlipal Tiger Reserve overlapping in both the district. The forest area of Karanjia Forest Division lies in Mayurbhanj district only whereas Baripada territorial division is spread over both Mayurbhanj and Baleshwar districts. The circle headquarter of both these divisions is at Angul. A field director of the rank of Conservator of Forests, is stationed at Baripada to manage Similipal Tiger Reserve. A social forestry division also exists at Baripada.

## 1.3 TOPOGRAPHY

Simlipal hill ranges dominate the topography of both the district. Northern and Southern part of the districts has hilly terrain. Portion of the district is having flat topography, some portion with undulating feature. Subarnarekha, Baitarni and Burhabalang are the three major river systems and drainage is in south eastwards towards the bay of Bengal.

## 1.4 CLIMATE AND RAINFALL

Both districts being close to sea, the climate of both the districts is warm and humid. Three distinct seasons can be distinguished. Summer is from March to June, Rainy season is from July to October and winter is from November to February. Mean temperature is between 21 $^0$c to 29 $^0$c , highest being 47$^0$c and lowest being around 5$^0$ c. Average annual rainfall for Mayurbhanj district is 1481 mm. Storms accompanied by thunder occur from April to June and alongwith occasional cyclones cause extensive damage to forests. A bar chart on page 2A depicts comparative picture of normal rainfall, average of several years of Mayurbhanj and Baleshwar districts.

## 1.5 AREA AND POPULATION

Total geographical area of Mayurbhanj District is 10418 km$^2$ and that of Baleshwar is 6311 km$^2$, with population of 18.72 lakh and 27.96 lakh respectively as per 1991 Census. The density of population in these districts are 443 and 179 respectively with literacy rate at 30.88% and 48.68% respectively.

DIAGRAM SHOWING NORMAL RAINFALL(in mm)
MAYURBHANJ
BALASORE
rainfall in m.m.
0
50
100
150
200
250
300
350
400
450
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC

## 1.6 LAND USE PATTERN

The land use pattern of both the Districts is given below.

| S.No. | Items | Mayurbhanj (Area in sq.km.) | Baleshwar (Area in sq.km.) |
|---|---|---|---|
| 1. | Geographical area | 10400 | 6470 |
| 2. | Forest area | 4280 | 48.460 |
| 3. | Barren and uncultivable land | 180 | 240 |
| 4. | Land put to non-agricultural use | 400 | 500 |
| 5. | Cultivable waste | 60 | 200 |
| 6. | Permanent pasture and grazing land | 290 | 260 |
| 7. | Misc. tree crops not included in net area sown | 130 | 300 |
| 8. | Current Fallows | 140 | 110 |
| 9. | Other Fallows | - | 40 |
| 10. | Net area sown | 4330 | 4560 |
| 11. | Gross cropped area including fruits | 5640 | 6840 |
| 12. | Area sown more than once excluding fruits | 1310 | 2280 |
| 13. | Cropping Intensity | 1310 | 1500 |

(Source: District Statistical Hand Books 1990-91)

## 1.7 SOCIO-ECONOMIC FEATURES

Mayurbhanj is primarily a tribal district with 57.67% of its population as tribal. Tribals depend upon forest for their livelihood and their day to day requirements. The district has 41% of its geographical area covered with forests. This district is rich in mineral wealth also. Important minerals found in the district are Iron ore, and manganese. Iron ore is of high quality containing 60% iron. Other minerals found are china clay, quartz and quartzite, soapstone, asbestos, fine clay, kyamile and talc. Major agricultural crop is paddy followed by pulses and groundnut. A lot of persons depend upon fresh water fishing. Out of 2.63lakh landhoders, 1.45 lac have marginal land holdings (< 1 ha).

Baleshwar district being coastal district fishing is one of the important economic activities of the district. The total annual production of marine fish and freshwater is 41,366 MT and 4471 MT respectively. The rice is major agricultural crop. In addition to it coastal people raise coconut and plantation crops. Out of 3.40 lakh landholders 2.05 lac have marginal landholding of less than 1 ha.

## 1.8 INFRASTRUCTURE

The index of economic development of any area is directly linked with the network of roads and railway lines in it. Whereas South eastern railway track going from Calcutta to Bhubaneshwar almost bifurcates Baleshwar District along its length, Mayurbhanj District does not have any railway line. However, network of roads in both the districts is very good. Details of road length are given below.

| S.No. | Category of Roads | Mayurbhanj (km) | Baleshwar (km) |
|---|---|---|---|
| 1. | National highways | 193.25 | 106.50 |
| 2. | State highways | - | 51.49 |
| 3. | Main District roads | 470.60 | 500.54 |

| | | | |
|---|---|---|---|
| 4. | Other District roads | 341.75 | 132.84 |
| 5. | Classified village roads | 879.77 | 220.34 |
| 6. | Municipal roads | 232.72 | 1171.00 |
| 7. | Forest roads | 1007.75 | 58.75 |
| 8. | Irrigation roads | 39.00 | 58.54 |
| 9. | OSEB roads | 3.00 | 5.20 |
| 10. | Panchayat Samiti roads | 1774.40 | 1718.60 |
| 11. | Gram panchayat roads | 11942.00 | 3023.00 |

## 1.9 FOREST PRODUCE AND FOREST BASED INDUSTRIES

Important forest produce of both the districts are Timber, fuelwood, ballies, bamboos, Tendu leaf, Mahuwa flowers, Mahuwa seeds, Sal seeds etc. In Baleshwar district there are 32 SSI (Small Scale Industry) forest and wood based industries with capital investment of Rs.10.92 lakhs and employment potential of 188 workers, whereas Mayurbhanj district contains 67 such small scale industries with capital of 31.32 lakhs and employment potential of 495.

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## CHAPTER II

## THE FOREST

### 2.0 FOREST AREA

As per the records of State Forest Department, Mayurbhanj district contains a forest area of 4283.91 sq.km. whereas 484.60 sq.km. forest cover exists in Balasore district. These forest areas are under the territorial jurisdiction of Karanjia and Baripada Forest Divisions. The break up of the forest area as per legal status is as under.

| S.No. | Contents | Karajnia Division (Mayurbhanj district in $km^2$) | Baripada Division (Baleshwar+ part of Mayurbhanj distt. in $km^2$ |
|---|---|---|---|
| 1. | Reserved forests | 1802.64 | 1143.54 |
| 2. | Protected forests | 221.91 | 255.08 |
| 3. | Undeclared Protected forests | 327.05 | 548.60 |
| 4. | Ex-Zamindari Forests | - | 57.37 |
| 5. | Lakhraj Forests | 26.29 | 75.84 |
| 6. | Unclassed Forests | 1.45 | 4.53 |
| 7. | Simlipal Tiger Reserve (RF) | 73.91 | 230.60 |
| | Total: | 2453.25 | 2315.56 |

## 2.1 FOREST TYPES

Broadly, the forest occurring in these two districts conforms to sub Group: 3-C North Indian Tropical Moist Deciduous Forests as per Champion & Seth classification. The major species in the area is Sal (Shorea robusta) and its pressence is overwhelming. It is found all over the tract on a variety of terrain and soils. It very oftenly forms pure to almost pure crop in the hills and as well as in plains. Silviculture practices of selective removal of other species, and enhancing regeneration and its establishment has also resulted in having a pure crop of Sal.

Major sub types of forests found in Mayurbhanj and Baleshwar districts are :

| | | |
|---|---|---|
| (1) | Moist Peninsular high level Sal | : 3C/ C2e (i) |
| (2) | Moist Peninsular low level Sal | : 3C/ C2e (ii) |
| (3) | Moist Peninsular valley Sal | : 3C/ C2e (iii) |
| (4) | Moist Sal savannah | : 3C/ DSI |
| (5) | Orissa Tropical Semi-evergreen forests | : 2B/ C3 |
| (6) | Very moist Peninsular Sal | : 3C/ C1d |
| (7) | Moist mixed deciduous forests. | : 3C/ C3 |
| (8) | Dry Peninsular Forests. | : 5B/ C1c |

(a) Moist Peninsular High Level Sal (3C/ C2e (i)

This sub type occurs usually above an elevation of 800 metres on laterite, trap and crystelline rocks in Simlipal hills. Crop is pure Sal of poor quality because of frost and fire which are common and to which sal is succeptible. Retrogression of this subtype because of frost and fire has resulted in formation of vast tracks of grass lands. Main associates of Sal are : Syzigium Cerasoideum, Dillenia pentagyna, Pterocarpus marsupium, Cedrela toona, careya arborea etc.

(b) Moist Peninsular Low Level Sal (3C/ C2 e (ii)

This type of forest is widely spread and is found on plain area, as well as on escarponents upto an elevation of 400 m above MSL. Sal is pure with quality III. Patches of quality II are also found in favourable locations. The

main associate are : Pterocarpus marsupium, Terminalia alata, Gmelina arborea, Madhuca indica, Anogeissus latifolia, etc. In the middle storey Emblica officinalis, Cassia fistula, Buchanania lanzan, Ougeinia oojeinensis are found.

(c) Moist Peninsular valley Sal (3C/ C2 e (iii)

This subtype mainly occurs in Simlipal hills upto an elevation of 800 m, on deep loamy soils, with site quality II/III. Sal constitutes more than 50% of the crop in association with Terminalia alata, Terminalia bellerica, Adina cordifolia, Pterocarpus marsupium, Schleichera oleosa, Bambax ceiba, Michaelia champaca, Alstonia Scholaris etc. Middle storey is represented by Syzigium cumini, Ougeinia oojeinensis, Milusa velutina, Callicarpa arborea, Careya arborea, Trema orientalis, Emblica officinalis, Cassia fistula, Helecteris isora etc.

(d) Moist Sal Savannah (3C DSI)

This subtype occurs in Similipal area and is a retrograde stage of subtype 3C/ C2 e (i) or Moist Peninsular High Level Sal. The retrogression is believed to be due to clearance of growth in old villages, cyclones, frosts, fires etc. These forests have sparse tree growth with dense grass which supports a large population of variety of fauna. A few frost hardy species like Syzigium cerasoideum, Dillenia pentagyna, Symplocos racemosa, Lagerstroemia parviflora etc. are noticed. Grasses found are Imperata arundinacea, Anthistiria gigantia, and Saccharum spontaneum etc.

(e) Orissa Tropical Semi-evergreen Forests (2B/ C3)

Sal is absent or very rarely found in this subtype, which exists in small patches in valleys. Trees in top storey are deciduous for a short period but the second storey is almost entirely evergreen. Top canopy is represented by Artocarpus lakoocha, Michelia champaca, Mangifera indica, Bridelia tomentosa, Xylia xylocarpa, Ficus spp, Saraca indica etc; whereas middle storey consists of Mesua ferrea, Polyalthea, cerasioides, Macaranga peltata, Litisea nitida, Anthocephalus indica, Bischophia javanica, Syzigium cuminii etc.

(f) Very Moist Peninsular Sal (3C/ C1 d)

This sub type also occurs in pockets in the same area as that of 2B/ C3 above, except that Sal is present. This sub type is believed to be a stable subclimax of semi-evergreen forests of 2B/ C3 leading to Moist Peninsular Sal, 3C/ C2 e. Top storey consists of Shorea robusta, Dillenia pentagyna, Terminalia alata, Bridelia retusa, Adina cordifolia, Bombax ceiba etc. Second storey is much the same as in (e) above. Bamboo is absent.

(g) Moist mixed Deciduous Forests (3C/ C3)

This subtype is found on the upper reaches of steep slopes where moisture and drainage conditions are not suitable to Sal. Upper storey consists of species described in the all moist Sal sub-forests except Sal. Some of important species are Xylia xylocarpa, Pterocarpus marsupium, Bombax ceiba, Adina cordifolia, Dillenia pentagyna, Bridelia retusa, Terminlia alata, etc. Middle storey is represented by Kydia calycina, Polyalthia spp, Anogeissus latifolia, etc.

(h) Dry Peninsular Sal Forests (5B/ C2 c)

These forests are found on hillocks in drier localities. The soil is shallow, impervious laterite or is calcarious. Poor quality Sal (IV) is found in this subtype. Common associates are : Terminalia alata, Anogeissus latifolia, Madhuca indica, Pterocarpus marsupium, Adina cordifolia, etc. Middle storey consists of Cleistanthus collinus, Gardenia spp, Zizyphus spp, Wendlandia tinctoria, Emblica officinalis etc. Bamboo is absent. Retrogression is believed to have been the result of past jhooming.

## 2.2 FOREST MANAGEMENT

A major portion of forest area in these districts is being mananged for Wildlife conservation through Similipal Tiger Reserve. Two separate Working plans are in vogue(1992 ) in forest area of district. R. Mishra,s Working Plan is operative in Karanjia Forest Division ( 1973-74 to 1992-93) over 1775 $km^2$ whereas S.Bose,s Working Plan is operative in Baripada Forest Division (1973-74 to 1992-93) over an area of 1442.68 $km^2$).

The system of Forest management prescribed for both the districts is almost similar. Selection system is prescribed for dense to moderately dense areas, where sal is an important species. Thinnings and cleanings follow the selection cum improvement fellings. The felling cycle is prescribed at 5 years. The exploitable size of sal, considering site qualities varies from 105 cm to 150 cm G.B.H.

Sal conversion working circle has been created for 35 sq.km. area in Karanjia Division. These areas are capable of growing sound Sal trees of 150 cm G.B.H. and having profuse Sal regeneration.

Coppice with Reserves system is prescribed for degraded forests in plains. Reservation is by area, species and trees to ensure a fair mix of ensuing crop after felling operations. Artificial regeneration is prescribed for open patches and blanks. Rotation is of 40 years and all trees below GBH of 45 cm are to be retained along with all trees producing edible fruits - like Mahuwa, Jamun etc.

Rehabitation Working Circle is formed for areas which have rooted wastes and are very badly degraded. Operation like cutting bark, coppicing and tending shoots along with soil and water conservation measures are prescribed. Blanks are to be planted up and the entire area is to be strictly protected from biotic interference.

Plantation working circle is also formed for planting up suitable areas with mainly teak.

A redeeming feature of forest conservation in both the Districts is involvement of village communities in protection and management of forests. The State Government vide their Resolution No. 10F(prop)4/90/29595 FFAH dated 11.12.1990 have issued guide lines for activities involving village communities in forest management by forming Forest Protection committees. According to this scheme a part of Reserved or protected forest adjoining villages is assigned to Forest Protection Committees (FPC) with Sarpanch, ward member, local forester, Revenue Inspector, village Level worker and other non official members. The villagers are

required to protect the assigned forest area from fire, illicit cutting, encroachment etc. In return they are entitled to collect for their bonafide use, fallen leaves, firewood and small timber. The FPC is responsible for proper distribution.

In almost all the forest areas in these two districts, it was found that the FPCs were extremely effective. The villagers were found to be guarding the assigned forest areas zealously, with the result that beautiful sal crop has came up in many areas within a period of just 2-3 years. Hacked areas have become dense forest within no time at all.

Another special feature of Baleshwar district is that about 5000 ha of Casuarina plantations have been raised along the sea coast by Orissa Forest Development Corporation in strips of about 150-200 m. Established plantations are handed over to territorial Divisions for protection and further management. The plantations, on the whole, are quite successful and have changed the landscape for the good.

## 2.3 DAMAGE TO THE FORESTS

Main source of damage to the forests is through humanbeings. Fires are common from mid February, due to carelessness of villagers and are also deliberately spread by them for easy collection of Mahuwa flowers and sal seed. During Akhand sikar, a practice followed by local Adiwasis in the month of April, fires are spread to facilitate hunting. Unmitigated forest fires followed by frost is the main reason of creation of blanks. Frost damage is generally limited to areas having altitude of above 600 m. In Baleshwar District, wind damage is also quite heavy whenever cyclonic winds strike. Damage by elephants is also common in Baripada and karanjia Divisions, in areas nearer to Simlipal Reserve. They strip bark of mature sal and other trees for food shelter retarding the growth of the tree and causing its death. Hoplocerambyx spinicornis, occasionally attack dry and unhealthy sal trees. Polyporons shoreae and Formes triceler are common fungul pests of Sal. The former can kill healthy sal trees by damaging root system. Damage by illicit felling is also seen in these forests, especially near villages.

## 2.4 RIGHTS AND CONCESSIONS

Rights, Concessions and privilages for supply of timber, firewood, MWP collection, grazing cattle were granted from time to time to raiyats from protected or nearby reserves as per Mayurbhanj Forest manual of 1911. Now these concessions have been affected and area of no use since most of such forests have disappeared or are in extremely degraded state. At present permits for timber and firewood for bona-fide use are granted at concessional rates from Protected forests. Coppice coupes in plains also sypplemented the requirement of the rural population. However, both these categories of forests have become degraded. Grazing is also permitted free of cost for domestic cattle. Protected Forests and Forest reserves in the plains have been badly affected because of rights and concessions.

## 2.5 WILDLIFE

An area of around 300 $km^2$ has been assigned to Simlipal Tiger Reserve and most of it comes from Mayurbhanj and Baleshwar Districts. The Reserve is one of the most famous in the country with abundant wildlife. The hilly terrain, as well as vast stretches of grassy plains and abundant water make it a local ground for flourishing varieties of wild life. Tigers, leopards, elephants, Bears, Sambar, Chital are commonly seen in the park. The tiger population has increased from 17 in 1992 to 95 in 1993 due to strict conservation measures enforced in Tiger Project areas. In the other forest areas of the district the commercially found fauna are Bears, Sambar, Chtal, Nilgai, Wildboar, Panthers etc.

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## CHAPTER - III

## METHODOLOGY OF SURVEY

**3.0** Methodology used in survey was stratified random sampling. The 2 1/2' x 2 1/2' grids of 1:50,000 Survey of India toposheets were taken as basic sampling units. The survey work was carried out as per manual of inventory prepared by Forest Survey of India, Dehradun and various parameters used and quantified are as defined in that manual.

### 3.1 AREA CONSIDERED FOR SURVEY

In order to decide forest areas, the recent Survey of India toposheets, preferably of 1:50,000 scale and in their non-availability, 1" = 1 mile toposheets were used as base map. All those areas which were demarcated by double dotted forest boundaries on these toposheets and were having green wash within or outside such boundaries, were taken as forest areas for undertaking this inventory.

### 3.2 INVENTORY DESIGN

A common inventory design for the whole organisation was evolved in consultation with the Central Statistical Organisation (Govt. of India) for undertaking inventory work in various parts of the country. The design envisaged the collection of data in two randomly selected plots each of 0.1 ha area in each grid of 2 1/2'x 2 1/2' (latitudes and longitudes) on the toposheet of 1:50,000 or 1:63,360 scale. A grid bounded by 2 1/2'x2 1/2' latitudes and longitudes covers about 20 $km^2$ area in which 0.2 ha area (2 plots of 0.1 each) is actually sampled. Thus the sampling intensity of the survey comes to 0.01%. The method of marking the plot centre on the map within grid is as follows :-

Two sides (X - axis and Y - axis) of a grid were measured in millimeters. The length of the side of the square plot (which comes nearly .6324 mm on 1:50,000 map sheet), was substracted from the above measurements and the balance so obtained were read in three digits after removing the decimal mark. Two random nos (one for x and other for y axis in three digits) were taken from table of random numbers. If the random

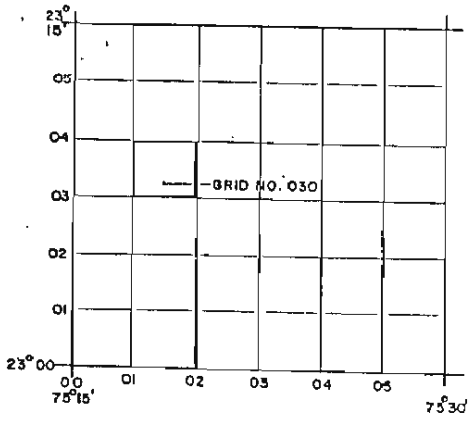
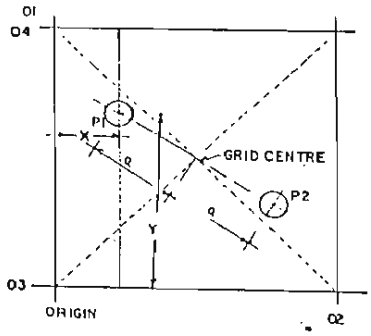



DIAGRAM-1
DIAGRAM SHOWING IDENTIFICATION OF GRIDS ON 1:50,000 OR 1:63,360 SCALE TOPOSHEETS

DIAGRAM-2
DIAGRAM SHOWING LAY-OUT OF PLOT IN 2½X2½' GRID

'X' & 'Y' ARE THE DISTANCES ALONG 'X' & 'Y' AXES WITH SW CORNER AS THE ORIGIN



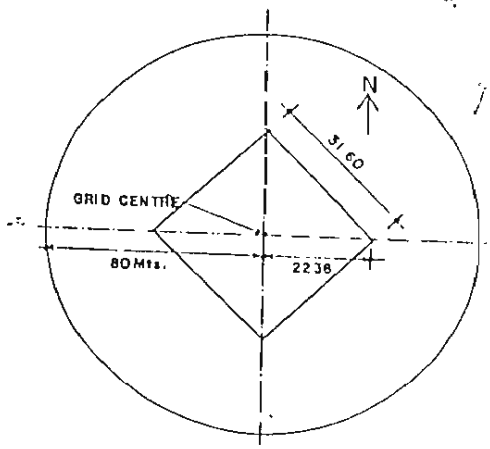




DIAGRAM-3
DIAGRAM SHOWING LAY-OUT OF PLOT

Contents

numbers taken were less than the corresponding number obtained for length of the grid (x, y axis) the same were retained. Further half of the length of the side of plot (0.3 mm) were added in the last digit of the random number and a decimal mark placed before this digit. The figures were further rounded off to nearest millimetre and these becomes coordinate of first plot by taking S-W corner of grid as origin. In case any random number was greater, then the corresponding numbers obtained for x and y axes were substracted from such random numbers and the balance were taken for obtaining coordinates of the plot 1 in the manner explained above. Number one plots of all the grids were marked on the map taking South West corner of respective grid as origin. The distance along x axis was measured towards East and along Y axis it was measured towards north. Thus the centre of plot 1 was marked on the map at the crossing of these two coordinates.

For marking the centre of second plot of each grid, the plot centre of 1st plot and centre of 2 1/2'x2 1/2' grid were joined and the line extended in opposite direction to the same distance beyond grid centre. The point so obtained is the plot centre of the second plot. The location of second plot is thus linked with the first plot. The layout of 2 1/2'x 2 1/2' grid and the plots are shown in diagrams 1, 2, and 3 on the preceding page. All such plots were marked on the toposheets and examined whether they fall in green wash/RF/PF areas. Only those plots were taken for field survey who were falling in forest areas i.e. the area covered by green wash or by double dotted forest boundaries RF/PF etc. on 1:50,000 scale or 1:63,360 scale mapsheets.

### 3.3 LOCATION OF PLOT ON THE GROUND

As stated earlier, the survey was confined to the forest areas only as decided on the basis of forest boundaries and green wash shown on the toposheets. The plot has to be visited when it falls in some forest area.All the forested plots of the survey area falling in Mayurbhanj and Baleshwar districts of Orissa State and duly marked on toposheets, were allotted to various crews. The crews had drawn up their programme of halts at some convenient places in order to tackle maximum plots from those camps. The

plots marked on the toposheet had to be exactly located on the ground with the help of some conspicuous features which could be identified on the map as well as on the ground. Usually the following features were selected for this purpose:

1. Bench Mark.
2. Triangulation point.
3. Village or road trijunction.
4. Old bridges and culverts.
5. Old temples, mosques and churches.
6. Crossing of rail tracks with roads, streams, rivers etc.
7. Junctions of rivers or streams and junction of roads.
8. Prominent bends in roads, rivers or streams.
9. Old ponds and wells.
10. Springs.
11. Prominent topographical features in hilly region such as spurs, knolls etc.
12. Mile stones or kilometer stones on the road side.
13 Pillars of international,inter state or inter-district boundaries and those forest areas etc. 14. Prominent bends of boundary etc.

After locating one of the above reference points on the ground as well as on the map, the bearing and distance from reference point to the plot centre were marked. This distance has to be traversed on the bearing calculated for the plot using Silva Compass and distance measured with a nylon rope/tape/chain etc. While using compass the magnetic declination as indicated on the concerned toposheet was also taken into account. This was essential as the location of the plot centre of the sample plot was shown on the toposheet which was according to the position of the true North and South. Thus, for example when a toposheet of 1975 was used in 1992, having magnetic variation of say $1^{o}30'$ west from the true north (noted on top right hand corner of toposheet) and decreasing by 1' every year, first 17' were deducted from $1^{o}$ 30'. Hence in 1992 magnetic variation for that toposheet would be $1^{o}$ 13' west from true North. If on the map, bearing of the plot centre from reference point was , say, $73^{o}$, then while using the magnetic compass to go to the plot centre, from the reference point, $1^{o}13'$ were added to $73^{o}$ and since the compass doesn't show 13', bearing on the compass was set to $74^{o}$. If the variation were to the east then one degree would be substracted. Similarly, for distance measurement the slope

correction was applied to cover the actual horizontal distance of the plot measured from the map.

On reaching the plot centre, a square plot was laid out by taking distance of 22.36 m. in all the four directions (north, south, east and west) from the plot centre. Thus an exact plot of 0.1 ha. area (having each side of 31.62 m. and diagonal of 44.72 m.) was laid out horizontally after making corrections for the slopes measured with the help of Blumleiss hypsometer along 4 semidiagonals (north, south, east, west) from the plot centre.

### 3.4 FORMAT FOR DATA COLLECTION

After laying out the plots in the field, various data were collected in the following field forms in codified manner (except in Plot Approach Form wherein information was collected in descriptive manner) as described in the field manual issued to the crews for the purpose of data collection. This facilitated the transfer of data on punch cards, consistency checking of data and finally in procesing the data on electronic computer at a later stage. Various field forms used in this survey were:-

1. Plot Approach form.
2. Plot Description form,
3. Plot Enumeration form.
4. Sample Tree form.
5. Bamboo Enumeration-Cum-Clump Analysis form.
6. Bamboo Weight form.

1. Plot Approach form.

This form is a record of approach to the plot centre from the field camp of a crew. It was filled in by the Crew Leader as he proceeded from his camp to some conspicuous feature called reference point near the plot. The distance and bearing from this well defined reference point to the plot centre were also recorded on it. The exact location of plot centre i.e. bearing and distance from two trees to the plot centre was also mentioned along with the time of departure from camp, time taken in various studies and time of arrival in the camp. This form helps the check crew or any other person to relocate the plot easily when required. The

data on this form are recorded in descriptive manner with a neatly drawn sketch showing the location of reference point and the plot centre.

2. Plot Description form.

This form is used for recording qualitative description in and around 2 ha of plot centre. The information regarding administrative units, legal status,land use, topography, soil, vegetation, bamboo regeneration, biotic influence, accessibility and plantation potential etc. were recorded. The data were recorded in codified manner. The stratification of area and classification of growing stock was done on the basis of these descriptions only.

3. Plot Enumeration form.

In this form, all the trees with dia 10 cm. and above and all the bamboo clumps occurring in all 0.1 ha sample plots were recorded by species. This was meant for computing total growing stock existing in the survey area.

This form helps in assessing the growing stock in terms of stems and volume of different species in different diameter and forest types classes.

4. Sample Tree form.

Detailed information regarding the species, diameter, height of tree, clear bole, bark thickness, dominance, longitudinal, sectional and defects etc. of all the trees occurring in north west quadrant of all the plots, were recorded in this form. Details are used in generating local volume equations of various species found in the forest area of the district.

5. Bamboo Enumeration-Cum-Clump Analysis form.

In this form, the data of individual culms occurring in the selected clumps bearing S.No. 1,9,17,25,33 ..... etc. (i.e. the first and every eighth clump) appearing in Plot enumeration form were recorded. Thus, the information about age, soundness, size and condition etc. of the culms of

the above clumps was obtained and analysed in various columns of this form.

This information gives the position of total bamboo stock by clump sizes occurring under various age groups, diameter classes and conditions.

6. Bamboo Weight form.

This form has been designed for collecting data to determine the green weight of bamboos of different species and sizes and further for establishing relationship between green weight and dry weight of bamboo culms. The data were recorded in respect of two selected culms from each dia.class i.e. 2 to 5 cm, 5 to 8 cm and 8 cm and above and the green weight of these culms upto 1 cm and was recorded in the form. The air dry weight of the culms was taken to be 60% of the green weight. This form helps in computing the total green bamboo stock and the corresponding dry bamboo stock as existing in the forest of the District.

The sample of above field forms has been given in appendix V .

### 3.5 FIELD WORK

The field work in Mayurbhanj and Baleshwar Districts of Orissa was completed during the period from March 1992 to May 1992. After completion of field work in Sambalpur District the parties were shifted to Mayurbhanj District to complete this work. In all six parties each consisting of a Jr. Technical Assistant, a Dy.Ranger and two Fieldmen were deployed in this survey area. There was a base camp established at Baripada to conduct and control the survey work. The work was supervised by Senior Technical Assistants and Deputy Director.

### 3.6 MAPS AND PLOTS

The details of the Survey of India toposheets used and number of plots tackled in each of them is given in apppendix I.

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# CHAPTER - IV

# DATA PROCESSING

## 4.0 CONSISTENCY CHECKING AND FORWARDING OF FIELD FORMS TO DATA PROCESSING UNIT

After completion of field work, the field forms pertaining to inventory of 257 plots (Mayurbhanj 218 + Baleshwar 39) were manually checked in the zonal office as per field manual and coding instructions meant for the purpose. Inconsistencies noticed in these forms were removed after discussing the specific point with the concerned Crew Leaders. The checked field forms were sent to the Data Processing Unit (MDMU) of Forest Survey of India, Dehradun for computer analysis and getting information in desired format.

## 4.1 DATA PROCESSING

The data processing involved the following operations:-

i) Manual processing

Field forms received in the Machine Data Management Unit of Forest Survey of India, Dehradun were checked with the list supplied by the zonal office. Entries of the field forms were made in the register, regarding the number of field forms relating to each map-sheet, grid and plot. The total number of records required to be entered under each card design was also estimated and indicated in the register for future references.

Job numbers, Card design and left hand zeros, wherever missing, were filled up in the field forms to avoid mistakes during entering the data on to the floppy or disk.

Each entry in the field forms was checked for consistency in the data. The maximum and minimum values of the codes were checked. The data was loaded on to the floppy/disk and verified. Then the listings were taken and checked manually. Sample statistics were calculated and checked with the computer output results. The programmes were developed according to the requirement of the data processing. Final computer output results were checked for consistency and relevance of results. Area tables were also prepared.

ii) Processing on electronic computer.

The data were loaded on floppy/disk through direct data entry operation and verified. The listings of loaded data were taken to check the data. Volume of each tree was estimated with the help of the local volume equations.

Contribution of the volume of each enumerated tree per hectare was derived and stored in a tree/plot volume file created for future processing. Using the tree/plot volume file, growing stock tables by species and diameter class under each crop composition were prepared and standard error of the estimated growing stock was calculated.

The data of this survey were processed on - VAX 11/780 at Dehradun.

## 4.2 AREA

Area figures were supplied by the zonal office. The geographical area and forest area were given as under.

(a) Geographical area - 16806 $km^2$

(b) Forest area - 2765 $km^2$

In Mayurbhanj and Baleshwar Districts weightage of each plot was calculated by dividing the total forest area by the total number of sample plots and the area under different parameters were estimated by multiplying the number of sample plots occuring in that class by the area weight of each sample plot. The total forested area was calculated on the above basis and classified by land use class and given in Table no. 5.1T.

The area falling in land use classes such as dense tree forests, moderately dense forests, open tree forests, Bamboo forests, young plantations and young crop regeneration was considered as tree vegetated area and was classified mainly into two crop compositions viz; (1) Sal and (2) Miscellaneous forests. The area under each crop composition was classified by topography, by slope class, by soil depth class, by top height, by size class, by canopy layer,. Similarly break up of forest area is done by grazing incidence, by regeneration, by soil erosion, by fire incidence, by plantation potential etc.

## 4.3 VOLUME ESTIMATION

Felled tree data for developing general volume equations were not collected during the inventory, because of ban on felling of trees. Local volume equations already derived and used in case of Koraput District Forest Inventory Survey by Central Zone, Nagpur were used to estimate the growing stock. The Local Volume Equations used for different species are as under:

1. Adina cordifolia
   $V = 0.08507 + 0.19669\ D + 7.16812\ D^2$

2. Anogeissus latifolia
   $V = 0.13928 \pm 2.87067\ D + 20.22404\ D^2 - 13.80572\ D^3$

3. Bombax ceiba
   $V = 0.02834 + 4.68381\ D^2$

4. Boswellia serrata
   $V = 0.36432 - 1.32768\ \sqrt{D} + 9.48471\ D^2$

5. Bridelia retusa
$\sqrt{V} = 0.11620 + 4.12711\ D - 1.08508\ \sqrt{D}$

6. Dalbergia latifolia
$V = -0.00965 + 0.58546\ D - 2.56050\ D^2 + 24.342125\ D^3$

7. Diospyros melanoxylon
$\sqrt{V} = 0.06728 + 4.06351\ D - 0.99816\ \sqrt{D}$

8. Garuga pinnata
$V = -0.09144 + 1.48588\ D - 5.53172\ D^2 + 24.04851\ D^3$

9. Lagerstroemia parviflora
$V = 0.07199 - 1.25923\ D + 9.28416\ D^2$

10. Lannea coromandelica
$V = -0.01071 - 0.66528\ D + 9.54478\ D^2 - 4.58876\ D^3$

11. Madhuca latifolia
$V = 0.10423 - 1.38429\ D + 8.39379\ D^2$

12. Mitragyna parviflora
$V = 0.08444 - 1.26801\ D + 8.75274\ D^2$

13. Pterocarpus marsupium
$\sqrt{V} = -0.16276 + 2.82002\ D + 0.04034\ \sqrt{D}$

14. Shorea robusta
$\sqrt{V} = 0.19994 + 4.57179\ D - 1.56823\ \sqrt{D}$

15. Syzigium cumini
$\sqrt{V} = 0.30706 + 5.12731\ D - 2.09870\ \sqrt{D}$

16. Terminlia bellerica
$V = -0.14823 + 2.44138\ D - 6.86434\ D^2 + 18.05444\ D^3$

17. Terminalia crenulata
$V = 0.05061 - 1.11994\ D + 8.77839\ D^2$

18. Miscellaneous species group
$\sqrt{V} = 0.06063 + 3.43666\ D - 0.75571\ \sqrt{D}$

Where D = Diameter in cm
V = Volume in cubic metre

## 4.4 ENUMERATED TREE VOLUME

The volume of each enumerated tree of a species was estimated by substituting its breast height overbark diameter in a local volume equation of that species.

## 4.5 PLOT VOLUME

The estimated volume of each enumerated tree in a plot when added up over the whole plot provided the plot volume. It was converted to per hectare volume and also stored in the tree/plot volume file. The per hectare plot volumes were used to estimate volume under different classes of desired parameters. The plot volumes were also used to estimate the sampling error of the growing stock for each crop composition.

## 4.6 STAND TABLES

The elements of tree/plot volume file were utilised to classify the trees by species, diameter and crop composition etc. Estimates of the number of stems per hectare and total stems by species and diameter classes were obtained for all the crop compositions.

## 4.7 STOCK TABLES

Estimates of volume per hectare and total volume by species and diameter classes were obtained for each crop composition from the tree/plot volume file.

## 4.8 SAMPLING ERROR

The sample was considered as a systematic cluster sample having two sample plots in each cluster. In order to estimate the sampling error the sample was considered to be of unequal sizes and ratio method of estimate was used since many grids only one plot was enumerated.

Let n = total no. of clusters (grids) in the sample

$Y_i$ = sum of per hectare volumes in i th grid

$x_i$ = number of plots in the i th grid

$$\bar{X} = \frac{1}{n}\sum_{i=1}^{n} x_i = \text{Average number of plots per grid}$$

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

Estimate of variance of R is

$$\hat{V}(\hat{R}) = \frac{N-n}{N\,n\,\bar{x}^{-2}} \sum_{i=1}^{n} \frac{(Y_i - \hat{R}\,x_i)^2}{n-1}$$

(Ignoring $\frac{N-n}{N}$ the finite population correction factor)

$$\hat{V}(\hat{R}) = \frac{1}{n(n-1)\bar{X}^{-2}} \left[\sum_{i=1}^{n} Y_i^2 - 2\hat{R} * \sum_{i=1}^{n} Y_i X_i + R^2 \sum_{i=1}^{n} X_i^2\right]$$

Estimate of the Standard Error (SE) of R is

$$SE = \sqrt{\hat{V}(\hat{R})}$$

$$SE\% = \frac{SE}{\hat{R}} \times 100$$

Standard errors have been estimated for the growing stock in each forest type and over the entire area irrespective of the strata.

## 4.9 BAMBOO

The presence of Bamboo was examined in an area of about 2 ha around the plot centre and its quality and density recorded in the plot description form. The area under bamboo was estimated from this information by applying the area weight of each plot. Area under each quality of bamboo was also estimated from the number of plots falling in each quality.

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## CHAPTER - V

## INVENTORY RESULTS : AREA

### 5.0 GENERAL

The forest resources information of Mayurbhanj and Balasore Districts has been compiled on the basis of the data collected from 257 Sample plots (218 plots on Mayurbhanj+39 plots in Balasore) which were located all over the forest areas of these two Districts excluding the National Park/ Wildlife Sanctuaries/Project Tiger reserve etc. Since Balasore District has small forest area of 258 $km^2$ which is part of Baripada Forest Division of Mayurbhanj District, it has been merged with Mayurbhanj District, for all purposes of this survey. This is because compilation of separate report for a small forest area of Balasore would not have given satisfactory results within desired precision limits and would not have served any purpose. So the forests of both the districts (Mayurbhanj 2507 $km^2$+ Balasore 258 $km^2$ = 2765 $km^2$) were clubed together, survey conducted and results projected accordingly.

The total forest area of 2765 $km^2$ is divided by the total number of sample plots (257) falling in the entire forest land to arrive at the weighted area represented by each sample plot, which works out to be 10.76 $km^2$. Break up of the forest area under various parameters like land use classes, crop compositions, topography classes, slope classes, soil depth classes, height classes, size classes canopy layers, grazing incidence, regeneration, soil erosion, fire incidence and plantation potential etc. was worked out after giving due weightage to sample plots located in various desired parameters as observed during the course of field work. These are discussed in details in the following paragraphs.

### 5.1 FOREST AREA BY LAND USE CLASSES

Table 5.1T gives a picture of how the entire forest land of Mayurbhanj and Balasore Districts excluding National Park/ Wildlife reserve is presently being used. The table indicates that dense forest (having density above 70%) has a meagre area of 1.17% whereas moderately dense forest (30-70%) occupies 35.41% of the forest area. The open forest (5% to 30%) and plantation has a land coverage of 22.57% and 21.79%

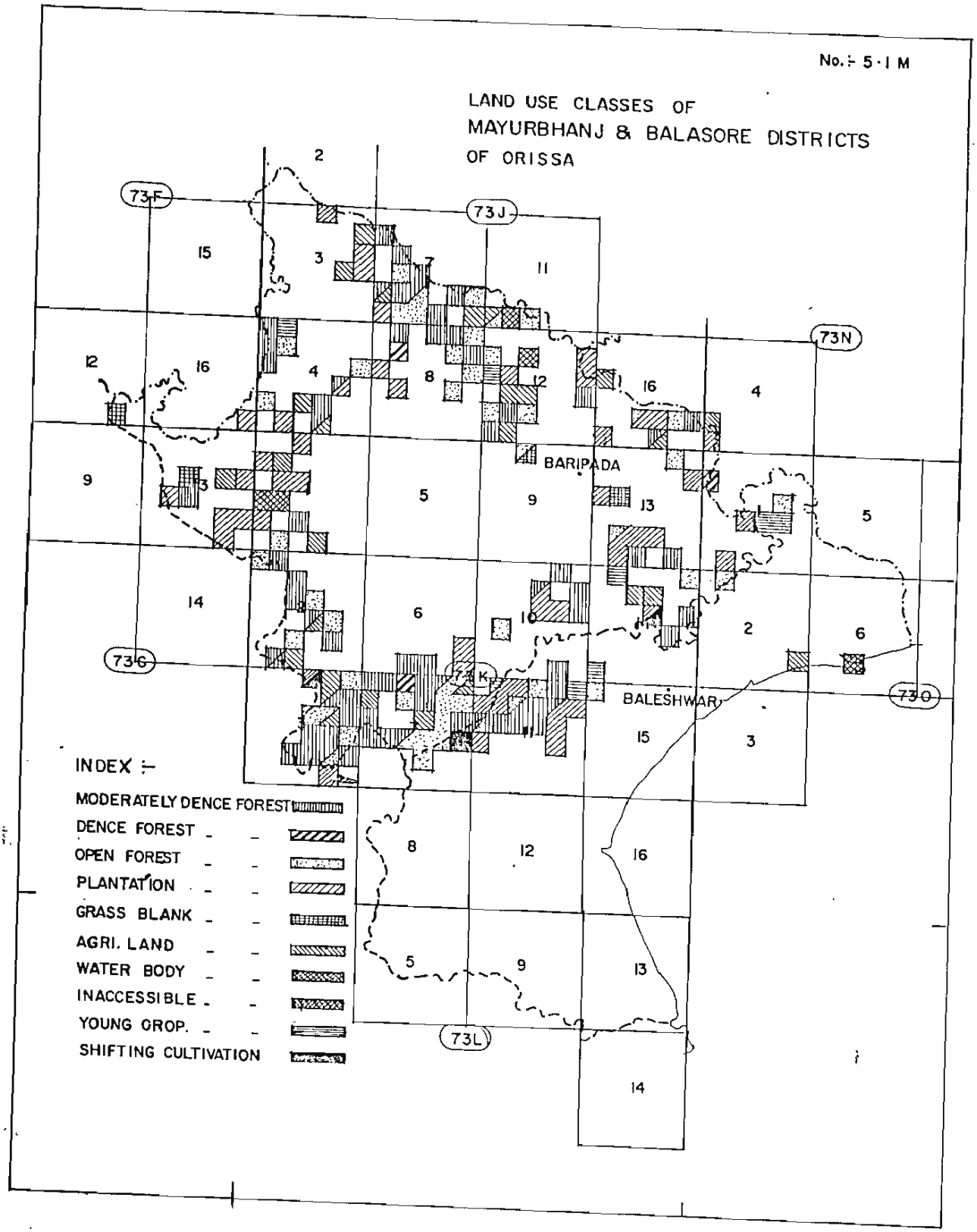
respectively. Bamboo forest is completely absent in Mayurbhanj and Balasore District. The survey reveals that 236.69 $km^2$ (8.56%) area of forest land is under non forestry use. There are permanent cultivations with scattered trees or without trees which are the result of diversion of forest land for cultivation or the encroachments on forest land for cultivation practices. In total 2377.69 $km^2$ of area out of a total forest land of 2765 $km^2$ is covered with vegetation. The remaining area contains cultivation/ habitation, Barren land., Grass land and water bodies etc. and 32.28 $km^2$ (1.17%) area which was inaccessible for survey work.

Table 5.1T

**Forest Area by Land Use Classes**

| Land use | No. of sample plots | Area ($Km^2$) | Area Percentage to the total forest area. |
|---|---|---|---|
| Dense Tree Forest | 3 | 32.28 | 1.17 |
| Moderately Dense Tree Forest | 91 | 979.05 | 35.41 |
| Open Tree Forest | 58 | 624.00 | 22.57 |
| Plantation | 56 | 602.49 | 21.79 |
| Grass land | 1 | 10.76 | 0.39 |
| Barren lands | 4 | 43.04 | 1.55 |
| Cultivation | 22 | 236.69 | 8.56 |
| Water bodies | 1 | 10.76 | 0.39 |
| Habitation | 5 | 53.79 | 1.94 |
| Young crop | 13 | 139.86 | 5.06 |
| Inaccessible plots | 3 | 32.28 | 1.17 |
| Total | 257 | 2765.00 | 100 |

Map no. 5.1M showing land use class has been prepared on the basis of above table which indicates location of various land use classes. It shows that the southern part and northern part of the district has compact forest having moderate density 30-70%. The dense forest does occur in some small pocket in between the moderately dense and open forests. Plantations have been taken in almost all directions in small patches.


No.:- 5·1 M
LAND USE CLASSES OF
MAYURBHANJ & BALASORE DISTRICTS
OF ORISSA
73F
73J
73N
73G
73K
73O
73L
BARIPADA
BALESHWAR
INDEX :-
MODERATELY DENCE FOREST
DENCE FOREST
OPEN FOREST
PLANTATION
GRASS BLANK
AGRI. LAND
WATER BODY
INACCESSIBLE
YOUNG CROP.
SHIFTING CULTIVATION

Contents

## 5.2 AREA BY CROP COMPOSITION

For the purpose of working out the distribution of vegetated area under different parameters viz; crop composition, topography classes, slope classes, soil depth classes, top height classes, size classes, grazing incidence, canopy layers, regeneration status, Soil erosion, Fire incidence and plantation potentiality, only the sample plots bearing land use such as dense forest, moderately dense forest, open forest, young plantation and young crop of natural or artificial regeneration have been taken into consideration which collectively form 221 sample plots representing 2377.69 $km^2$ of forest area in Mayurbhanj and Balasore districts. The remaining 36 sample plots representing 387.31 $km^2$ of the forest land of these districts have been kept out of description upto para 5.13 of this report.

The stratification of entire vegetated area of Mayurbhanj and Balasore districts has been done into crop composition (forest types) on the basis of existing vegetation in 2 ha area around centre of the sample plots. Accordingly two main strata viz; Sal and Miscellaneous have been identified in these districts. The distribution of vegetated area in these two strata is indicated below in table no. 5.2T. The table indicates that Sal forests share about 52.49% of the vegetated area spread over 1248.02 $km^2$ whereas Miscellaneous stratum covers 1129.67 $km^2$ (47.51%) of the vegetated area.

**Table 5.2T**
**Distribution of forest area in different crop compositions**

| S.No. | Strata | No. of sample plots | Area in $km^2$ | Percentage area |
|---|---|---|---|---|
| 1 | Sal | 116 | 1248.02 | 52.49 |
| 2 | Misc | 105 | 1129.67 | 47.51 |
| | Total | 221 | 2377.69 | 100 |

A location map no. 5.2M has been prepared to show the location of two main forest types viz; Sal anbd Miscellaneous. Sal forest is distributed almost in the entire area of Mayurbhanj District where the Miscellaneous crop, though scattered everywhere, has also formed a conspicuous pocket in the southern part of the District.

## 5.3 AREA BY CROP COMPOSITION AND TOPOGRAPHY

Table no. 5.3T produced below gives distribution of vegetated area by crop composition and topography classes. The table suggests that 42.99% of the vegetated area has flat topography and 11.31% vegetation exists on undulating lands. About 45.70% vegetation exists in hilly terrain. The Sal forest was found more in plains and undulating land than hilly terrain whereas Miscellaneous forest was found more on hilly terrain than on plains giving reverse trend.

**Table 5.3T**

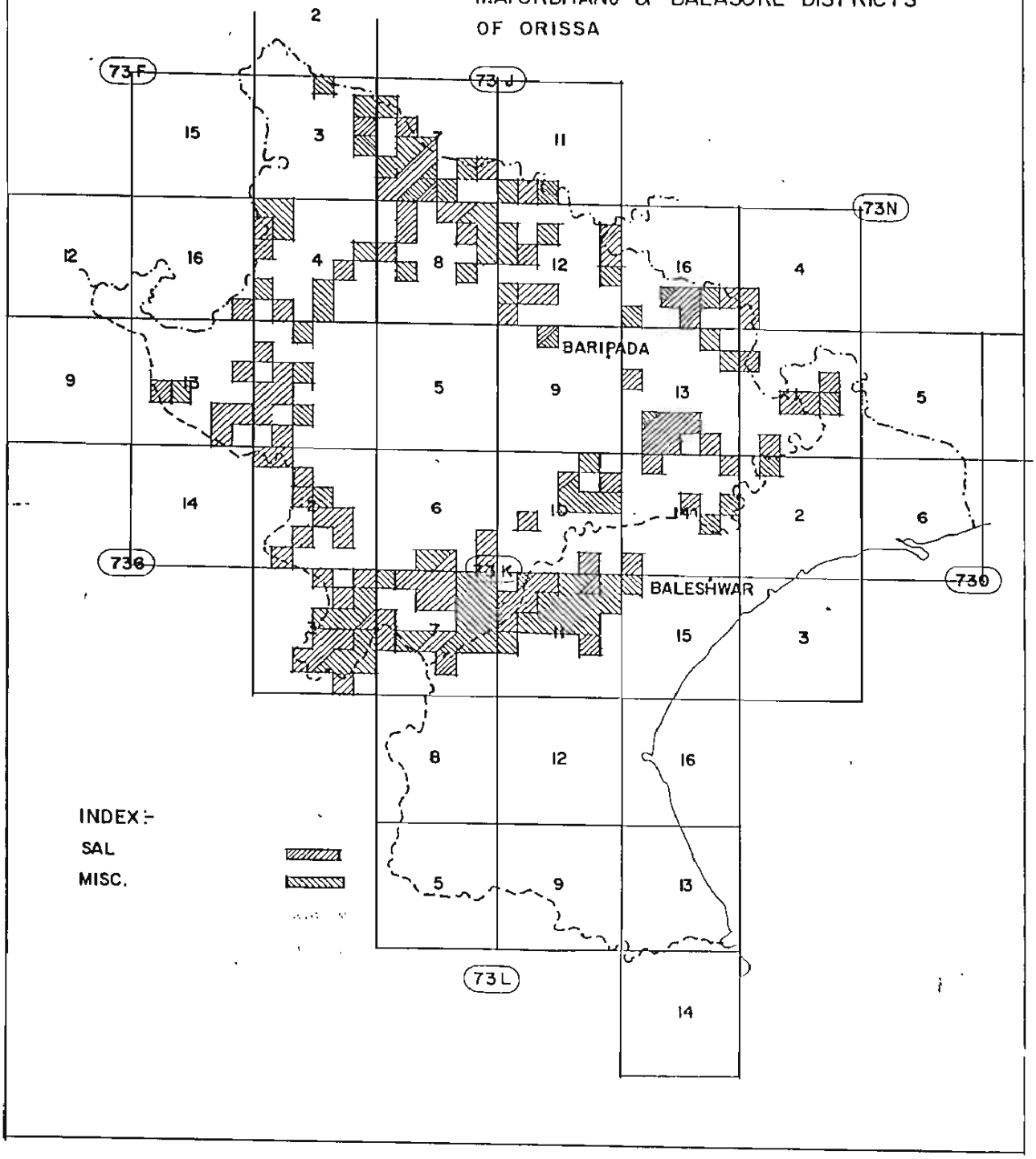
**Break up of forest area by Topography**

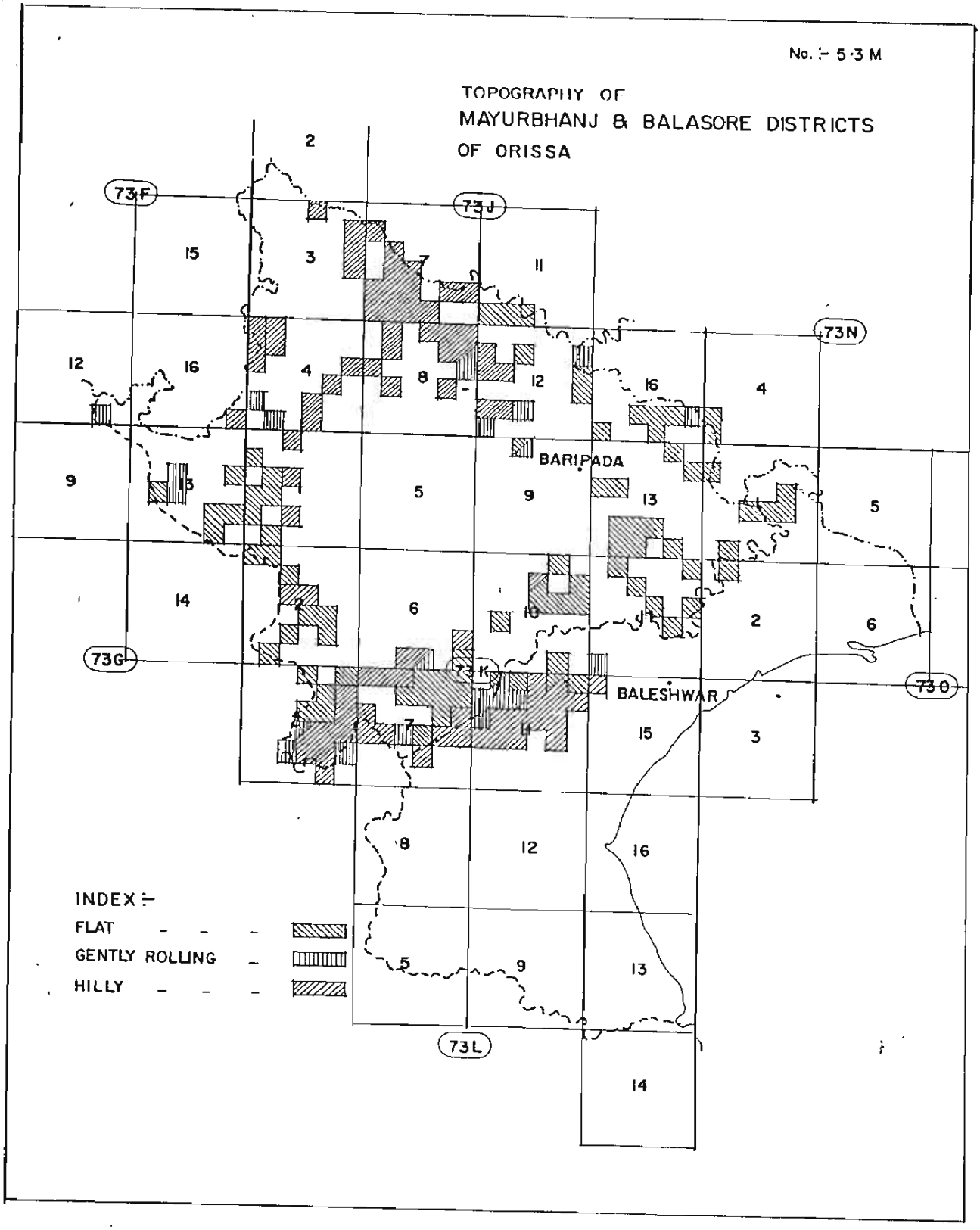
| Forest Types | Topography | | | | | |
|---|---|---|---|---|---|---|
| | Flat | Gently rolling | Hilly | Very hilly | Total | Percentage |
| Sal | 656.28 | 204.42 | 387.32 | - | 1248.02 | 52.49 |
| Misc | 365.80 | 64.55 | 699.32 | - | 1129.67 | 47.51 |
| Total | 1022.08 | 268.97 | 1086.64 | - | 2377.69 | 100 |
| % | 42.99 | 11.31 | 45.70 | | - | 100 |

Map no. 5.3M has been presented to show the position of general topography of the forest land. The map indicates that the topography of northern and extreme southern part (vegetated) of the District is hilly and the remaining areas are flat with small undulation.

No. :- 5·2 M

CROP COMPOSITION OF
MAYURBHANJ & BALASORE DISTRICTS
OF ORISSA




No. :- 5·3 M
TOPOGRAPHY OF
MAYURBHANJ & BALASORE DISTRICTS
OF ORISSA
73F
73J
73N
73G
73K
73O
73L
BARIPADA
BALESHWAR
INDEX :-
FLAT
GENTLY ROLLING
HILLY

Contents

## 5.4 AREA BY CROP COMPOSITION AND SLOPE CLASSES

The distribution of vegetated area by forest types and slope classes has been shown in table no. 5.4T produced below. The table indicates that 57.92% of the vegetation exists on gentle slopes below 10%. The moderate slope (10 to less than 60%) has 40.72% of the vegetation. The steeply sloping area has a meagre amount of 1.36% of vegetation. Sal forest is existing mainly in gentle slopes whereas the Miscellaneous forest was found more on sloping lands than on gentle slopes (plains).

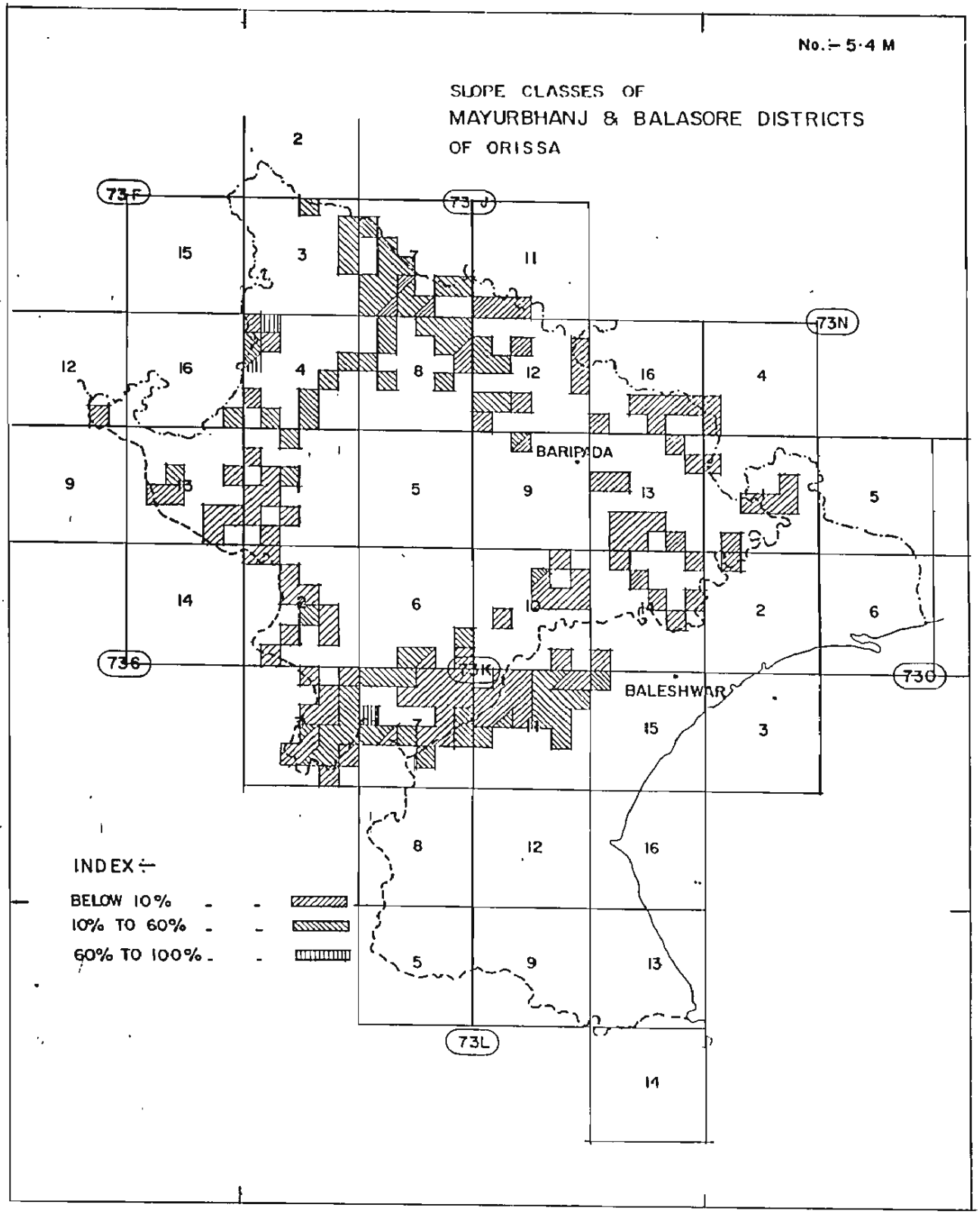
**Table no. 5.4T**
**Distribution of forest area into different Slope Classes**

| Forest Types | Slope below 10% | 10-<60% | 60-<100% | Above 100% | Total | % |
|---|---|---|---|---|---|---|
| Sal | 860.70 | 376.56 | 10.76 | - | 1248.02 | 52.49 |
| Misc | 516.42 | 591.73 | 21.52 | - | 1129.67 | 47.51 |
| Total | 1377.12 | 968.29 | 32.28 | - | 2377.69 | 100 |
| % | 57.92 | 40.72 | 1.36 | - | | 100 |

Map no. 5.4M prepared for slope percentage shows that the hilly portion of vegetated area has slope between 10 to 60% whereas the forest land under plains has slops between 0 to 10%.

## 5.5 AREA BY CROP COMPOSITIONS AND SOIL DEPTH CLASSES

The distribution of vegetated area by crop composition and soil depth classes has been shown in Table 5.5T. As per the distribution table the soil having medium depth has supported about 52.04% of vegetation. About 39.36% of the vegetation was supported by deep soil. The shallow soil supports a meagre amount of 8.60% of total vegetation. The table indicates that Sal requires deep soil whereas Miscellaneous crop grows on soils having shallow and medium soil depth also.


No.:- 5·4 M
SLOPE CLASSES OF
MAYURBHANJ & BALASORE DISTRICTS
OF ORISSA
73F
73J
73N
73O
73K
73L
BARIPADA
BALESHWAR
INDEX :-
BELOW 10%
10% TO 60%
60% TO 100%

Contents

**Table 5.5T**

**Distribution of forest area by Soil Depth Classes in Mayurbhanj and Balasore districts**

| Forest Type | No soil | Very shallow | Shallow | Medium | Deep | Total | % |
|---|---|---|---|---|---|---|---|
| Sal | - | - | 43.04 | 527.18 | 677.80 | 1248.02 | 52.49 |
| Misc | - | - | 161.38 | 710.08 | 258.21 | 1129.67 | 47.51 |
| Total | - | - | 204.42 | 1237.26 | 936.01 | 2377.69 | 100 |
| Percentage | - | - | 8.60 | 52.04 | 39.36 | | 100 |

## 5.6 AREA BY CROP COMPOSITIONS AND TOP HEIGHT CLASSES

Table no. 5.6T produced below gives details about the distribution of vegetated area by crop composition and top height classes. The table indicates that 24.43% of the vegetation is of 1 to 5 mt top height, 17.65% of vegetation has 6-10 mt and 4.98% of vegetation has top height betwen 21-25 mt top height. Both crop compositions i.e. Sal and Misc show heterogenity as all size classes are available in these forests.

**Table 5.6T**

**Break up of forest crop by Top Height Classes in Mayurbhanj and Balasore districts**

| Forest Types | 1-5M | 6-10M | 11-15M | 16-20M | 21-25M | 26-30M | Total | % |
|---|---|---|---|---|---|---|---|---|
| Sal | 344.28 | 258.21 | 344.28 | 204.42 | 96.83 | - | 1248.02 | 52.49 |
| MISC | 236.69 | 161.38 | 365.80 | 344.28 | 21.52 | - | 1229.67 | 47.51 |
| Total | 580.97 | 419.59 | 710.08 | 548.70 | 118.35 | - | 2377.69 | 100 |
| % | 24.43 | 17.65 | 29.86 | 23.08 | 4.98 | - | | 100 |

Map no. 5.6M prepared for top height shows that the vegetation in Northern and Southern parts has better growth top height 10-15 and 16-20. In plain areas of West and North West there is poor growth of trees as reflected by the map.

## 5.7 AREA BY CROP COMPOSITION AND SIZE CLASSES

Table No. 5.7T produced below gives distribution of vegetated area by crop composition and size classes. Most of the crop is young and of smaller size (59.73%). The table indicates that 31.22% of the crop is at regeneration stage and 28.51% is of pole sizes, mixed size crop being about 31.67%.

Small and big timber contribute 3.17 and 5.43% respectively. Both the forest types exhibit almost similar trend with regard to crop sizes.

**Table 5.7T**

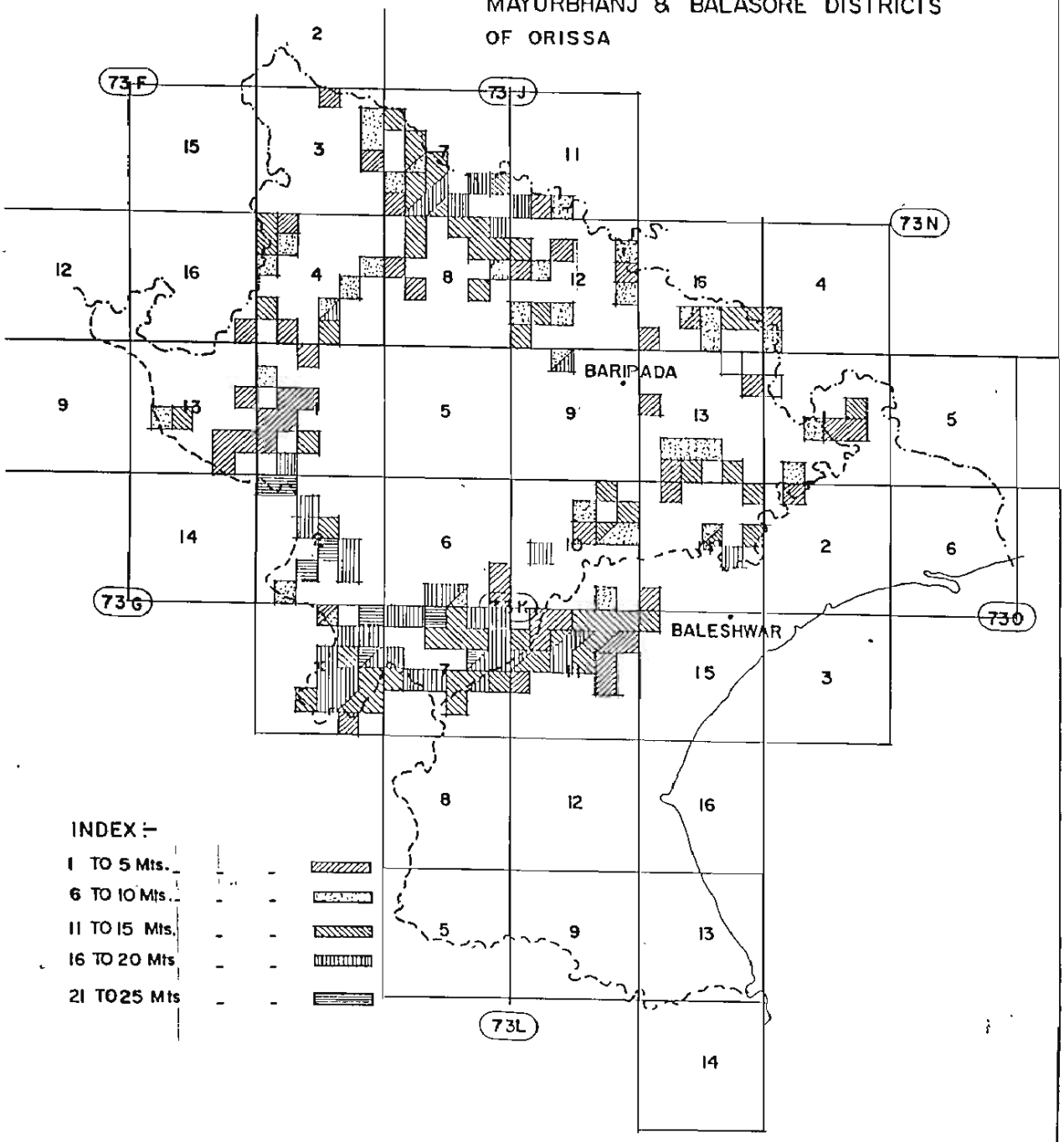
**Break up of forest crop by Size Classes in Mayurbhanj and Balasore districts**

| Crop composi- | Regene-ration | Pole crop | Small timber | Big timber | Mixed size class | Total | Percentage of area |
|---|---|---|---|---|---|---|---|
| Sal | 505.66 | 333.52 | 43.04 | 53.80 | 312.00 | 1248.00 | 52.49 |
| Misc | 236.69 | 344.28 | 32.28 | 75.31 | 441.11 | 1229.67 | 47.51 |
| Total | 742.35 | 677.80 | 75.32 | 129.11 | 753.11 | 2377.69 | 100 |
| % | 31.22 | 28.51 | 3.17 | 5.43 | 31.67 | | 100 |

Map no. 5.7M indicates the location of the vegetation by its size classes. It shows that the vegetation of northern and southern parts has mixed size classes without having dominance of any particular size. The pole crop is prevailing almost everywhere and similar is the case of regeneration crop except in some pockets of southern part.

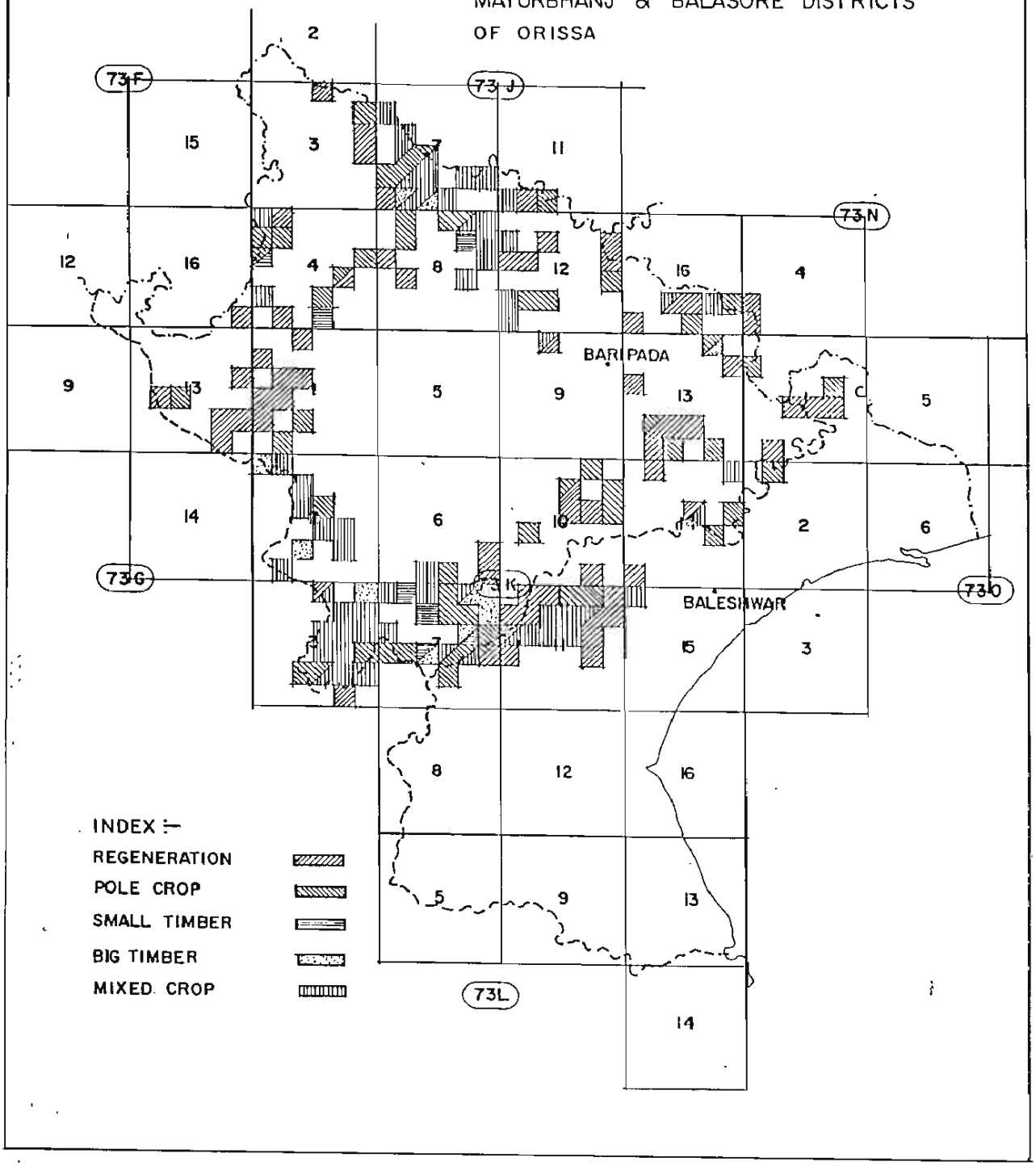
No. :- 5·6 M

TOP HEIGHT OF
MAYURBHANJ & BALASORE DISTRICTS
OF ORISSA



No.:- 5·7 M

SIZE CLASSES OF
MAYURBHANJ & BALASORE DISTRICTS
OF ORISSA




Contents

## 5.8 AREA BY CROP COMPOSITION AND CANOPY LAYERS

The break-up of vegetated area has been shown by crop composition and canopy layers in table 5.8T produced below. The table reveals that 28.96% of the vegetated area has very young vegetation where canopy formation has not yet taken place. An equal amount of area (28.96%) has a vegetation with a single canopy. Only 42.08% area has vegetation with two distinct canopies.

**Table 5.8T**

**Distribution of forest area by Canopy Layer Classes in Mayurbhanj and Balasore districts**

| Crop composition | No storey | Single storyed | Two storeyed | Three or above storeyed | Total | Percentage area |
|---|---|---|---|---|---|---|
| Sal | 473.38 | 344.28 | 430.36 | - | 1248.02 | 52.44 |
| Misc | 215.18 | 344.28 | 570.21 | - | 1129.67 | 47.51 |
| Total | 688.56 | 688.56 | 1000.57 | - | 2377.69 | 100 |
| % | 28.96 | 28.96 | 42.08 | - | - | 100 |

## 5.9 AREA BY GRAZING INCIDENCE

Grazing in the forest by domestic cattle is a major problem which affects adversely the growth and regeneation of the forests particularly in the area adjoining to habitations. The survey indicates that 38.13% of the forest area is subjected to heavy grazing, 15.95% to moderate grazing and 17.12% to light grazing. In all 71.20% area is affected by grazing in one or the other way. About 16.74% of forest area is free from grazing. The intense grazing pressure on forest cover has resulted in poor intensity of regeneration in the forest of the district. The break up of grazing incidence is given in table 5.9T produced below:

Table No. 5.9T

**Grazing incidence in forests of Mayurbhanj and Balasore districts**

| Grazing incidence | no. of sample | Area($km^2$) | Percentage area |
|---|---|---|---|
| 1. Heavy grazing | 98 | 1054.36 | 38.13 |
| 2. Moderate grazing | 41 | 441.11 | 15.95 |
| 3. Light gazing | 44 | 473.38 | 17.12 |
| 4. No grazing | 43 | 462.63 | 16.24 |
| 5. Not recorded | 31 | 333.52 | 12.06 |
| Total | 257 | 2765.00 | 100 |

## 5.10 REGENERATION

The regeneration status was assessed during the survey of forest resources of the districts. The exercise involved the counting of number of seedlings (established regeneration) in 16 square metre net area around all the sample plots. On the basis of number of seedlings the assessment of regeneration was made as follows in the table no. 5.10T produced overleaf. The table indicates that adequate and inadequate regeneration is existing in 44.75 and 41.63% of the forest area. The profuse regeneration is confined to only 1.56% of the forest area. There are 12.06% areas where regeneration was not recorded. The land is almost degraded and being used for non forestry purposes.

Table no. 5.10T

**Intensity of regeneration in forest areas of Mayurbhanj and Balasore districts**

| Regeneration status | No. of plots | Area in $km^2$ | Percentage area |
|---|---|---|---|
| Profuse | 4 | 43.04 | 1.56 |
| Adequate | 115 | 1237.25 | 44.75 |
| Inadequate | 107 | 1151.19 | 41.63 |
| Not recorded | 31 | 333.52 | 12.06 |
| Total | 257 | 2765.00 | 100 |

## 5.11 AREA BY SOIL EROSION

The extent of soil erosion has been assessed during the course of survey on the basis of sample plots. The data has been given in the table no. 5.11T produced below. The table indicates that about 59.14% of the forest area is subjected to heavy soil erosion and 10.12% area has at moderate soil erosion and 18.29% have no erosion. However, in 12.06% of the forest area, the soil erosion data was not recorded.

Table no. 5.11T

**State of Soil erosion in forest area of Mayurbhanj and Balasore districts**

| Soil erosion | No. of sample plots | Area ($km^2$) | Percentyage of area |
|---|---|---|---|
| Mild erosion | 1 | 10.76 | 0.39 |
| Moderate erosion | 26 | 279.73 | 10.12 |
| Heavy erosion | 152 | 1635.33 | 59.14 |
| No erosion | 46 | 505.66 | 18.29 |
| Not recorded | 31 | 303.52 | 12.06 |
| Total | 257 | 2765.00 | 100 |

## 5.12 AREA BY FIRE INCIDENCE

The break up of forest area by fire incidence has been shown in table 5.12T produced below. The table suggests that the incidence of heavy and frequent fire has taken place in 7.39% and 7.79% of vegetated area respectively. Occas ional fire has been noticed in 36.96% of forest area. However 35-80% area was not at all affected by forest fire of any intensity. In 12.06% area the data regarding forest fire incidence was not recorded as they are the non vegetated areas. The overall position indicates that fire incidence is a common problem in Mayurbhanj and Balasore Districts. The area is subjected to mostly occas ional fire only.

**Table No. 5.12T**

**Fire incidence in forest area of Mayurbhanj and Balasore district**

| Fire incidence | No. of sample plots | Area ($km^2$) | Percentage area |
|---|---|---|---|
| Very heavy | 19 | 204.42 | 7.39 |
| Frequent | 20 | 215.18 | 7.79 |
| Occas ional | 95 | 1022.08 | 36.96 |
| No fire | 92 | 989.80 | 35.80 |
| Not recorded | 31 | 333.52 | 12.06 |
| Total | 257 | 2765.00 | 100 |

## 5.13 ESTIMATION OF PLANTABLE AREA

For the purpose of assessing suitability of plantable area the forest which has crown density between 0.3 only has been taken into account. The forest which has crown density 0.3 and above, the estimation of plantability has not been done as there is no necessity to undertake such area for plantation because of its being already properly stocked. For the purpose of assessing suitability for plantation, due regard has been given to soil depth, slope, altitude etc. Apart from the

neglected area the forest land which is devoid of vegetation or completely degraded has also been examined for this purpose. However, the area presently under non-forestry use such as cultivation etc. whether encroached or allotted for cultivation, has not been examined for plantation suitability.

**Table 5.13T**

**Plantation Potential in forest area of Mayurbhanj and Balasore districts**

| Plantation potential | no. of sample plots | Area ($km^2$) | Percentage area |
|---|---|---|---|
| Plantable area | 69 | 742.36 | 26.85 |
| Unplantable area | 6 | 64.55 | 2.33 |
| Not applicable | 151 | 1624.57 | 58.76 |
| Not recorded | 31 | 333.52 | 12.06 |
| Total | 257 | 2765.00 | 100 |

## 5.14 OCCURRENCE OF BAMBOO

In the forest of Balasore and Mayurbhanj districts the bamboo is almost absent. So data regarding area under bamboo forest etc. is not given in this report. There are some small scattered patches wherein the traces of bamboo was noticed but their presence was insignificant to compute and describe.

## 5.15 CRITICAL ASPECTS

(i) The dense forest is diminishing and being converted to moderately dense and further to open forest due to excessive felling from dense forest and heavey biotic pressure.

(ii) The small sized trees are predominantly existing in the forests of Mayurbhanj and Balasore. The crop needs protection so that it could grow well and multiply.



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(iii) About one fourth area of forest lands requires plantation/afforestation to cover the entire forest land with vegetation.

(iv) Considerable area of forests are subjected to heavy grazing due to which the regeneration is badly affected. Effective steps should be taken to control and regulate the cattle in the forests.

(v) The condition of regeneration is not very satisfactory due to other biotic interference also. Proper steps should be taken to minimise such interference.

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## CHAPTER VI

## INVENTORY RESULTS- GROWING STOCK OF TREES

### 6.0 GROWING STOCK AND STAND

The growing stock in terms of total standing volume and growing stands were assessed of the vegetated forest area by method as described in Chapter IV (item 4.6 to 4.8). Separate assessment was done for each stratum also. It has been found that the forests of Mayurbhanj and Baleshwar district can be classified into two stratum: Sal and Miscellaneous. In Sal stratum, the percentage of Sal tree in the forest is more than 20%. Miscellaneous stratum contains trees of all species inter mixed with each other with no particular species prediminantly occuring in the that block of forest area. The distribution of growing stock in both the strata can be summarised in the following table.

**Table 6.0 T**

**Growing stock and growing stand in forest area of Mayurbhanj and Balasore districts**

| Stratum | No. of plots | Area in $km^2$ | Percentage area covered | Total stems | Stem per ha | Total standing volume $m^3$ | Vol. per ha $m^3$ | Percentage of growing stock |
|---|---|---|---|---|---|---|---|---|
| Sal | 116 | 1248.02 | 52.49 | 22722570 | 182.06 | 4016215 | 32.18 | 45.47 |
| Misc | 105 | 1129.67 | 47.51 | 20234383 | 179.11 | 4816086 | 42.63 | 54.53 |
| Total | 221 | 2377.69 | 100.0 | 42956953 | 180.66 | 8832301 | 37.14 | 100.0 |

Thus, 52.49% of the forest area is covered with Sal forest whereas Misc. forest occupies 47.51% of area. Sal stratum contribute 52.9% of growing stand where contribution to standing volume is 45.47% . On the other hand contribution of Miscellaneous forest to these are 47.1% and 54.53% respectively indicating larger representation of higher diameter class in this stratum.

## 6.1 STEMS PER HA AND TOTAL STEMS - STRATUM SAL

The distribution of per ha stand and total stand by species and dia classes for Sal stratum, has been shown in table no. 6.1T(a) and 6.1T(b). The following table 6.1 T indicate that in this stratum, Sal contributes 55.78% of the growing stand followed by Terminalia crenulata (7.81%), Anogeissus latifolia (3.41%), Syzygium cumini (2.04%) and madhuca latifolia (1.89%)

**Table 6.1T**

**Total stems and stem/ha in Sal stratum of Mayurbhanj and Balasore districts**

| | Species | Total stems | Stem/ha | Percentage |
|---|---|---|---|---|
| 1. | Shorea robusta | 12673.858 stems | 101.55 | (55.78%) |
| 2. | Terminalia crenulata | 1775.201 stems | 14.22 | (7.81%) |
| 3. | Anogeissus latifolia | 774.633 stems | 6.20 | (3.41%) |
| 4. | Syzigium cumini | 462.628 stems | 3.70 | (2.04%) |
| 5. | Madhuca latifolia | 430.352 stems | 3.45 | (1.89%) |
| 6. | Lannea coromandelica | 312.005 stems | 2.5 | (1.37%) |
| 7. | Others | Remaining stems and percentage | | |
| | Total stems | 22722.570 stems | 100 | |

79% of trees comprising growing stand fall in diameter class 10-20.

## 6.2 STEMS PER HA AND TOTAL STEMS - STRATUM MISCELLANEOUS

The distribution of stems per ha and total stems estimated in Miscellaneous stratum having 1129.67 $km^2$ of forest area is given in table 6.2T(a) and 6.2T(b). The table indicates that in all 179.118 stems per ha was found in Mis cellaneous strtum giving a total stand of 20234383 stems in the stratum. There is no marked dominance of any particular species.

**Table 6.2 T**

**Total stems and stem/ha in Misc. stratum of Mayurbhanj and Balasore districts**

| Species | Total stems | Stem/ha | Percentage |
|---|---|---|---|
| 1. Anogeissu latifolia | 1362249 stems | 12.06 | 6.73% |
| 2. Terminalia crenulata | 1295798 stems | 11.47 | 6.40% |
| 3. Shorea robusta | 1173971 stems | 10.39 | 5.80% |
| 4. Lannea coromandelica | 697737 stems | 6.17 | 3.45% |
| 5. Garuga pinnata | 653437 stems | 5.78 | 3.23% |
| 6. Bridelia retusa | 487309 stems | 4.31 | 2.41% |
| 7. Other in small proportion -Remaining stems and percentages | | | |
| Total stems .. | 20234383 | | 100 |

The species whose contribution to growing stand is more than 2% are Anogeissus latifolia (6.73%), Terminalia crenulata (6.4%), Shorea robusta (5.8%), Lannea coromandelica(3.45%), Garuga pinnata (3.23%), Bridelia retusa (2.41%), and Adina cordifolia (2.3%). Table 6.2 T indicate the distribution of these species. 76% of trees contributing growing stand are having diameter below 20 cm.

## 6.3 STEMS PER HA AND TOTAL STAND - ALL STRATA COMBINED

The consolidated position of stems per ha and total stand in whole of the vegetated area (2765 $km^2$) of Mayurbhanj and Balsore Districts have been worked out and shown in table No. 6.3T. The table indicates that in all 42956952 stems were estimated to exist at the rate of 180.667 stems per ha in whole of the vegetated area where survey was conducted. The stand position of Sal stratum is slightly better than that of Miscellaneous stratum but the difference is not much. The stand of vegetation is in decreasing order from lower diameter size to higher diameter sizes. There is hardly any trees beyond 60 cm diam class in these forests.

## 6.4 PER HA VOLUME AND TOTAL VOLUME - STRATUM SAL

The per ha volume has been worked out on the basis of the volume computed for all sample plots added together and average volume worked out. Similarly total volume for Sal and Miscellaneous strata has been computed by multiplying the per ha volume by the area under these two strata separately. Accordingly the per ha volume and total volume has been given in table 6.4T(a) and 6.4T(b) respectively which are enclosed with this report. The table indicates that in all 32.181 $m^3$/ha volume was found in Sal stratum out of which 15.164 $m^3$ per ha was shared by Sal alone in Sal stratum. The other leading species are Terminalia crenulata (2.400$m^3$/ha), Madhuca latifolia (2.229 $m^3$/ha) and Anogeissus latiflia (1.682 $m^3$/ha) etc. Though Madhuca latifolia has no significant number of stand yet it has contributed more towards volume because of its higher sizes which has yielded more volume. In all, 4016215 $m^3$ volume of growing stock has been estimated in Sal stratum which has 1248.02 $km^2$ area. The contribution of volume by leading species in Sal stratum is indicated below:

**Table 6.4 T**

**Growing stock in Sal stratum**

| Species | Total volume $m^3$ | Vol/ha | Percentage |
|---|---|---|---|
| Shorea robusta | 1992400 | 15.96 | 49.61 |
| Terminalia crenulata | 299531 | 2.40 | 7.46 |
| Madhuca latifolia | 278245 | 2.23 | 6.93 |
| Anogeissus latifolia | 209939 | 1.68 | 5.23 |
| Syzigium cumini | 122951 | 0.98 | 3.06 |
| Others in small quantities - Remaining volume and percentages | | | |
| Total volume .. | 4016215 | | 100 |

## 6.5 PER HA VOLUME AND TOTAL VOLUME - STRATUM MISCELLANEOUS

The per ha volume and total volume worked out in Miscellaneous stratum of 4816086 $m^3$ of volume of growing stock was estimated to exist at the rate of 42.633 $m^3$/ha so the stocking in Misc stratum is better than that of Sal stratum though the number of stems are slightly more in Sal than in Miscellaneous stratum. The leading species which have contributed in growing stock in Miscellaneous stratum are mentioned below:

**Table 6.5 T**

**Growing stock in Misc. stratum**

| Species | Volume $M^3$ | Vol/ha | Percentage |
|---|---|---|---|
| Anogeissus latifolia | 466554 | 4.13 | 9.69 |
| Madhuca latifolia | 338606 | 2.99 | 7.03 |
| Shorea robusta | 328232 | 2.90 | 6.82 |
| Terminalia crenulata | 308374 | 2.73 | 6.40 |
| Lanea coromandelica | 221272 | 1.96 | 4.59 |
| Others in small quantities | Remaining volume and percentages | | |
| Total volume .. | 4816086 | | 100 |

## 6.6 PER HA VOLUME AND TOTAL VOLUME - ALL STRATA COMBINED

The per ha volume and total growing stock (volume) position in whole of the Mayurbhanj and Balasore Districts (where survey was conducted) have been shown in table no. 6.6T annexed with the report. The table indicates that in all 8832302 $m^3$ of volume has been estimated in the survey area on average of 37.147 $km^2$/ha.

## 6.7 MEAN VOLUME PER HA BY TOPOGRAPHY

Mean volume ($m^3$) per ha by topography classes under both crop compositions (Sal and Misc) has been given in table no. 6.7T below. The table indicates that hilly areas have better stocking than that of plains and undulating class. Further, in case of Miscellaneous forest, the areas having gently rolling topography has better stocking (Mean volume) than plains but in case of Sal forest the plain areas has more stocking than undulating lands.

**Table 6.7T**

**Mean volume ($M^3$) per ha by Topography**

| Crop Composition | Topography | | |
|---|---|---|---|
| | Flat | Gently rolling | Hilly |
| Sal | 28.296 | 26.959 | 41.941 |
| Misc | 26.521 | 36.246 | 52.086 |

## 6.8 MEAN VOLUME PER HA BY SLOPE CLASSES

Mean volume per ha by slope classes has been indicated in Table no. 6.8T below. The table indicates that the Mean volume in case of Sal forest is in increasing order from lower slopes to higher slopes (upto 100%). However beyond 100% slopes there is no vegetation. In case of Miscellaneous forest Mean volume is more in 10-<60% slope class than that of land having slope less than 10%. No vegetation of Miscellaneous crop exists beyond 60% slopes.



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**Table no. 6.8T**

**Mean volume ($M^3$)/ha by slope classes**

| Crop composition | Slopes | | |
|---|---|---|---|
| | 0.<10% | 10<60% | 60.<100% |
| Sal | 28.152 | 39.443 | 100.328 |
| Misc | 37.692 | 47.911 | 0.0 |

## 6.9 MEAN VOLUME PER HA BY SOIL DEPTH CLASSES

The mean volume per ha by Soil depth is indicated in table no. 6.9T below. The table shows that in case of Sal forest the land with shallow depth has better stocking of 33.435 $m^3$ per ha than the deep soil which has slightly less volume i.e. 32.979 $m^3$. However, the Mean volume in the land having shallow, medium and deep soil depth is almost equal with slight difference. In case of Miscellaneous forest the medium soil depth has greater mean volume of 47.529 $m^3$/ha whereas shallow and deep soil have almost same mean volume.

**Table no. 6.9T**

**Mean volume ($m^3$)/ha by soil depth classes**

| Crop composition | Soil depth | | |
|---|---|---|---|
| | Shallow | Medium | Deep |
| Sal | 33.435 | 31.051 | 32.979 |
| Misc | 34.966 | 47.529 | 34.048 |

## 6.10 MEAN VOLUME PER HA BY TOP HEIGHT CLASSES

The mean volume ($M^3$) per ha by top height classes has been indicated in table 6.10T below. The table shows that the mean volume is in increasing order from lower top height class to higher top height class in both crop compositions. It is revealed from the table that in case of Sal the height class of 21-25 m gives 96.120 $m^3$ volume per ha where as Miscellaneous forest of the same height class gives 116.881 $m^3$ volume per ha. This is due to the fact that even small size trees (by diam) grow higher than the Miscellaneous forest of same diam class but the volume contents of Miscellaneous forest of the same diam class yield more volume as it has more branches also which add to volume. The height of Miscellaneous forests is comparatively lesser than Sal forest but diam and volume is more in the same height class.

**Table no. 6.10T**

**Mean volume ($m^3$) by top height classes**

| Crop composition | Height classes | | | | |
|---|---|---|---|---|---|
| | 1-5M | 6-10M | 11-15M | 16-20M | 21-25M |
| Sal | 7.921 | 9.237 | 33.970 | 68.719 | 96.120 |
| Misc | 4.974 | 17.261 | 40.138 | 77.478 | 116.881 |

## 6.11 MEAN VOLUME PER HA BY SIZE CLASSES

The mean volume ($m^3$) per ha by size classes is given in table no. 6.11T below. The table indicates that the mixed size crop has yieled more volume 74.463 $M^3$ in case of Sal forest and 76.818 $m^3$ in case of Miscellaneous forests. In case of both the strata the small timber crop has yielded more volume than the big timber class. The reason is the number of trees being more in small timber and less in big timber class which has resulted in lesser Mean volume in big timber class. So it is not the size class alone that is responsible for contribution of volume but it is the number of stems also which is basically responsible for contribution of more volume for a particular size class.

**Table no. 6.11T**

**Mean volume/ha ($M^3$) by size classes**

| Crop | Regeneration | Pole crop | Small timber | Big timber | Mixed |
|---|---|---|---|---|---|
| Sal | 7.226 | 25.988 | 58.375 | 38.957 | 74.463 |
| Misc | 5.197 | 29.316 | 64.864 | 24.349 | 76.818 |

## 6.12 GROWING STOCK WITH ESTIMATE OF SE% BY FOREST TYPE

The table no. 6.12T below deals with the standard error calculated for both the forest types in respect of forest area, volume per ha and total volume of the growing stock for survey area of Mayurbhanj and Balasore Districts. The table reveals that the standard error for computation of area is 7.1 for Sal forest and 7.7 for Miscellaneous forest. The standard error for total volume is 14.7 for Sal and 13.2 for Miscellaneous forest. The SE for total volume is slightly higher than the limit of + 10% accepted for the survey. This is because of the less number of plots. However, for the estimation of total area and total growing stock the standard error is reduced to 5.2% and 8.3% which is very much within the precision limit fixed for the survey.

**Table no. 6.12T**

**Growing stock with estimation of SE% by forest type**

| Forest type | Area $km^2$ | SE% | Vol/ha $m^3$ | SE% | Total volume($m^3$) | SE% |
|---|---|---|---|---|---|---|
| Sal | 1248.02 | 7.1 | 32.181 | 12.9 | 4016.2 | 14.7 |
| Misc | 1129.67 | 7.7 | 42.633 | 10.7 | 4816.1 | 13.2 |
| Total | 2377.69 | 5.2 | 37.146 | 6.5 | 8832.3 | 8.3 |

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# GROWING STOCK TABLES

Contents

**Table No. 6.1T (a)**

**STEMS PER HA IN SAL STRATUM OF MAYURBHANJ AND BALASORE DISTRICTS AREA - 1248.02 km$^2$**

| SPECIES DESCRIPTION | DIAMETER CLASSES IN CM | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80+ | Total | % |
| Adina cordifolia | 0.603 | 0.086 | 0.172 | 0.000 | 0.000 | 0.086 | 0.086 | 0.000 | 0.000 | 0.000 | 0.000 | 1.034 | 0.57 |
| Anogeissus latifolia | 2.672 | 1.638 | 0.862 | 0.690 | 0.172 | 0.000 | 0.172 | 0.000 | 0.000 | 0.000 | 0.000 | 6.207 | 3.41 |
| Bombax ceiba | 0.172 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.172 | 0.09 |
| Bridelia retusa | 0.431 | 0.451 | 0.172 | 0.345 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.379 | 0.76 |
| Dalbergia latifolia | 0.172 | 0.086 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.259 | 0.14 |
| Diospyros melanoxylon | 1.121 | 0.000 | 0.172 | 0.086 | 0.172 | 0.172 | 0.086 | 0.000 | 0.000 | 0.000 | 0.000 | 1.810 | 0.99 |
| Garuga pinnata | 1.293 | 0.345 | 0.086 | 0.000 | 0.000 | 0.000 | 0.086 | 0.000 | 0.000 | 0.000 | 0.000 | 1.810 | 0.99 |
| Lagerstroemia parviflora | 0.517 | 0.345 | 0.086 | 0.086 | 0.086 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.121 | 0.62 |
| Lannea coromandelica | 1.552 | 0.345 | 0.345 | 0.172 | 0.086 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 2.500 | 1.37 |
| Madhuca latifolia | 0.948 | 0.086 | 0.690 | 0.603 | 0.086 | 0.172 | 0.517 | 0.172 | 0.000 | 0.086 | 0.086 | 3.448 | 1.89 |
| Mitragyna parviflora | 0.000 | 0.086 | 0.000 | 0.000 | 0.086 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.172 | 0.09 |
| Pterocarpus marsupium | 0.259 | 0.086 | 0.086 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.431 | 0.24 |
| Shorea robusta | 70.517 | 12.328 | 6.379 | 4.397 | 3.534 | 2.155 | 1.983 | 0.172 | 0.000 | 0.000 | 0.086 | 101.552 | 55.78 |
| Syzygium cumini | 1.810 | 0.948 | 0.603 | 0.000 | 0.000 | 0.000 | 0.172 | 0.172 | 0.000 | 0.000 | 0.000 | 3.707 | 2.04 |
| Terminalia belerica | 1.207 | 0.172 | 0.086 | 0.000 | 0.086 | 0.000 | 0.000 | 0.000 | 0.000 | 0.086 | 0.000 | 1.638 | 0.90 |
| Terminalia crenulata | 9.224 | 1.983 | 1.034 | 0.690 | 0.517 | 0.431 | 0.172 | 0.172 | 0.000 | 0.000 | 0.000 | 14.224 | 7.81 |
| Rest of species | 26.207 | 6.552 | 3.966 | 1.724 | 0.948 | 0.431 | 0.431 | 0.172 | 0.086 | 0.000 | 0.086 | 40.603 | 22.30 |
| All species total | 118.707 | 25.517 | 14.741 | 8.793 | 5.776 | 3.448 | 3.707 | 0.862 | 0.086 | 0.172 | 0.259 | 182.069 | 100.00 |

Table No. 6.1T (b)

TOTAL STEMS (IN '000) IN SAL FORESTS OF MAYURBHANJ AND BALASORE DISTRICTS

AREA - 1248.02 $KM^2$

| SPECIES DESCRIPTION | DIAMETER CLASSES IN CM | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80+ | Total |
| Adina cordifolia | 75.312 | 10.759 | 21.518 | 0.000 | 0.000 | 10.759 | 10.759 | 0.000 | 0.000 | 0.000 | 0.000 | 129.106 |
| Anogeissus latifolia | 333.523 | 204.417 | 107.588 | 86.070 | 21.518 | 0.000 | 21.518 | 0.000 | 0.000 | 0.000 | 0.000 | 774.633 |
| Bombax ceiba | 21.518 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 21.518 |
| Bridelia retusa | 53.794 | 53.794 | 21.518 | 43.035 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 172.141 |
| Dalbergia latifolia | 21.518 | 10.759 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 32.276 |
| Diospyros melanoxylon | 139.864 | 0.000 | 21.518 | 10.759 | 21.518 | 21.518 | 10.759 | 0.000 | 0.000 | 0.000 | 0.000 | 225.935 |
| Garuga pinnata | 161.382 | 43.035 | 10.759 | 0.000 | 0.000 | 0.000 | 10.759 | 0.000 | 0.000 | 0.000 | 0.000 | 225.935 |
| Lagerstroemia parviflora | 64.553 | 43.035 | 10.759 | 10.759 | 10.759 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 139.864 |
| Lannea coromandelica | 193.658 | 43.035 | 43.035 | 21.518 | 10.759 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 312.005 |
| Madhuca latifolia | 118.347 | 10.759 | 86.070 | 75.312 | 10.759 | 21.518 | 64.553 | 21.518 | 0.000 | 10.759 | 10.759 | 430.352 |
| Mitragyna parviflora | 0.000 | 10.759 | 0.000 | 0.000 | 10.759 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 21.518 |
| Pterocarpus marsupium | 32.276 | 10.759 | 10.759 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 53.794 |
| Shorea robusta | 8800.693 | 1538.507 | 796.151 | 548.698 | 441.111 | 268.970 | 247.452 | 21.518 | 0.000 | 0.000 | 10.759 | 12673.858 |
| Syzygium cumini | 225.935 | 118.347 | 75.312 | 0.000 | 0.000 | 0.000 | 21.518 | 21.518 | 0.000 | 0.000 | 0.000 | 462.628 |
| Terminalia belerica | 150.623 | 21.518 | 10.759 | 0.000 | 10.759 | 0.000 | 0.000 | 0.000 | 0.000 | 10.759 | 0.000 | 204.417 |
| Terminalia crenulata | 1151.191 | 247.452 | 129.106 | 86.070 | 64.553 | 53.794 | 21.518 | 21.518 | 0.000 | 0.000 | 0.000 | 1775.201 |
| Rest of species | 3270.673 | 817.668 | 494.904 | 215.176 | 118.347 | 53.794 | 53.794 | 21.518 | 10.759 | 0.000 | 10.759 | 5067.391 |
| All species total | 14814.858 | 3184.603 | 1839.754 | 1097.397 | 720.839 | 430.352 | 462.628 | 107.588 | 10.759 | 21.518 | 32.276 | 22722.570 |

Table No. 6.2T (a)

STEMS PER HA IN MISCELLANEOUS FORESTS OF MAYURBHANJ AND BALASORE DISTRICTS AREA - 1129.67 $KM^2$

| SPECIES DESCRIPTION | DIAMETER CLASSES IN CM | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80+ | Total | % |
| Adina cordifolia | 3.137 | 0.588 | 0.196 | 0.098 | 0.000 | 0.000 | 0.098 | 0.000 | 0.000 | 0.000 | 0.000 | 4.118 | 2.30 |
| Anogeissus latifolia | 5.980 | 2.255 | 1.373 | 0.980 | 0.490 | 0.294 | 0.588 | 0.098 | 0.000 | 0.000 | 0.000 | 12.059 | 6.73 |
| Bombax ceiba | 0.196 | 0.392 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.098 | 0.000 | 0.686 | 0.38 |
| Bridelia retusa | 2.353 | 0.784 | 0.588 | 0.196 | 0.098 | 0.000 | 0.294 | 0.000 | 0.000 | 0.000 | 0.000 | 4.314 | 2.41 |
| Dalbergia latifolia | 0.588 | 0.196 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.784 | 0.44 |
| Diospyros melanoxylon | 1.961 | 0.588 | 0.196 | 0.098 | 0.098 | 0.098 | 0.196 | 0.098 | 0.196 | 0.000 | 0.000 | 3.529 | 1.97 |
| Garuga pinnata | 3.039 | 1.275 | 0.686 | 0.490 | 0.098 | 0.000 | 0.196 | 0.000 | 0.000 | 0.000 | 0.000 | 5.784 | 3.23 |
| Lagerstroemia parviflora | 0.686 | 0.000 | 0.294 | 0.000 | 0.000 | 0.098 | 0.098 | 0.000 | 0.000 | 0.000 | 0.000 | 1.176 | 0.66 |
| Lannea coromandelica | 2.843 | 0.882 | 0.294 | 0.784 | 0.588 | 0.294 | 0.392 | 0.098 | 0.000 | 0.000 | 0.000 | 6.176 | 3.45 |
| Madhuca latifolia | 0.392 | 0.196 | 0.000 | 0.098 | 0.588 | 0.000 | 0.686 | 0.490 | 0.196 | 0.098 | 0.000 | 2.745 | 1.53 |
| Mitragyna parviflora | 0.490 | 0.294 | 0.000 | 0.196 | 0.000 | 0.098 | 0.000 | 0.000 | 0.098 | 0.000 | 0.000 | 1.176 | 0.66 |
| Pterocarpus marsupium | 0.980 | 0.196 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.176 | 0.66 |
| Shorea robusta | 4.804 | 1.961 | 1.373 | 0.392 | 1.078 | 0.294 | 0.294 | 0.196 | 0.000 | 0.000 | 0.000 | 10.392 | 5.80 |
| Syzygium cumini | 0.490 | 0.196 | 0.196 | 0.098 | 0.000 | 0.098 | 0.196 | 0.000 | 0.098 | 0.098 | 0.000 | 1.471 | 0.82 |
| Terminalia belerica | 0.392 | 0.294 | 0.098 | 0.294 | 0.000 | 0.000 | 0.000 | 0.196 | 0.000 | 0.000 | 0.098 | 1.373 | 0.77 |
| Terminalia crenulata | 6.373 | 1.863 | 0.882 | 0.686 | 0.294 | 0.882 | 0.392 | 0.098 | 0.000 | 0.000 | 0.000 | 11.471 | 6.40 |
| Rest of species | 70.098 | 19.902 | 10.000 | 4.118 | 2.353 | 1.275 | 1.569 | 0.490 | 0.392 | 0.098 | 0.392 | 110.686 | 61.79 |
| All species total | 104.804 | 31.863 | 16.176 | 8.529 | 5.686 | 3.431 | 5.000 | 1.765 | 0.980 | 0.392 | 0.490 | 179.118 | 100.00 |

Table No. 6.2 (b)

TOTAL STEMS (IN '000) IN MISCELLANEOUS FORESTS OF MAYURBHANJ AND BALASORE DISTRICTS AREA - 1129.67 $KM^2$

| SPECIES DESCRIPTION | DIAMETER CLASSES IN CM | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80+ | Total |
| Adina cordifolia | 354.406 | 66.451 | 22.150 | 11.075 | 0.000 | 0.000 | 11.075 | 0.000 | 0.000 | 0.000 | 0.000 | 465.158 |
| Anogeissus latifolia | 675.587 | 254.730 | 155.053 | 110.752 | 55.376 | 33.226 | 66.451 | 11.075 | 0.000 | 0.000 | 0.000 | 1362.249 |
| Bombax ceiba | 22.150 | 44.301 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 11.075 | 0.000 | 77.526 |
| Bridelia retusa | 265.805 | 88.602 | 66.451 | 22.150 | 11.075 | 0.000 | 33.226 | 0.000 | 0.000 | 0.000 | 0.000 | 487.309 |
| Dalbergia latifolia | 66.451 | 22.150 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 88.602 |
| Diospyros melanoxylon | 221.504 | 66.451 | 22.150 | 11.075 | 11.075 | 11.075 | 22.150 | 11.075 | 22.150 | 0.000 | 0.000 | 398.707 |
| Garuga pinnata | 343.331 | 143.978 | 77.526 | 55.376 | 11.075 | 0.000 | 22.150 | 0.000 | 0.000 | 0.000 | 0.000 | 653.437 |
| Lagerstroemia parviflora | 77.526 | 0.000 | 33.226 | 0.000 | 0.000 | 11.075 | 11.075 | 0.000 | 0.000 | 0.000 | 0.000 | 132.902 |
| Lannea coromandelica | 321.181 | 99.677 | 33.226 | 88.602 | 66.451 | 33.226 | 44.301 | 11.075 | 0.000 | 0.000 | 0.000 | 697.737 |
| Madhuca latifolia | 44.301 | 22.150 | 0.000 | 11.075 | 66.451 | 0.000 | 77.526 | 55.376 | 22.150 | 11.075 | 0.000 | 310.105 |
| Mitragyna parviflora | 55.376 | 33.226 | 0.000 | 22.150 | 0.000 | 11.075 | 0.000 | 0.000 | 11.075 | 0.000 | 0.000 | 132.902 |
| Pterocarpus marsupium | 110.752 | 22.150 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 132.902 |
| Shorea robusta | 542.685 | 221.504 | 155.053 | 44.301 | 121.827 | 33.226 | 33.226 | 22.150 | 0.000 | 0.000 | 0.000 | 1173.971 |
| Syzygium cumini | 55.376 | 22.150 | 22.150 | 11.075 | 0.000 | 11.075 | 22.150 | 0.000 | 11.075 | 11.075 | 0.000 | 166.128 |
| Terminalia belerica | 44.301 | 33.226 | 11.075 | 33.226 | 0.000 | 0.000 | 0.000 | 22.150 | 0.000 | 0.000 | 11.075 | 155.053 |
| Terminalia crenulata | 719.888 | 210.429 | 99.677 | 77.526 | 33.226 | 99.677 | 44.301 | 11.075 | 0.000 | 0.000 | 0.000 | 1295.798 |
| Rest of species | 7918.765 | 2248.265 | 1129.670 | 465.158 | 265.805 | 143.978 | 177.203 | 55.376 | 44.301 | 11.075 | 44.301 | 12503.896 |
| All species total | 11839.385 | 3599.439 | 1827.407 | 963.542 | 642.361 | 387.632 | 564.835 | 199.354 | 110.752 | 44.301 | 55.376 | 20234.383 |

Table NO. 6.3T

TOTAL STEMS IN FORESTS OF MAYURBHANJ AND BALASORE DISTRICTS — AREA - 2765 km$^2$

| SPECIES DESCRIPTION | | DIAMETER CLASSES IN CM | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80+ | Total |
| Adina cordifolia | TOTAL | 429717 | 77209 | 43667 | 11075 | 0.000 | 10758 | 21833 | 0.000 | 0.000 | 0.000 | 0.000 | 594263 |
| | PER HA | 1.807 | 0.325 | 0.184 | 0.047 | 0.000 | 0.045 | 0.092 | 0.000 | 0.000 | 0.000 | 0.000 | 2.499 |
| Anogeissus latifolia | TOTAL | 1009109 | 459146 | 262640 | 196822 | 76893 | 33225 | 87968 | 11075 | 0.000 | 0.000 | 0.000 | 2136882 |
| | PER HA | 4.244 | 1.931 | 1.105 | 0.828 | 0.323 | 0.140 | 0.370 | 0.047 | 0.000 | 0.000 | 0.000 | 8.987 |
| Bombax ceiba | TOTAL | 43667 | 44300 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 11075 | 0.000 | 0.000 | 99043 |
| | PER HA | 0.184 | 0.186 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.047 | 0.000 | 0.000 | 0.417 |
| Boswellia serrata | TOTAL | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | PER HA | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Bridelia retusa | TOTAL | 319598 | 142395 | 87968 | 65185 | 11075 | 0.000 | 33225 | 0.000 | 0.000 | 0.000 | 0.000 | 659449 |
| | PER HA | 1.344 | 0.599 | 0.370 | 0.274 | 0.047 | 0.000 | 0.140 | 0.000 | 0.000 | 0.000 | 0.000 | 2.773 |
| Dalbergia latifolia | TOTAL | 87968 | 32909 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 120877 |
| | PER HA | 0.370 | 0.138 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.508 |
| Diospyros melanoxylon | TOTAL | 361368 | 66451 | 43667 | 21833 | 32592 | 32592 | 32909 | 11075 | 22150 | 0.000 | 0.000 | 624641 |
| | PER HA | 1.520 | 0.279 | 0.184 | 0.092 | 0.137 | 0.137 | 0.138 | 0.047 | 0.093 | 0.000 | 0.000 | 2.627 |
| Garuga pinnata | TOTAL | 504712 | 187012 | 88285 | 55375 | 11075 | 0.000 | 32909 | 0.000 | 0.000 | 0.000 | 0.000 | 879371 |
| | PER HA | 2.123 | 0.787 | 0.371 | 0.233 | 0.047 | 0.000 | 0.138 | 0.000 | 0.000 | 0.000 | 0.000 | 3.698 |
| Lagerstroemia parviflora | TOTAL | 142079 | 43035 | 43984 | 10758 | 10758 | 11075 | 11075 | 0.000 | 0.000 | 0.000 | 0.000 | 272766 |
| | PER HA | 0.598 | 0.181 | 0.185 | 0.045 | 0.045 | 0.047 | 0.047 | 0.000 | 0.000 | 0.000 | 0.000 | 1.147 |
| Lannea coromandelica | TOTAL | 514839 | 142711 | 76260 | 110119 | 77209 | 33225 | 44300 | 11075 | 0.000 | 0.000 | 0.000 | 1009742 |
| | PER HA | 2.165 | 0.600 | 0.321 | 0.463 | 0.325 | 0.140 | 0.186 | 0.047 | 0.000 | 0.000 | 0.000 | 4.247 |
| Madhuca latifolia | TOTAL | 162647 | 32909 | 86070 | 86386 | 77209 | 21517 | 142079 | 76893 | 22150 | 21833 | 10758 | 740457 |
| | PER HA | 0.684 | 0.138 | 0.362 | 0.363 | 0.325 | 0.090 | 0.598 | 0.323 | 0.093 | 0.092 | 0.045 | 3.114 |
| Mitragyna parviflora | TOTAL | 55375 | 43984 | 0.000 | 22150 | 10758 | 11075 | 0.000 | 0.000 | 11075 | 0.000 | 0.000 | 154419 |
| | PER HA | 0.233 | 0.185 | 0.000 | 0.093 | 0.045 | 0.047 | 0.000 | 0.000 | 0.047 | 0.000 | 0.000 | 0.649 |

Table No. 6.3T (contd)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pterocarpus marsupium | | | | | | | | | | | | |
| | TOTAL | 143028 | 32909 | 10758 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 186696 |
| | PER HA | 0.602 | 0.138 | 0.045 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.785 |
| Shorea robusta | | | | | | | | | | | | |
| | TOTAL | 9343378 | 1760011 | 951203 | 592999 | 562937 | 302195 | 280677 | 43667 | 0.000 | 0.000 | 10758 | 13847829 |
| | PER HA | 39.296 | 7.402 | 4.001 | 2.494 | 2.368 | 1.271 | 1.180 | 0.184 | 0.000 | 0.000 | 0.045 | 58.241 |
| Syzygium cumini | | | | | | | | | | | | |
| | TOTAL | 281310 | 140497 | 97461 | 11075 | 0.000 | 11075 | 43667 | 21517 | 11075 | 11075 | 0.000 | 628756 |
| | PER HA | 1.183 | 0.591 | 0.410 | 0.047 | 0.000 | 0.047 | 0.184 | 0.090 | 0.047 | 0.047 | 0.000 | 2.644 |
| Tectona grandis | | | | | | | | | | | | |
| | TOTAL | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | PER HA | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Terminalia belerica | | | | | | | | | | | | |
| | TOTAL | 194923 | 54743 | 21833 | 33225 | 10758 | 0.000 | 0.000 | 22150 | 0.000 | 10758 | 11075 | 359469 |
| | PER HA | 0.820 | 0.230 | 0.092 | 0.140 | 0.045 | 0.000 | 0.000 | 0.093 | 0.000 | 0.045 | 0.047 | 1.512 |
| Terminalia crenulata | | | | | | | | | | | | |
| | TOTAL | 1871078 | 457880 | 228782 | 163596 | 97778 | 153470 | 65818 | 32592 | 0.000 | 0.000 | 0.000 | 3070998 |
| | PER HA | 7.869 | 1.926 | 0.962 | 0.688 | 0.411 | 0.645 | 0.277 | 0.137 | 0.000 | 0.000 | 0.000 | 12.916 |
| Rest of species | | | | | | | | | | | | |
| | TOTAL | 11189438 | 3065933 | 1624574 | 680334 | 384151 | 197771 | 230997 | 76893 | 55059 | 11075 | 55059 | 17571288 |
| | PER HA | 47.060 | 12.895 | 6.833 | 2.861 | 1.616 | 0.832 | 0.972 | 0.323 | 0.232 | 0.047 | 0.232 | 73.901 |
| All species total | | | | | | | | | | | | |
| | TOTAL | 26654244 | 6784042 | 3667161 | 2060939 | 1363200 | 817983 | 1027463 | 306941 | 121510 | 65818 | 87652 | 42956952 |
| | PER HA | 112.101 | 28.532 | 15.423 | 8.668 | 5.733 | 3.440 | 4.321 | 1.291 | 0.511 | 0.277 | 0.369 | 180.667 |

Table No. 6.4T(a)

STANDING VOLUME PER HA IN SAL FORESTS OF MAYURBHANJ AND BALASORE DISTRICTS

AREA - 1248.02 $km^2$

| SPECIES DESCRIPTION | DIAMETER CLASSES IN CM | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80+ | Total |
| Adina cordifolia | 0.029 | 0.011 | 0.053 | 0.000 | 0.000 | 0.084 | 0.109 | 0.000 | 0.000 | 0.000 | 0.000 | 0.286 |
| Anogeissus latifolia | 0.172 | 0.306 | 0.320 | 0.454 | 0.145 | 0.000 | 0.285 | 0.098 | 0.000 | 0.000 | 0.000 | 1.682 |
| Bombax ceiba | 0.017 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.017 |
| Bridelia retusa | 0.026 | 0.067 | 0.048 | 0.157 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.299 |
| Dalbergia latifolia | 0.013 | 0.017 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.030 |
| Diospyros melanoxylon | 0.054 | 0.000 | 0.047 | 0.036 | 0.130 | 0.172 | 0.103 | 0.000 | 0.000 | 0.000 | 0.000 | 0.542 |
| Garuga pinnata | 0.060 | 0.044 | 0.024 | 0.000 | 0.000 | 0.000 | 0.142 | 0.000 | 0.000 | 0.000 | 0.000 | 0.270 |
| Lagerstroemia parviflora | 0.023 | 0.048 | 0.019 | 0.032 | 0.490 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.171 |
| Lannea coromandelica | 0.071 | 0.055 | 0.112 | 0.069 | 0.052 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.359 |
| Madhuca latifolia | 0.058 | 0.014 | 0.167 | 0.221 | 0.042 | 0.128 | 0.550 | 0.292 | 0.000 | 0.317 | 0.442 | 2.229 |
| Mitragyna parviflora | 0.000 | 0.001 | 0.000 | 0.000 | 0.024 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.025 |
| Pterocarpus marsupium | 0.008 | 0.010 | 0.025 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.043 |
| Shorea robusta | 2.995 | 1.541 | 1.600 | 1.842 | 2.224 | 2.014 | 2.837 | 0.361 | 0.000 | 0.000 | 0.551 | 15.964 |
| Syzygium cumini | 0.074 | 0.122 | 0.148 | 0.000 | 0.000 | 0.000 | 0.245 | 0.396 | 0.000 | 0.000 | 0.000 | 0.985 |
| Terminalia belerica | 0.082 | 0.033 | 0.025 | 0.000 | 0.042 | 0.000 | 0.000 | 0.000 | 0.000 | 0.552 | 0.000 | 0.734 |
| Terminalia crenulata | 0.394 | 0.241 | 0.249 | 0.281 | 0.343 | 0.376 | 0.184 | 0.332 | 0.000 | 0.000 | 0.000 | 2.400 |
| Rest of species | 1.211 | 0.782 | 0.929 | 0.670 | 0.543 | 0.316 | 0.539 | 0.327 | 0.290 | 0.000 | 0.538 | 6.144 |
| All species total | 5.289 | 3.293 | 3.764 | 3.762 | 3.593 | 3.089 | 4.993 | 1.707 | 0.290 | 0.868 | 1.530 | 32.181 |

Table No. 6.4T (b)

TOTAL GROWING STOCK ('000 $M^3$) of SAL FORESTS OF MAYURBHANJ AND BALASORE DISTRICTS AREA -1248.02 $km^2$

| SPECIES DESCRIPTION | DIAMETER CLASSES IN CM | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80+ | Total |
| Adina cordifolia | 3.680 | 1.398 | 6.566 | 0.000 | 0.000 | 10.425 | 13.578 | 0.000 | 0.000 | 0.000 | 0.000 | 35.647 |
| Anogeissus latifolia | 21.512 | 38.245 | 39.878 | 56.715 | 18.073 | 0.000 | 35.515 | 0.000 | 0.000 | 0.000 | 0.000 | 209.939 |
| Bombax ceiba | 2.101 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 2.101 |
| Bridelia retusa | 3.230 | 8.400 | 6.052 | 19.606 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 37.288 |
| Dalbergia latifolia | 1.618 | 2.149 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 3.767 |
| Diospyros melanoxylon | 6.729 | 0.000 | 5.890 | 4.487 | 16.193 | 21.451 | 12.881 | 0.000 | 0.000 | 0.000 | 0.000 | 67.630 |
| Garuga pinnata | 7.434 | 5.549 | 3.002 | 0.000 | 0.000 | 0.000 | 17.735 | 0.000 | 0.000 | 0.000 | 0.000 | 33.721 |
| Lagerstroemia parviflora | 2.903 | 5.961 | 2.334 | 4.004 | 6.174 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 21.376 |
| Lannea coromandelica | 8.923 | 6.861 | 13.940 | 8.565 | 6.492 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 44.781 |
| Madhuca latifolia | 7.252 | 1.755 | 20.811 | 27.632 | 5.183 | 15.966 | 68.599 | 36.391 | 0.000 | 39.553 | 55.104 | 278.245 |
| Mitragyna parviflora | 0.000 | 0.120 | 0.000 | 0.000 | 3.051 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 3.171 |
| Pterocarpus marsupium | 1.052 | 1.195 | 3.066 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 5.314 |
| Shorea robusta | 373.769 | 192.282 | 199.684 | 229.849 | 277.501 | 251.384 | 354.088 | 45.046 | 0.000 | 0.000 | 68.796 | 1992.400 |
| Syzygium cumini | 9.278 | 15.239 | 18.428 | 0.000 | 0.000 | 0.000 | 30.603 | 49.403 | 0.000 | 0.000 | 0.000 | 122.951 |
| Terminalia belerica | 10.241 | 4.132 | 3.141 | 0.000 | 5.237 | 0.000 | 0.000 | 0.000 | 0.000 | 68.835 | 0.000 | 91.585 |
| Terminalia crenulata | 49.230 | 30.115 | 31.022 | 35.119 | 42.770 | 46.918 | 22.961 | 41.395 | 0.000 | 0.000 | 0.000 | 299.531 |
| Rest of species | 151.091 | 97.628 | 115.971 | 83.586 | 67.793 | 39.413 | 67.220 | 40.768 | 36.189 | 0.000 | 67.108 | 766.769 |
| All species total | 660.045 | 411.029 | 469.785 | 469.563 | 448.468 | 385.557 | 623.180 | 213.003 | 36.189 | 108.387 | 191.009 | 4016.215 |

Table No. 6.5T(a)

GROWING STOCK /HA IN $M^3$ OF MISC. FORESTS OF MAYURBHANJ AND BALASORE DISTRICTS AREA - 1129.67 $km^2$

| SPECIES DESCRIPTION | DIAMETER CLASSES IN CM | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80+ | Total |
| Adina cordifolia | 0.173 | 0.103 | 0.067 | 0.044 | 0.000 | 0.000 | 0.136 | 0.000 | 0.000 | 0.000 | 0.000 | 0.523 |
| Anogeissus latifolia | 0.428 | 0.453 | 0.537 | 0.632 | 0.423 | 0.363 | 1.040 | 0.253 | 0.000 | 0.000 | 0.000 | 4.130 |
| Bombax ceiba | 0.018 | 0.078 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.297 | 0.000 | 0.392 |
| Bridelia retusa | 0.143 | 0.096 | 0.151 | 0.087 | 0.061 | 0.000 | 0.442 | 0.000 | 0.000 | 0.000 | 0.000 | 0.981 |
| Dalbergia latifolia | 0.038 | 0.032 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.070 |
| Diospyros melanoxylon | 0.089 | 0.084 | 0.054 | 0.041 | 0.058 | 0.110 | 0.304 | 0.260 | 0.673 | 0.000 | 0.000 | 1.675 |
| Garuga pinnata | 0.181 | 0.164 | 0.174 | 0.191 | 0.065 | 0.000 | 0.307 | 0.000 | 0.000 | 0.000 | 0.000 | 1.081 |
| Lagerstroemia parviflora | 0.035 | 0.000 | 0.093 | 0.000 | 0.000 | 0.092 | 0.143 | 0.000 | 0.000 | 0.000 | 0.000 | 0.362 |
| Lannea coromandelica | 0.124 | 0.140 | 0.078 | 0.330 | 0.388 | 0.259 | 0.452 | 0.188 | 0.000 | 0.000 | 0.000 | 1.959 |
| Madhuca latifolia | 0.025 | 0.021 | 0.000 | 0.037 | 0.327 | 0.000 | 0.766 | 0.941 | 0.532 | 0.350 | 0.000 | 2.997 |
| Mitragyna parviflora | 0.002 | 0.006 | 0.000 | 0.044 | 0.000 | 0.094 | 0.000 | 0.000 | 0.858 | 0.000 | 0.000 | 1.003 |
| Pterocarpus marsupium | 0.039 | 0.022 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.061 |
| Shorea robusta | 0.221 | 0.237 | 0.347 | 0.159 | 0.676 | 0.271 | 0.455 | 0.540 | 0.000 | 0.000 | 0.000 | 2.906 |
| Syzygium cumini | 0.017 | 0.025 | 0.054 | 0.047 | 0.000 | 0.091 | 0.288 | 0.000 | 0.316 | 0.517 | 0.000 | 1.355 |
| Terminalia belerica | 0.033 | 0.051 | 0.022 | 0.105 | 0.000 | 0.000 | 0.000 | 0.420 | 0.000 | 0.000 | 1.086 | 1.718 |
| inalia crenulata | 0.304 | 0.245 | 0.223 | 0.304 | 0.192 | 0.772 | 0.517 | 0.173 | 0.000 | 0.000 | 0.000 | 2.730 |
| of species | 3.273 | 2.496 | 2.295 | 1.556 | 1.349 | 1.065 | 1.838 | 0.887 | 1.114 | 0.341 | 2.477 | 18.690 |
| species total | 5.141 | 4.251 | 4.097 | 3.577 | 3.540 | 3.117 | 6.688 | 3.662 | 3.494 | 1.504 | 3.563 | 42.633 |

Table No. 6.5T (b)

TOTAL GROWING STOCK('000M$^3$) OF MISC. FORESTS OF MAYURBHANJ AND BALASORE DISTRICTS AREA - 1129.67 KM$^2$

| SPECIES DESCRIPTION | DIAMETER CLASSES IN CM | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80+ | Total |
| Adina cordifolia | 19.522 | 11.581 | 7.581 | 4.991 | 0.000 | 0.000 | 15.386 | 0.000 | 0.000 | 0.000 | 0.000 | 59.061 |
| Anogeissus latifolia | 48.360 | 51.136 | 60.717 | 71.430 | 47.839 | 40.990 | 117.463 | 28.618 | 0.000 | 0.000 | 0.000 | 466.554 |
| Bombax ceiba | 2.023 | 8.767 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 33.513 | 0.000 | 44.303 |
| Bridelia retusa | 16.175 | 10.835 | 17.006 | 9.869 | 6.938 | 0.000 | 49.979 | 0.000 | 0.000 | 0.000 | 0.000 | 110.802 |
| Dalbergia latifolia | 4.286 | 3.664 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 7.950 |
| Diospyros melanoxylon | 10.058 | 9.505 | 6.086 | 4.619 | 6.587 | 12.477 | 34.384 | 29.422 | 76.054 | 0.000 | 0.000 | 189.191 |
| Garuga pinnata | 20.459 | 18.495 | 19.671 | 21.560 | 7.318 | 0.000 | 34.633 | 0.000 | 0.000 | 0.000 | 0.000 | 122.136 |
| Lagerstroemia parviflora | 3.925 | 0.000 | 10.483 | 0.000 | 0.000 | 10.346 | 16.140 | 0.000 | 0.000 | 0.000 | 0.000 | 40.893 |
| Lannea coromandelica | 13.995 | 15.809 | 8.860 | 37.252 | 43.795 | 29.205 | 51.103 | 21.253 | 0.000 | 0.000 | 0.000 | 221.272 |
| Madhuca latifolia | 2.780 | 2.316 | 0.000 | 4.150 | 36.954 | 0.000 | 86.504 | 106.290 | 60.109 | 39.502 | 0.000 | 338.606 |
| Mitragyna parviflora | 0.196 | 0.651 | 0.000 | 4.949 | 0.000 | 10.586 | 0.000 | 0.000 | 96.923 | 0.000 | 0.000 | 113.305 |
| Pterocarpus marsupium | 4.408 | 2.461 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 6.869 |
| Shorea robusta | 24.976 | 26.748 | 39.230 | 17.914 | 76.336 | 30.654 | 51.415 | 60.960 | 0.000 | 0.000 | 0.000 | 328.232 |
| Syzygium cumini | 1.906 | 2.807 | 6.099 | 5.361 | 0.000 | 10.243 | 32.538 | 0.000 | 35.708 | 58.379 | 0.000 | 153.040 |
| Terminalia belerica | 3.762 | 5.791 | 2.536 | 11.868 | 0.000 | 0.000 | 0.000 | 47.458 | 0.000 | 0.000 | 122.681 | 194.096 |
| Terminalia crenulata | 34.287 | 27.625 | 25.224 | 34.336 | 21.711 | 87.257 | 58.411 | 19.522 | 0.000 | 0.000 | 0.000 | 308.374 |
| Rest of species | 369.687 | 281.997 | 259.298 | 175.756 | 152.370 | 120.340 | 207.606 | 100.199 | 125.870 | 38.476 | 279.802 | 2111.401 |
| All species total | 580.806 | 480.187 | 462.790 | 404.056 | 399.849 | 352.097 | 755.561 | 413.722 | 394.664 | 169.871 | 402.483 | 4816.086 |

Table NO. 6.6T

TOTAL GROWING STOCK (IN '000 $M^3$) IN FORESTS OF MAYURBHANJ AND BALASORE DISTRICTS AREA - 2765 $km^2$

| SPECIES DESCRIPTION | | DIAMETER CLASSES IN CM | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80+ | Total |
| Adina cordifolia | TOTAL | 23202 | 12978 | 14146 | 4990 | 0.000 | 10425 | 28963 | 0.000 | 0.000 | 0.000 | 0.000 | 94707 |
| | PER HA | 0.098 | 0.055 | 0.059 | 0.021 | 0.000 | 0.044 | 0.122 | 0.000 | 0.000 | 0.000 | 0.000 | 0.398 |
| Anogeissus latifolia | TOTAL | 69872 | 89380 | 100594 | 128145 | 65912 | 40989 | 152978 | 28618 | 0.000 | 0.000 | 0.000 | 676492 |
| | PER HA | 0.294 | 0.376 | 0.423 | 0.539 | 0.277 | 0.172 | 0.643 | 0.120 | 0.000 | 0.000 | 0.000 | 2.845 |
| Bombax ceiba | TOTAL | 4124 | 8766 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 33513 | 0.000 | 46404 |
| | PER HA | 0.017 | 0.037 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.141 | 0.000 | 0.195 |
| Boswellia serrata | TOTAL | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | PER HA | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Bridelia retusa | TOTAL | 19405 | 19234 | 23058 | 29474 | 6937 | 0.000 | 49978 | 0.000 | 0.000 | 0.000 | 0.000 | 148089 |
| | PER HA | 0.082 | 0.081 | 0.097 | 0.124 | 0.029 | 0.000 | 0.210 | 0.000 | 0.000 | 0.000 | 0.000 | 0.623 |
| Dalbergia latifolia | TOTAL | 5903 | 5813 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 11716 |
| | PER HA | 0.025 | 0.024 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.049 |
| Diospyros melanoxylon | TOTAL | 16786 | 9504 | 11975 | 9105 | 22780 | 33927 | 47264 | 29421 | 76054 | 0.000 | 0.000 | 256820 |
| | PER HA | 0.071 | 0.040 | 0.050 | 0.038 | 0.096 | 0.143 | 0.199 | 0.124 | 0.320 | 0.000 | 0.000 | 1.080 |
| Garuga pinnata | TOTAL | 27892 | 24044 | 22673 | 21559 | 7317 | 0.000 | 52368 | 0.000 | 0.000 | 0.000 | 0.000 | 155856 |
| | PER HA | 0.117 | 0.101 | 0.095 | 0.091 | 0.031 | 0.000 | 0.220 | 0.000 | 0.000 | 0.000 | 0.000 | 0.655 |
| Lagerstroemia parviflora | TOTAL | 6828 | 5960 | 12817 | 4004 | 6173 | 10345 | 16139 | 0.000 | 0.000 | 0.000 | 0.000 | 62269 |
| | PER HA | 0.029 | 0.025 | 0.054 | 0.017 | 0.026 | 0.044 | 0.068 | 0.000 | 0.000 | 0.000 | 0.000 | 0.262 |
| Lannea coromandelica | TOTAL | 22918 | 22669 | 22800 | 45816 | 50286 | 29205 | 51103 | 21252 | 0.000 | 0.000 | 0.000 | 266053 |
| | PER HA | 0.096 | 0.095 | 0.096 | 0.193 | 0.211 | 0.123 | 0.215 | 0.089 | 0.000 | 0.000 | 0.000 | 1.119 |
| Madhuca latifolia | TOTAL | 10032 | 4070 | 20810 | 31782 | 42137 | 15965 | 155102 | 142681 | 60108 | 79054 | 55104 | 616851 |
| | PER HA | 0.042 | 0.017 | 0.088 | 0.134 | 0.177 | 0.067 | 0.652 | 0.600 | 0.253 | 0.332 | 0.232 | 2.594 |
| Mitragyna parviflora | TOTAL | 195 | 770 | 0.000 | 4949 | 3050 | 10586 | 0.000 | 0.000 | 96922 | 0.000 | 0.000 | 116475 |
| | PER HA | 0.001 | 0.003 | 0.000 | 0.013 | 0.012 | 0.045 | 0.000 | 0.000 | 0.100 | 0.000 | 0.000 | 0.490 |

Table No. 6.6T (contd)

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pterocarpus marsupium | | | | | | | | | | | | | |
| | TOTAL | 5460 | 3656 | 3066 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 12183 |
| | PER HA | 0.023 | 0.015 | 0.013 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.051 |
| Shorea robusta | | | | | | | | | | | | | |
| | TOTAL | 398744 | 219030 | 238914 | 247762 | 353837 | 282038 | 405502 | 106005 | 0.000 | 0.000 | 68796 | 2320631 |
| | PER HA | 1.677 | 0.921 | 1.005 | 1.042 | 1.488 | 1.186 | 1.705 | 0.446 | 0.000 | 0.000 | 0.289 | 9.760 |
| Syzygium cumini | | | | | | | | | | | | | |
| | TOTAL | 11184 | 18045 | 24526 | 5361 | 0.000 | 10243 | 63140 | 49402 | 35707 | 58379 | 0.000 | 275990 |
| | PER HA | 0.047 | 0.076 | 0.103 | 0.023 | 0.000 | 0.043 | 0.266 | 0.208 | 0.150 | 0.246 | 0.000 | 1.161 |
| Tectona grandis | | | | | | | | | | | | | |
| | TOTAL | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | PER HA | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Terminalia belerica | | | | | | | | | | | | | |
| | TOTAL | 14003 | 9922 | 5676 | 11868 | 5237 | 0.000 | 0.000 | 47457 | 0.000 | 68834 | 122681 | 285681 |
| | PER HA | 0.059 | 0.042 | 0.024 | 0.050 | 0.022 | 0.000 | 0.000 | 0.200 | 0.000 | 0.290 | 0.516 | 1.202 |
| Terminalia crenulata | | | | | | | | | | | | | |
| | TOTAL | 83517 | 57740 | 56246 | 69455 | 64481 | 134174 | 81371 | 60917 | 0.000 | 0.000 | 0.000 | 607904 |
| | PER HA | 0.351 | 0.243 | 0.237 | 0.292 | 0.271 | 0.564 | 0.342 | 0.256 | 0.000 | 0.000 | 0.000 | 2.557 |
| Rest of species | | | | | | | | | | | | | |
| | TOTAL | 520778 | 379624 | 375269 | 259342 | 220163 | 159753 | 274826 | 140967 | 162058 | 38476 | 346910 | 2878170 |
| | PER HA | 2.190 | 1.597 | 1.578 | 1.091 | 0.926 | 0.672 | 1.156 | 0.593 | 0.682 | 0.162 | 1.459 | 12.105 |
| All species total | | | | | | | | | | | | | |
| | TOTAL | 1240851 | 891215 | 932575 | 873619 | 848316 | 737654 | 1378740 | 626725 | 430852 | 278258 | 593491 | 8832302 |
| | PER HA | 5.219 | 3.748 | 3.922 | 3.674 | 3.568 | 3.102 | 5.799 | 2.636 | 1.812 | 1.170 | 2.496 | 37.147 |

## ANNEXURE I

### LIST OF SURVEY OF INDIA TOPOSHEETS

| S.No. | Toposheet No. | Scale of map. | Year of Survey of mapsheet | No. of plots inventoried by F.S.I. |
|---|---|---|---|---|
| 1. | 73 F/12 | 1:50,000 | 1976-77 | 1 |
| 2. | 73 F/16 | " | 1976-77 | 1 |
| 3. | 73 G/9 | " | 1978-79 | 1 |
| 4. | 73G/13 | " | 1978-79 | 9 |
| 5. | 73 J/3 | " | 1979-80 | 5 |
| 6. | 73 J/4 | " | 1979-80 | 17 |
| 7. | 73 J/7 | " | 1976-77 | 22 |
| 8. | 73 J/8 | " | 1979-80 | 13 |
| 9. | 73 J/11 | " | 1976-77 | 4 |
| 10. | 73 J/12 | " | 1979-80 | 15 |
| 11. | 73 J/16 | " | 1976-77 | 9 |
| 12. | 73 K/1 | " | 1972-73 | 12 |
| 13. | 73 K/2 | " | 1973-74 | 14 |
| 14. | 73 K/3 | | 1972-73 | 25 |
| 15. | 73 K/6 | " | 1973-74 | 5 |
| 16. | 73 K/7 | " | 1972-73 | 28 |
| 17. | 73 K/9 | " | 1972-73 | 2 |
| 18. | 73 K/10 | " | 1972-73 | 8 |
| 19. | 73 K/11 | " | 1971-72 | 1 |
| 20. | 73 K/13 | 1:50,000 | 1972-73 | 12 |
| 21. | 73 K/14 | " | 1972-73 | 08 |
| 22. | 73 N/4 | " | 1976-77 | 2 |
| 23. | 73 O/1 | " | 1968-69 | 3 |
| 24. | 73 0/2 | " | | |
| | | BALESHWAR DISTRICT | | |
| 25. | 73 K/7 | " | 1972-73 | 1 |
| 26. | 73 K/10 | " | 1972-73 | 2 |
| 27. | 73 K/11 | " | 1971-72 | 29 |
| 28. | 73 K/14 | " | 1972-73 | 1 |
| 29. | 73 K/15 | " | 1971-72 | 1 |
| 30. | 73 O/1 | " | 1968-69 | 3 |
| 31. | 73 O 2 | " | 1968-69 | 1 |
| 32. | 73 O/6 | " | 1969-70 | 1 |
| | | | Total .. | 257 |

Annexure - II

Glossary of vernacular (Oriya) names with corresponding Botanical names of common species met with in Mayurbhanj district.

| S.No. | Local Name | Botanical Name |
|---|---|---|
| 1. | Andiri | Bursera serrata |
| 2. | Atundi | Combretum decandrum |
| 3. | Aonla | Emblica officinalis |
| 4. | Arakh | Calotropis procera |
| 5. | Amba | Mangifera indica |
| 6. | Ankhu-kolt | Carrisa spinarum |
| 7. | Anchu | Morinda tinctoria |
| 8. | Akanabindhi | Cissampelos pareira |
| 9. | Asan | Terminalia crenulata |
| 10. | Ananta-mula | Hemidesmus indicus |
| 11. | Arjun | Terminalia arjuna |
| 12. | Amda | Spondias mangifera |
| 13. | Amthi | Bauhinia retusa |
| 14. | Ankula | Alangium lamarckii |
| 15. | Arkala | Millettia auriculata |
| 16. | Bahada | Terminalia belerica |
| 17. | Bela | Aegle marmelos |
| 18. | Barangi | Albizzia stipulata |
| 19. | Bija | Pterocarpus marsupium |
| 20. | Baincha | Flacourtia sepiaria |
| 21. | Behenta | Limonia acidissima |
| 22. | Bamur | Acacia arabica |
| 23. | Ban-khajuri | Phoenix acaulis |
| 24. | Ban-capasia | Kydia calycina |
| 25. | Ban-tulsi | Perilla ocimoides |
| 26. | Bandhan | Ougeinia dalbergioides |
| 27. | Bhanta | Clerodendron infortunatum |
| 28. | Budel-mal | Spatholobus roxburghii |
| 29. | Bat-guri | Ardisia solenasea |
| 30. | Bam-oda | Zingiber casumunar |
| 31. | Bans(Dongor) | Dendrocalamus strictus |
| 32. | Bans(Pani) | Oxytenanthera albociliata |
| 33. | Bans(Patsi) | Oxytenanthera monostigma |
| 34. | Bans(Topi) | Cephalostachyum purgracile |
| 35. | Bet- | Calamus species |
| 36. | Bara | Ficus bengalensis |
| 37. | Bod-kurhein | Wrightia tomentosa |
| 38. | Barbakulia | Dalbergia paniculata |
| 39. | Benimonj | Cascaria tomentosa |
| 40. | Ban-kandul | Atylosia volubilis |
| 41. | Bankadeli | Musa superba |
| 42. | Bhalia | Semicarpus anacardium |
| 43. | Bhersinga | Murraya koenigii |

| | | |
|---|---|---|
| 44. | Bheru | Chloroxylon swietenia |
| 45. | Baidhanka | Mucuna prurita |
| 46. | Boro | Callicarpa lanata |
| 47. | Baruna | Crataeva religiosa |
| 48. | Chadel gudi | Vitex peduncularis |
| 49. | Chauli | Elaeodendron glaucum |
| 50. | Chara | Buchnania latifolia |
| 51. | Chandan | Santalum album |
| 52. | Chhatian | Alsotonia scholaris |
| 53. | Chhai patoli | Stereospermum angustifolium |
| 54. | Chhota Rai | Dillenia aurea |
| 55. | Chun -koli | Zizyphus funiculosa |
| 56. | Bengasag(Brahmi buti) | Hydrocotyle asiatica |
| 57. | Dam kurudu | Gardenia latifolia |
| 58. | Dhatki | Woodfordia fruticosa |
| 59. | Dhauranjan | Holoptelia integrifolia |
| 60. | Dhaman | Grewia tiliaefolia |
| 61. | Dumtari(Chilli-mal) | Acacia pinnata |
| 62. | Dhaura | Anogeissus latifolia |
| 63. | Dimiri | Ficus glomerata |
| 64. | Dudhi-mal (Gar) | Cryptolepsis buchanani |
| 65. | Gambhari | Gmelina arborea |
| 66. | Girli | Indigofera pulchella |
| 67. | Garkhair | Albizzia procera |
| 68. | Gila | Entada scandens |
| 69. | Genduli | Sterculia urens |
| 70. | Gurudu(kurlu) | Gardenia gummifera |
| 71. | Ghanto | Zizyphus xylopyra |
| 72. | Gonairi. | Cochlospermum gossipium |
| 73. | Giringa | Pterospermum heyneanum |
| 74. | Gohira | Acacia leucophloea |
| 75. | Gud mari | Premna herbacea |
| 76. | Gutikhadika | Nyctanthes arbortristis |
| 77. | Gad panas | Litsia macrophylla |
| 78. | Gandh palas | Miliusa velutina |
| 79. | Harida | Terminalia chebula |
| 80. | Haldi(Ban) | Curcuma amada |
| 81. | Hinjala | Barringtonia acutangula |
| 82. | Had kinkali | Murraya exotica |
| 83. | Hatkan | Leea macrophylla |
| 84. | Iswar-jata | Asparagus racemosus |
| 85. | Jabjotia | Urena species |
| 86. | Jamu. | Syzygium cumini |
| 87. | Jamarla | Antidesma diandrum |
| 88. | Jamla | Homonoia riparia |
| 89. | Japhra | Bixa orellana |
| 90. | Kaitha | Feronia elephantum |
| 91. | Khurdu | Gardenia turgida |
| 92. | Kendu | Diospyros melanoxylon |
| | | " sylvatica |
| 93. | Kamalagundi | Mallotus philippinensis |
| 94. | Kanteikoli | Zizyphus oenoplia |
| 95. | Karada | Cleistanthus collinus |
| 96. | Khus-khus (Bena) | Vetiveria zizanioides |
| 97. | Karanjo | Pongamia glabra |

Contents

| | | |
|---|---|---|
| 98. | Kirkichi | Mimosa himalayana |
| 99. | Kodali | Sterculia villosa |
| 100. | Kanda (Budhimahul) | Hymenodictyon excelsum |
| 101. | Kasi | Bridelia retusa |
| 102. | Kochila | Strychnos nux-vomica |
| 103. | Koilakha | Asteracantha longifolia |
| 104. | Khair | Acacia catechu |
| 105. | Kansarilota | Ipomoea pes-caprae |
| 106. | Katak | Strychnos potatorum |
| 107. | Kumbhi | Careya arborea |
| 108. | Kekad | Garuga pinnata |
| 109. | Kundo-phul | Jasminum humile |
| 110. | Kusum | Schleichera oleosa |
| 111. | Kalami sag | Ipomoea reptans |
| 112. | Kurum | Adina cordifolia |
| 113. | Kulhia kanda | Dioscorea spp. |
| 114. | Kandei | Urginea indica |
| 115. | Laipalas | Butea superba |
| 116. | Mahalimba | Ailanthus excelsa |
| 117. | Mardha-mal | Spatholobus roxburghii |
| 118. | Mahul | Bassia latifolia |
| 119. | Mudang | Loranthus Spp. |
| 120. | Moi | Lannea coromandelica |
| 121. | Muturi | Smilax macrophylla |
| 122. | Makadkendu | Diospyros embryopteris |
| 123. | Mur-muri | Helicteres isora |
| 124. | Mundi | Mitragyna parvifolia |
| 125. | Mali (bara) | Hiptage madablota |
| 126. | Mohana | Randia dumatorum |
| 127. | Malpi | Patalidium barlerioides |
| 128. | Makha | Schrebera swietenoides |
| 129. | Murga | Agave species |
| 130. | Nalbali | Cipadessa futicosa |
| 131. | Nim | Azadirachta indica |
| 132. | Nirmuli | Cuscuta reflexa |
| 133. | Oluo (Ban) | Amorphophallus species |
| 134. | Palasa | Butea monosperma |
| 135. | Patmasu(Gandha palas) | Miliusa velutina |
| 136. | Paldhua | Erythrina suberosa |
| 137. | Pupuni | Oroxylon indicum |
| 138. | Padhel | Stereospermum suaveolens |
| 139. | Palua | Curcuma aromatica |
| 140. | Phasi | Anogeissus acuminata |
| 141. | Pengu-mal | Celastrus paniculata |
| 142. | Pipal | Ficus religiosa |
| 143. | Purhei(Pudeikoli) | Ficus cunia |
| 144. | Poi-gam | Eugenia operculata |
| 145 | Ponas | Artocarpus integrifolia |
| 146. | Potchurimul | Ventilago madraspatana |
| 147. | Panasi | Eulaliopsis binata |
| 148. | Phul badhuni | Thysanolaena agrostis |
| 149. | Pita alu | Dioscorea spp. |
| 150. | Rani-kathi | Flemingia chappar |
| 151. | Rai | Dillenia pentagyna |
| 152. | Rohini | Soymida febrifuga |

| | | |
|---|---|---|
| 153 | Raj simal | Xanthoxylon rhetsa |
| 154. | Runjo | Abrus precatorius |
| 155. | Saguan | Tectona grandis |
| 156. | Sahada | Streblus asper |
| 157. | Sal(Sarai) | Shorea robusta |
| 158. | Salai | Boswellia serrata |
| 159. | Sena(Sidha) | Largerstroemia parviflora |
| 160. | Siali | Bauhinia vahlii |
| 161. | Siju | Euphorbia royaleana |
| 162. | Simul | Salmalia malabarica |
| 163. | Sinkulia (Sweeper grass) | Heteropogon contortus |
| 164. | Siris | Albizzia lebbek |
| 165. | Sisoo | Dalbergia latifolia |
| 166. | Sunari | Cassia fistula |
| 167. | Suna-ragoda | Grewia hirsuta |
| | | Strobilanthes circarensis |
| | | Strobilanthes jeyporensis |
| | | Strobilanthes auriculatus |
| 168. | Sugandhi-mal | Ichnocarpus frutescenes |
| 169. | Sigakai (Chilli) | Acacia concinna |
| 170. | Salap | Caryota urens |
| 171. | Saru (Bono) | Colocasia spp. |
| 172. | Tentuli | Tamarindus indica |
| 173. | Tal | Borassus flabellifer |
| 174. | Telkuram | Ixora parviflora |
| 175. | Thelka | Randia uliginosa |
| 176. | Tilai | Wendlandia tinctoria |
| 177. | Tangini | Xylia xylocarpa |
| 178. | Tandi(Kasatandi) | Saccharum spontaneum |

ANNEXURE - III

LIST OF OFFICERS AND STAFF ASSOCIATED WITH SURVEY WORK IN MAYURBHANJ DISTRICT OF ORISSA STATE

1. S/sh. V.B.Joshi, IFS, Joint Director
2. S.B.Elkunchwar, IFS, Dy.Director

3. M.D. Singh, STA
4. B.R. Pandey, STA
4. M.K. Madaria, JTA
5. P.R. Singh, JTA
6. R.P. Sao, JTA
7. R.K. Mahobe, JTA
8. P.R. Rawani, JTA
9. S.K. Bajpai, JTA
10. J.S. Kumbhkar, JTA
11. C.B. Murty, Jr.D/Man
12. D.S. Gulkari, Jr.D/Man
13. N.P. Singh, Dy.Ranger
14. M.H. Kanoje, Dy.Ranger
15. G.G. Pathak, Dy.Ranger
16. R.C. Verma, Dy.Ranger
17. N.C. Dewangan, Dy.Ranger
18. A.K. Bose, Dy.Ranger
19. Jagdeo Prasad, Dy.Ranger
20. C.S. Rawat, Fieldman
21. Bhagbali Dawana, Fieldman
22. Fagoo Ram, Fieldman
23. M.K. Singh, Fieldman
24. Sarwan Das, Fieldman
25. B.P. Sharma, Fieldman
26. D.G.K.Pillai, Fieldman
27. L.N. Kuril, Fieldman
28. Bansi Ram, Fieldman
29. R.P. Thapliyal, Fieldman
30. P.A. Swamy, Fieldman
31. Dwarika Prasad, Fieldman
32. Chandan Singh, Fieldman
33. B.K.Maharana, Fieldman
34. Dharam Singh, Fieldman
35. Chandrika Prasad, Fieldman
36. R.R. Singh, Fieldman
37. V.S. Bist, Fieldman
38. Ramadhin Yadav, Fieldman
39. Bharat Singh, Fieldman
40. Dharam Deo, Driver
41. R.S. Pandey, Driver
42. R.A. Dondre, Driver
43. R.S. Ukey, Driver
44. V.J. Gondane, Driver
45. N.C. Malakar, Driver

# PLOT APPROACH FORM

(1) Plot Approach Form must be filled in while the journey is in progress.

(2) While recording data, it is essential to record month and years 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 .....
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 upto 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 (hrs.). .....
14. Direction and distance covered on foot upto 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 .....
18. Compass bearing from reference point to the plot approached for commencing survey (please give the plot No. also) .....
19. Distance of the plot from reference point (Mtrs.) .....
20. Date and time at which arriving at the plot. .....
21. Time (hrs. of leaving the plot) .....
22. Time (hrs. at which returned to the camp). .....

...2....

Name and Signature

23. Compassing done by .....
24. Distance measured by .....
25. Plot 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. Reference in the field written by .....
32. Remarks .....

Date:

Signature of the Crew Leader.

Diagrams etc.

A

B

PLOT DESCRIPTION FORM

Field Form No. 2

| Job No. | Card design | Zone | State | District | Forest Division | Map sheet No. | Grid 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 | | | | | | | Plantation potential | Road distance | Mud path distance | River distance | Kaccha road | Pucca road | River distance to market outlet | Obstacles | Plot status | Degraded forests |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| General Topography | Slopes | 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 | Injuries to crop | Fire incidence | Grazing incidence | Presence of Weeds | Presence of grass | Bamboo density | Bamboo quality | Bamboo flowering | Bamboo regeneration | | | | | | | | | |
| 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 | 79-80 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Date .....

Signature of Crew leader .....

Name of Crew leader .....

GPN-E—284-IFRCDN-9-93—1,800-PA4.

Contents

| Job No. | Card Design | Mapsheet No. | Grid No. | Plot No. |
|---|---|---|---|---|
| 1-3 | 4-5 | 6-11 | 12-15 | 16 |
| | | | | |

**FIELD FORM No. 3**

**PLOT ENUMERATION FORM**

| Total No. of bamboo clumps | 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 |
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Date.....

Signature of Crew Leader.....

Name of Crew Leader.....

Contents

FIELD FORM No. 4

## SAMPLE TREE FORM

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

| Total No. of Trees |
|---|
| 55--56 |
| |

| SPECIES | Tree Serial No. | Species Code | Dominance | D. B. H. OB (cm) | D. B. T. (mm) | Tree Height (m) | Clear bole (m) | Condition | Longitudinal | Sectional | SPECIES | Tree Serial No. | Species Code | Dominance | D. B. H OB (cm) | D. B. T. (mm) | Tree Height (m) | Clear bole (m) | Condition | Longitudinal | 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 |
| | | | | | | | | | | | | | | | | | | | | | |
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Date _____

Signature of Crew Leader _____

Name of Crew Leader _____

Contents

## BAMBOO ENUMERATION FORM

Field Form 5

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

| Average culm height (in cm.) | | Bamboo quality |
|---|---|---|
| Upto 1 cm top dia. | Upto 2 cm top dia. | 78 |
| 72-74 | 75-77 | |

| Species | Species Code | Clump Sl. No. | Clump diametres (cm.) | Clump size class | Green sound culms | | | | | | | Green damaged culms | | | | | | | Dry sound culms | | | Dry damaged culms | | | Decayed culms | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Current | One to two seasons old | | | Over two seasons old | | | Current | 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 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
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Date .....

Signature of Crew Leader .....

Name of Crew Leader .....

Contents

BAMBOO WEIGHT [illegible]

Field Form No. 7

| Job No. | Card Design |
|---|---|
| 1—3 | 4—5 |
| | |

| Mapsheet No. | Grid No. | Plot No. |
|---|---|---|
| 6—11 | 12—15 | 16 |
| | | |

| Specimen Code | Sample No. | Green Weight of culm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Green Weight of sub-sample | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2 to under 5 cm. | | | | | | | Diameter Class 5 to under 8 cm. | | | | | | | | 8 cm. and over | | | | | | | | | | | | | | | | |
| | | Dia. in cm. | Total length in dmt. | Utilizable length in dmt. | | Weight in Grams | | | Dia. in cm. | Total length in dmt. | Utilizable length in dmt. | | Weight in Grams | | | | Dia. in cm. | Total length in dmt. | Utilizable length in dmt. | | Weight in Grams | | | | | | | | | | | Sub-Samples culms 2-5 | Sub-Samples culms 5-8 | Sub-Samples culms 8+ |
| | | | | Upto 1 cm. top dia. | Upto 2 cm. top dia. | | | | | | Upto 1 cm. top dia. | Upto 2 cm. top dia. | | | | | | | Upto 1 cm. top dia. | Upto 2 cm. top dia. | | | | | | | | | | | | | |
| 17-19 | 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 | 64-68 | 69-72 | 73-76 | 77-80 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Date _____

Signature of Crew Leader _____

Name of Crew Leader _____

Contents