R/SZ-5

Technical Report No. 4.

PRE-INVESTMENT SURVEY OF FOREST RESOURCES
EAST GODAVARI (A.P.)

DEMAND AND MARKET STUDIES

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE
NEW DELHI, 1972.

Contents

CONTENTS

Para		Page
1.	Introduction	1
2.	Analysis of Estimates of Present Wood Consumption.	4
3.	Background	6
3.1.	General	6
3.2.	Population	8
3.3.	Literacy	9
3.4.	Per Capita Income	10
4.	Consumption of Wood and Bamboos by Industries	12
4.1.	General	12
4.2.	Andhra Pradesh Paper Mills, Rajahmundry	12
4.3.	Markets	14
4.4.	Raw Material	15
5.	Consumption of Wood by Ship and Boat Building Industry.	17
5.1.	Hindustan Shipyard, Visakhapatnam	17
5.2.	Govt. Boat Building Yard, Kakinada	18
6.	Consumption of Wood for Vehicle Body Building	19
7.	Timber for Mining	20
8.	Consumption of Wood for Railway Sleepers	22
9.	Consumption of Wood for Transmission Poles	22
10.	Consumption of Saw logs by Saw Milling Industry	23
10.1.	General	23
10.2.	Number of Saw Mills and Input of Saw Logs	23
10.2.1.	Saw Mills in Visakhapatnam District	24
10.2.2.	Saw Mills in East Godavari District	26
10.2.3.	Saw Mills in West Godavari District	30
10.2.4.	Saw Mills in Khammam District	31
10.3.	Species Sawn	33
10.4.	Sources of Supply	36
10.5.	Specifications of Saw Logs	37
10.6.	Production of Sawn Wood	38
10.7.	Equipment and Employment	39
10.8.	Profitability of the Saw Mills	39
10.9.	Capacity	42
10.10.	A Note on the Government owned Integrated Saw Mill, Seasoning Kiln and Treatment Plant, Rajahmundry.	44

Page		Page
11.	Consumption of Timber for Hand Sawing	48
12.	Consumption of Wood for Agricultural Implements	50
13.	Pole Wood for Construction	52
13.1.	General	52
13.2.	Type of Houses	53
13.3.	Data used for Preparing the Accounts	54
13.4.	Consumption of Pole Wood in the Agency Areas	55
13.4.1.	Wood for Construction of New Houses in Agency Areas	56
13.4.2.	Wood used for Repairs and Replacement of Houses in Agency Areas	57
13.5.	Consumption of Pole Wood in Plains Areas	57
13.5.1.	Pole Wood for New Houses in Plains	59
13.5.2.	Pole Wood for Repairs and Replacements	59
13.6.	Summary	60
14.	Consumption of Fire Wood	63
14.1.	Consumption of Industrial Fire Wood	63
14.2.	Consumption of Domestic Fuel Wood	64
14.2.1.	Consumption of Fire Wood in Agency Areas	67
14.2.2.	Consumption of Fire Wood in the Rural Areas of Plains	69
14.2.3.	Consumption in Urban Areas of Plains	69
14.2.4.	Sources of Supply	70
14.2.4.1.	From Forests	70
14.2.4.2.	Saw Mill Waste	72
14.2.4.3.	Casuarina Wood	73
14.2.4.4.	Other Non Forest Species	73
14.2.4.5.	Other Sources	73
14.2.4.6.	Summary	74
15.	Bamboo for Non Industrial Uses	76
16.	Timber Trade in the Zone	79
16.1.	Timber Trade in Vijayanagaram Town	82
16.2.	Timber Trade in Visakhapatnam	83
16.3.	Timber Trade in Rajahmundry	86
16.4.	Timber Trade in Kakinada	93
16.5.	Timber Trade in Eluru	95
16.6.	Timber Trade in Kothagudem	96
16.7.	Timber Trade in Khammam	98
17.	Summary of Present Consumption of Wood and Bamboos in the Zone	100
18.	Supply of Industrial Wood	102
19.	Forecast of Future Demand for Wood in the Zone	105

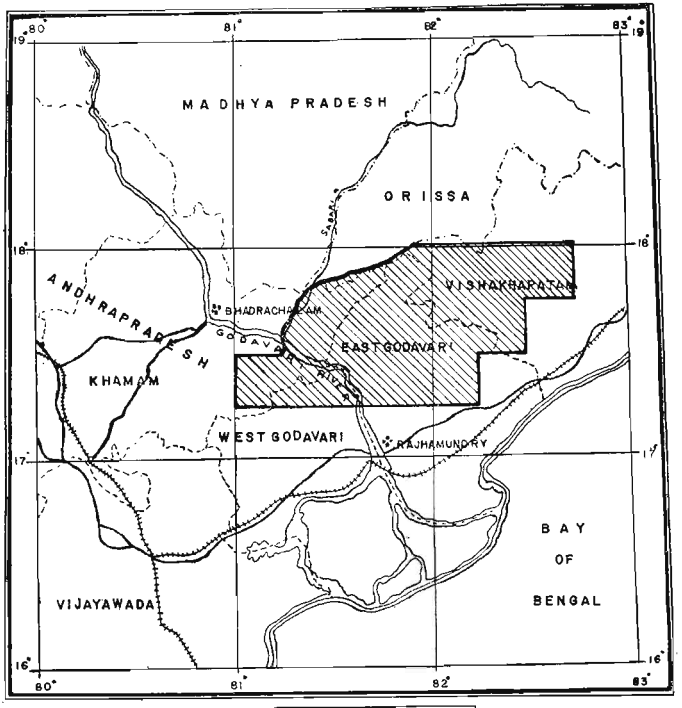
LIST OF TABLES

Table No.	Subject	Page
1	Population Statistics of Demand Study Zone	9
2	Literacy Statistics	10
3	Supply of Bamboos to Andhra Pradesh Paper Mills from the Zone	16
4.	Consumption of Wood for Mining	21
5	Input of Saw Logs in the Saw Mills of the Zone	24
6.	Saw Mills in Visakhapatnam District	24
7.	Saw Mills of Visakhapatnam Town	25
8.	Saw Mills in East Godavari District	26
9.	Saw Mills in Rajahmundry Town	27
10.	Saw Mills in Kakinada Town	30
11.	Saw Mills in West Godavari District	30
12	Saw Mills in Eluru	31
13	Saw Mills in Khammam District	32
14	Saw Mills in Khammam Town	32
15	Saw Mills in Kothagudem Town	33
16	Species Composition of Saw Log Input	34
17	Quantity of Round Timber Sawn at Govt. Saw Mill	45
18	Population and No. of Houses in the Agency Areas	56
19	Population and No. of Houses in Plains Areas	58
20	Number of Houses using Pole Wood in Plains	59
21	Quantity of Consumption per person for a period of 30 days	65
22	Expenditure per person per 30 days in A.P. State	66

Table No.	Subject	Page
23	Record Removals of Fual Wood in 1967-68	70
24	Bamboos Re-exported from Rajahmundry (1968)	77
25	Timber Trade by Species in 7 Major Markets of the Zone	80
26	Supply Sources of Timber Traded in the 7 Markets of the Zone	81
27	Exports and Re-exports for zone	81
28	Receipts of Timber into Rajahmundry Market in 1968	87
29	Accounts of Consumption inside zone and Export to places outside	91
30	Timber prices at Rajahmundry (January 1969)	92
31	Sawn Wood Prices in Khammam Market	99
32	Summary of Estimates of Consumption of Industrial Wood in 1968	100
33	Import of Timber into Zone	102
34	Recorded Production from Forests of Zone 1967-68	103

MAP SHOWING THE LOCATION OF SURVEYED AREA OF EAST GODAVARI. (A. P.)

SCALE : 1 INCH = 32 MILES



INDEX

SURVEYED AREA.
ROAD.
RIVER.
RLY. LINE.
STATE BOUNDARY.
DIST. BOUNDARY.

1. INTRODUCTION

This study was undertaken to ascertain with as much accuracy and detail as possible the present pattern and level of wood use in the 4 districts of Andhra Pradesh namely Visakhapatnam, East Godavari, West Godavari and Khammam. These 4 districts form the demand study zone and will be referred to hereafter as the 'Zone'. The East Godavari catchment of Andhra Pradesh in which the Preinvestment Survey of Forest Resources has been undertaken, is located in the 4 districts mentioned above. These districts with a population of 9.5 million persons (1971) constitute the main market for the wood emanating from the areas surveyed because geographically it is the nearest region and economically it is an area with a growing demand for various products. The entire wood needs of the 4 districts are not being met from the areas surveyed. The picture of wood demand is rather complex with the variety of species, numerous sizes and different grades of wood being demanded at various levels of prices. The supply sources are many including regions outside the State of Andhra Pradesh. In view of the complexity of the situation, this detailed study has been undertaken with the following objects:-

1. To prepare the accounts of level of wood consumption in 1968 by various categories of wood users with particular reference to species, sizes and grades of timber in demand. Wood in this context includes both industrial wood and fire wood.

2. To prepare accounts of consumption of bamboo for industrial and non-industrial uses.

3. To survey the present status of markets in the zone and indicate the species, sizes, qualities and quantities in demand and their price levels.

4. To forecast the level of consumption in the zone in 1975 and in 1980.

To this end detailed information about the economic background of the 4 districts viz: situation, population, rate of growth of population, characteristics of population, income, literacy, growth of industrial economy, growth of agricultural economy, etc. was gathered.

The accounts of consumption of wood for various uses have been prepared category-wise. The following categories of wood consumption have been recognised and the quantification was done according to the method briefly indicated in the foregoing paras:

a) Round Wood Consumed By Various Wood Based Industries In The Zone:

A list of wood based industries in Central Zone has been prepared - which in fact proved to be a very short list - because many industries are absent in the zone. The consumption of bamboos and wood by industries is ascertained either by direct enquiry or through the records of the forest department.

b) Consumption Of Saw Logs By Sawmilling Industry:

By far the most significant processing industry in the zone is the sawmilling industry. Much stress has been laid in the preparation of accounts of saw logs which constitute the input in the sawmills of the zone. An exhaustive list of saw mills has been prepared and a quantification of the total level of consumption and also the species and the sources from which the wood is obtained, is made.

c) Consumption Of Wood For Railway Sleepers, Mining Props And Transmission Poles:

The traditional wood use in categories like railways, mining, telecommunication poles, etc., is of very little significance in this zone. Yet their role has been clarified in the report.

d) Consumption Of Poles For Construction:

The demand study zone being predominantly rural area, the consumption of wood in this category is high. In the absence of a sample survey various derivative methods have been used to estimate the consumption of wood under this category. The recorded data that is profusely quoted is from Census 1961.

e) Round Wood For Agricultural Purposes:

Rough estimates mostly of preliminary nature have been made to quantify the wood required for diverse needs for agriculture in the zone

f) Consumption Of Fire Wood.

With the help of sample surveys which have already been conducted on a national scale, estimates of firewood consumption in the zone have been made

g) Consumption Of Bamboo:

Primarily Bamboo consumption is for industrial uses in view of a paper mill that is located within the zone. Quantification is done for the bamboo used by the paper mill. In addition, Bamboos consumed by various other non-industrial uses have also been accounted for separately.

After obtaining detailed information about the pattern and the level of consumption, consolidated consumption accounts have been prepared and keeping in view the factors that affect the demand, forecast of the requirements for 1975 and 1980 are made.

2. ANALYSIS OF ESTIMATES OF PRESENT WOOD CONSUMPTION

Estimates of present (1968) levels of wood and bamboo consumption in the Zone are summarized in Table No. 32. An examination of this Table indicates:-

1) The level of consumption of industrial wood i.e., all categories of wood except fuel wood is 121,500 cum (r).

2) The consumption of saw log sized round wood by the sawmilling industry is by far the most significant in the zone. In terms of round wood equivalent it is 72,000 cum (r) and represents about 59% of the total industrial wood consumption in the zone. There are 207 saw mills in the zone at 74 centres - their dispersal being far and wide in the districts of East Godavari and West Godavari and not so spread out in the other two districts.

   Integrated Govt. Saw Mill, seasoning kiln and treatment plant at Rajahmundry is the only major mill in the region with an input of 5,660 cum (r) logs. However, most mills are one band saw mills with their actual input of saw logs between 300 to 500 cum (r) per annum.

3) There are no plywood, particle board or hard board mills in the zone. Ship building, boat building and vehicle body building industries and transmission poles put together account for a modest 2,700 cum (r) per annum which is just 2% of total consumption.

4) The estimated consumption of logs for hand sawing is 4,000 cum (r) which works out to be about 3% of total consumption.

5) Requirements of timber for mining is to the extent of 8,000 cum (r) (6.5% of total consumption) per year. This is the consumption of Collieries at Singareni in Khammam District which produce 1.5 million tonnes of coal per year.

6) The consumption of poles for construction is estimated at 29,800 cum (r), which is 24.5% of total consumption.

7) Wood used for agricultural implements accounts for about 4% of total consumption. It is 5,000 cum (r).

8) There is sizable re-export of timber imported first into the markets of the zone to outside districts and also export from the quantity produced in the zone. Together they amount to 27,500 cum (r).

9) Use of wood for fuel far surpasses all other uses put together. It is estimated to be more than 3.6 million c cum (r) annually of which 90,000 cum (r) is industrial firewood.

10) There are three chief sources of supply of industrial wood:

(a) Imports into the zone mostly from Bastar (M.P.), Orissa and Maharashtra;

(b) Production from the forests of 8 forest divisions that lie in the zone; and

(c) Production from non-forest lands.

Out of total consumption of 149,000 cum (r) (including re-exports (27,500 cum (r))) of industrial wood, the supply from three sources mentioned above is:

		Cum (r)
a)	Imports	60,000
b)	Production from forests of zone -	
	Recorded	52,000
	Unrecorded	5,500
c)	Production from non forest areas ..	31,500
	Total ..	149,000

All the forest area in the eight divisions is not surveyed by the organization. Portions of Khammam and Paloncha divisions and Kothagudem division in its entirety, are out of the surveyed area. The estimated present annual drain of industrial wood from the surveyed forest area is 22,000 cum (r).

11) As per classification the basis of which has been explained in para 14.2 the fire wood supply sources are as mentioned below:

		Cum.(r)
- Supply of firewood (which has alternate uses) from forests (900,000, recorded removals consumed in agency and + 35,500 cum consumed in agency and removed on free grants)	...	935,500
- Supply from private farm lands of Casuarina	...	100,000
- Supply from saw mill waste	...	35,500
- Supply of fire wood from unrecorded sources that is, removal by head loads from forests, non forest species and other material.	...	2,553,500
Total	...	3,625,500

12. The only major forest based industry is the Andhra Pradesh Paper Mills at Rajahmundry. It consumes 100,000 air dry tonnes of Bamboos per annum of which 74,000 air dry tonnes are derived from forests of the zone.

13. There is a consumption of 50,000 air dry tonnes of Bamboos for non industrial uses in the zone entirely derived from forests of the zone.

Contents

3. BACKGROUND

3.1. General:

The State of Andhra Pradesh which is the fifth largest in India has a population of 43.39 million (1971) and ranks as the fourth most populous State in the Country. Administratively it is divided into 21 districts thougby physiographic regions the State has 3 regions:

1) The coastal plains
2) The inland plains
3) The eastern ghats

Forests are mainly on the eastern ghats and on inland plains which consist of flat or undulating lands and small hillocks and include Telangana and Rayalaseema regions. Krishna and Godavari are the two most important rivers in the State which flow through the eastern ghats to the Bay of Bengal. They are perennial and bear on their banks some of the richest forests of the State.

The Preinvestment Survey of Forest Resources has located after detailed reconnaissance studies, the East Godavari catchment lying in the districts of Visakhapatnam, East Godavari, West Godavari and Khammam as the most promising wood supply basin in the State. The four districts constitute the demand study zone for which the accounts of consumption of wood have been prepared.

The region is mainly dependent on agricultural economy The districts of East Godavari and West Godavari are among the richest in the State. These are considered as the granary of Andhra Pradesh. Besides paddy which is the main crop, cultivation of Jute, Sugar cane and tobacco and raising of Coconut and Banana gardens have helped in the economic growth of these districts.

Industrially, these four districts show some advancement but not commensurate with the potential. Visakhapatnam town with a population of 0.36 million (1971) is the hub of industrial activity in the region. Hindustan Shipyard, Caltex refineries, Indian Oxygen, Coromandal fertilisers and a concern manufacturing transformers are the major industries located here. The busy harbour lends a distinctive skyline dotted with cranes to this growing town. There are also 6 jute mills located at Chittivalasa and Vijayanagaram and a Sugar mill at Anakapalli in Visakhapatnam district.

In East Godavari district the only industries worth the name are an Acetic acid plant at Chelluru, Sugar mills at Samalkot and Pithapuram, a textile mill at Kakinada and two promising concerns at Kadiyam (near Rajahmundry) one of which is a fruit canning industry and the other which manufactures electrical goods like Aluminium rods and cables.

In West Godavari district Kovvuru is the centre of heavy chemicals industry. The Andhra Sugar Factory here produces Caustic soda, Hydrochloric acid and Alum. There is also a fertilisers mixing concern at Kovvuru. Tanuku is another important industrially developed town in West Godavari district. It has textile mills and also a sugar factory. In Eluru, the headquarter of West Godavari district there is a roller flour mill, textile mill, a jute mill, and a tanning factory.

In the district of Khammam, Kothagudem is the centre of industrial activity. Besides the Singareni collieries which produce 15 lakh tonnes of coal per annum there is a Barium Chemicals plant and a thermal power station in and around Kothagudem.

Industrially the entire region is on the threshold of further advancement and it can be expected that some centres like Visakhapatnam, Rajahmundry, Kovvuru, Tanuku, Eluru and Kothagudem will develop further into urban agglomerations with greater propensity towards constructional activity.

3.2. Population:

The population of the demand study zone is 9.3 million which is 24% of the total population of the State. The density of population in West Godavari district is highest (304 per sq. km.) and that of Khammam district is the least (86 per sq. km.). In general 80% of the population of the zone is confined to the rural areas. The urban population is the highest in East Godavari district (593,637) where there are 2 big towns (Rajahmundry, Kakinada) with a population of over 100,000 each. Visakhapatnam district has an urban population of 611,898 of which Visakhapatnam itself has a population of 362,270. The other big towns in this district are Anakapalli, Vijayanagaram and Narsipatnam.

West Godavari district has an urban population of 420,617 of which more than 100,000 live in Eluru town. The other populated centres in the district are Bheemavaram, Narsapur, Palacole, Tadepalligudem and Tenuku.

The urban population of the Khammam district is the least being 197,577. There are only 2 towns - Khammam (35,000) and Kothagudem (69,000). The following table gives the population statistics of the 4 districts.

Contents

TABLE - 1

Population Statistics of Command Study Zone
1971.

District	Area -000 Km.	1971 Pop. in mill.	Change 61-71	Density per sq km.	Rural pop. in mill	Urban Pop. in millions
Visakhapatnam	13.7	2.79	+ 18.45	203	2.17	0.611
East Godavari	10 83	3.07	+ 17.97	281	2.48	0.593
West Godavari	7.72	2.36	+ 19.54	304	1.94	0 420
Khammam	15.92	1.36	+ 29.46	86	1.17	0.197
Population of Zone		9.58			7.76	1.8

Out of the total population, 485,051 persons according to 1961 Census are living in the agency areas of the 4 districts. The agency areas mainly occur in eastern ghats and are surrounded by forests. The people living there are mainly Scheduled Tribes whose economy is very much dependent on the forests. The rest of the population is confined to the plains areas and according to 1981 Census it is 7.44 million. The average annual change in the population is different in the agency areas and in the plains areas.

3.8. Literacy:

The percentage of adult literacy varies from one district to the another. It is only 11.37% in the case of Khammam and 28.63% in the case of W. Godavari. In the case of Visakhapatnam it is 13.01% and in East Godavari it is 24.45%. The progress towards increase in the number of literate people and in the number of school-going

children is of significance when we consider the markets for paper within the zone. However the facts about literacy are only mentioned here in a passing way but are not used to make any forecast for the demand for paper in future years.

The following table gives the number of literate people, the percentage to total population and the annual rise in literacy based on 1951 and 1961 figures:

TABLE - 2.

Literacy Statistics.

District	Literate '000		% to total population	
	1961	1971	1961	1971
Visakhapatnam	393	595	17.2	21.33
East Godavari	678	955	23.0	31.02
West Godavari	609	828	30.8	34.94
Khammam	161	253	15.2	18.45

3.4. Per Capita Income:

Figures of per capita income for the zone from 1952-53 to 1965-66 are as indicated below:

Per Capita Income at current prices

Year	Per Capita Income (Rs.)
1952-53	221.91
1953-54	238.37
1954-55	214.47
1955-56	225.65
1956-57	255.85
1957-58	281.44
1958-59	275.99
1959-60	287.60
1960-61	296.24

Contd.

Contents

Year	Per Capita Income (Rs.)
1961-62	319.21
1962-63	328.62
1963-64	372.15
1964-65	402.55
1965-66	338.94

(Source: Bureau of Economics & Statistics, Hyderabad).

The following are some of the figures of per capita income at fixed prices:

Per Capita Income at Fixed Prices (1960-61)

1950-51	256
1955-56	281
1960-61	306
1965-66	319

(Source: Bureau of Economics & Statistics, Hyderabad).

Contents

4. CONSUMPTION OF WOOD AND BAMBOOS BY INDUSTRIES

4.1. General

The only industry using wood to a considerable extent is the primary processing industry of saw milling which has the furniture and joinery industries at its adjuncts The wood used in saw milling industry is discussed in para 10. There are no plywood and veneer mills, particle board or fibre board mills in the zone. There is however a paper mill of significant size at Rajahmundry which is presently using Bamboo as raw material, the present status of this industry and the scope for its expansion is discussed as under:

4.2. Andhra Pradesh Paper Mills, Rajahmundry:

The Andhra Pradesh Paper Mills at Rajahmundry was under the management of Government of Andhra Pradesh (Industries Department) till 1964. At that time it had a capacity of only 10 tonnes per day. In 1964 the present management took over the mill as managing agents. 49% of the shares are presently held by Somani and Bangor group of industrialists and the Govt. of Andhra Pradesh holds 51% of the shares. The Board of Directors has two representatives of Government functioning in it - the Secretaries of Industries and Food and Agriculture Departments of Govt. of Andhra Pradesh - besides the representatives of industrialists.

The rated capacity of the mill is 100 tonnes per day or 35,000 tonnes per year. Both the ten tonne old unit and the new machines were commissioned for commercial trial production in April, 1967

The production for the year ending 30th June, 1967, was 6,560 tonnes. The production of the new machines has gradually gone up and it became possible to stabilise the rated capacity production during 1967-68. By the year ending June, 1968 the annual production of paper was 28,370 tonnes(nearly 80 tonnes per day). It is expected that the full capacity of 100 tonnes per day will be reached during the coming years.

The mill has 4 digesters each with a capacity of 80 cum and kraft process is adopted for cooking The factory is equipped with modern machines and mostly stainless Steel parts are used in machinery to avoid problems of erosion and corrosion. The mill is chiefly manufacturing printing and wrapping paper, bond paper, match paper and craft paper on high speed paper machines whose speed is 200 metres per minute.

The mill is obtaining the chemicals from the following sources and at the rates mentioned against them.

Lime	..	From Dronachalam - Rs. 40 per tonne
Salt cake	..	Bengal and Calcutta - Rs. 500-600 per tonne.
Chlorine and Caustic soda	..	Kovvur (Kovvur is situated 2 miles away from the paper mills on the other bank of River Godavari).
Alum	..	Bombay - Rs. 500 per tonne (A new Alum plant is coming up at Kothagudem in which case the prices for Alum will be considerably less).
China clay		Rajahmundry - Rs. 230 per tonne.

Coal is obtained from the Kothagudem and Belampalli in Andhra Pradesh itself and its cost is about Rs. 70 per tonne at mill site. It is possible to get even increased quantities of coal from these collieries at acceptable price.

The power consumption of the mill at present is 8,500 KW. per day of which 2,000 KW. is produced by the 2 generators at the mill site.

Contents

Additional power required now is obtained from Ramagundam and Machkund. To enable future expansion an additional power house which can produce 5,000 KW is being installed. Moreover the Andhra Pradesh Government has liberalised the supply of power to industries and no difficulties are envisaged regarding power availability for an expanded capacity.

The perennial River Godavari is a source of abundent water now and it will be so in future.

The present method of effluent disposal is to pump the effluent up stream and let it loose on a sandy island in the middle of the river. The effluent is given time to soak into the sand and get filtered. Filtered effluent is then allowed to join the main stream of the river where the water flow is 2,000 cusecs per minute. It is said that this manner of effluent disposal is one of the best modes that can be found in the country. Effluent disposal will present no problems even when the expansion of the mill take place.

The mill is situated in a vast area of 106 acres and a railway siding is being constructed which is expected to be ready in 2 or 3 years. There is also a big yard allotted to the paper mills at the Railway station. Thus consideration of space presents no problem for future expansion of the mill.

From the above details it is clear that all elements of infrastructure exist to further expand the present 100 ton per day paper mill after duly considering the aspects of markets for the products and availability of fibrous raw material for manufacture of pulp.

4.3. Markets:

The mills have no problem of marketting their present production. Currently they are producing:

Industrial paper, Wrapping and packing paper	50 tonnes per day.
White writing & Printing paper, Offset paper, Map litho paper, Bond paper, Ledger paper	50 tonnes per day.

90% of their paper is marketted in Andhra Pradesh itself and only 10% is going out to other states. They receive bulk orders from the following customers:

		Tonnes per year
1.	Box Board Industries Association	11,000
2.	ITD Co., Guntur	3,000
3.	Hylam, Hyderabad	2,000
4.	IPM	1,500
5.	A.P. Govt. Text Book Press	1,000
6.	A.P. Govt. orders through DGTD	3,500

2.4. Raw Material:

The mill was granted bamboo leases in 7 divisions of Andhra Pradesh namely Visakhapatnam, Kakinada, Eluru, Bhadrachalam South, Nandyal, Kurnool and Giddalur. The expected annual yield from 74 falling series leased out to the mills is 100,000 tonnes. The royalty rate is Rs. 5/- per tonne of air dry bamboo (at 10% moisture content) as weighed at the mill site. The royalty rates are subject to revision once in 5 years. The total period of the present agreement, current from 1967, is 30 years.

Out of 100,000 tonnes, nearly 74,000 tonnes are supplied from the forests of Visakhapatnam, Kakinada, Eluru and Bhadrachalam South divisions which are under survey by the project. From areas in

Contents

Kurnool circle about 25,000 to 26,000 tonnes is the annual yield allotted to the mills. However during 1967-68 the mills obtained only 3,000 tonnes of bamboos from these areas.

TABLE - 3.

Supply of Bamboos to Andhra Pradesh Paper Mills from the Zone.

Division	No. of series	Average yield per year in tonnes (air dry)
Visakhapatnam	20	34,650
Kakinada	15	25,550
Eluru*	4	6,800
Bhadrachalam South	8	7,000
	47	74,000

*In Eluru division two Series (Kondapalli and G. Kondur) whose annual estimated yield is 1,400 tonnes are not surveyed by P.I.S.

The mill is paying from Rs. 65 to Rs. 120 per tonne of Bamboos delivered at mill site. The cost naturally depends on lead and some variations in cost of bamboo obtained from various leads is given below:

Locality	Average lead	Cost at mill site
1. Kakinada Division	70 miles	75/-
2. Visakhapatnam Division	90 miles	85/-
3. Bhadrachallam & West Godavari	70 to 100 miles river drive	Rs. 98/-
4. Kurnool	300 miles - rail	Rs. 120/-

The mills do not find it very economical to bring bamboos from Kurnool area. They are inclined to extract the areas in agency to the fullest extent.

Contents

5. CONSUMPTION OF WOOD BY SHIP AND BOAT BUILDING INDUSTRY

5 1. Hindustan Shipyard, Visakhapatnam:

The most important ship building industry of the country is located at Visakhapatnam The Hindustan Shipyard at Visakhapatnam builds on an average 5 ships per year but the use of timber in the modern ship building industry is very little. Whatever timber is used by the Hindustan Shipyard is of very rigid specifications and local timber dealers are discouraged by these specifications in making supplies to the Shipyard. In fact it is known that the Hindustan Shipyard is calling for global tenders and is obtaining supplies of quality-1 Douglas fir even from Canada in the shape of 12" x 12" x 16' boards This wood is used for the manufacture of gang planks (3" x 12" x 16') and hatch covers Of late certain dealers in coniferous timber from Pathankot and Kashmir are making efforts to capture this order as a measure of import substitution The total quantity of timber consumed annually by Hindustan Shipyard is 1,500 cum (r) broken up by species into the following quantities.

Teak	340 cum (s)
Calophyllum inophyllum (Poon)	310 cum (s)
Coniferous timber	850 cum (s)

(Source: Hindustan Shipyard, Visakhapatnam)

All this timber at present is being imported from outside the State of Andhra Pradesh and there is no drain on this account on the forests of the zone. To arrive at the total quantity imported into the zone 1,500 cum (r) which is directly imported by Hindustan Shipyard has to be added to the imports revealed through trade enquiries in the markets.

Contents

5.2. Government Boat Building Yard, Kakinada:

There is a boat building yard managed by the Government of Andhra Pradesh at Kakinada. The total intake of round timber in the boat building is 300 cum (r) per year. Most of this timber is of Teak only. The consumption of the timber species-wise is as given below:

Teak	...	440 cum (r)
Pterocarpus marsupium	...	30 cum (r)
Terminalia tomentosa	...	15 cum (r)
Adina cordifolia	...	15 cum (r)

Though the boat building yard calls for an all India tender for supply of logs, generally the supply is from the timber merchants of Rajahmundry and Kakinada. The boat building yard has its own saw mill where the logs are converted to required sizes.

6. CONSUMPTION OF WOOD FOR VEHICLE BODY BUILDING

There is one vehicle body building firm at Kakinada - Ramdas Motor Transport Company, Limited. The firm is building vehicle bodies using timber and plywood. Their consumption of timber is about 450 cum (r) Teak - 340 cum (r), Sal - 70 cum (r), Adina cordifolia - 40 cum (r). Sal is being used only since last year and that too for the first time. There is a possibility that a high percentage of sal may be used generally in future years. The firm also uses considerable quantities of plywood and the consumption is given below:

12 mm. thickness 6' x 4' sheets - 200 annually.

9 mm. " 6' x 4' sheets - 400 "

3 mm. " 6' x 4' sheets - 50 "

Logs are obtained from the merchants of Rajahmundry and a small quantity from Kakinada and sawn in their own saw mill.

Broken up by sources out of 450 cum (r) consumption, 400 cum (r) is imported and 50 cum (r) is the drain on the forests of the zone.

Contents

TIMBER FOR MINING

Singareni Coal Mines whose headquarters is at Kothagudem does mining operations at several places in Khammam district and also at Bellampalli, Mandamarri and Ramagundam in Adilabad district. The estimated quantity of coal mined per year in Singareni collieries is 1.5 million tonnes. As far as Khammam district is concerned only the quantities of timber that are used in the mines in the collieries at Kothagudem and Yellandu are significant.

Timber in these mines is used either in the form of sawn wood pieces called "Chocks" or in the form of round ballies for props and cross bars. The general sizes of chocks in use are:

4' x 6" x 5"
4' x 6" x 4"
4' x 5" x 5"
4' x 5" x 4"
6' x 5" x 4"

The props are generally 75 cms to 105 cms in girth and the length vary from 2.5 metres to 5.5 metres. The most common species used are:

Hardwickia binata	(Yeppa)
Diospyros melanoxylon	(Tumika)
Terminalia tomentosa	(Maddi)
Anogeissus latifolia	(Chirumanu)

There is also some consumption of soft wood logs like Gmelina arborea (Gummadi), Boswellia serrata (Andook), and Terminalia belarica (Tapasi).

The collieries have their own leases in the forests of Kothagudem and Paloncha divisions from where they obtain most of the timber that is required by them. These forests are not surveyed by the Pre-investment survey. The total quantity of timber consumed by the collieries for one purpose or other is 8,000 cum (r) in 1968 and Table 4 gives the

Contents

break-up of this quantity into various categories for the 2 important mines in Khammam district.

TABLE - 4.

Consumption of Wood for Mining.

Unit: Cum (r)

Category	Quantity
Chocks	5,000
Props	2,000
Cross bars	400
Logs (soft wood)	200
Logs (hard wood)	400
Total	8,000

(Source: Singareni Collieries Authorities, Kothagudem).

This timber is derived from forests within Khammam district but do not form part of drain on the forests surveyed as it comes mainly from the divisions of Kothagudem and Paloncha.

Contents

8. CONSUMPTION OF WOOD FOR RAILWAY SLEEPERS.

During the year 1967-68 no supply of sleepers to Indian Railways was reported from any of the divisions that are surveyed.

9. CONSUMPTION OF WOOD FOR TRANSMISSION POLES

The consumption of transmission poles by electricity and Post and Telegraph Departments in the Zone is assumed to be equal to the supply from recorded sources. However during the year 1967-68 the total supply amounted to a negligible figure of 1,500 poles from the divisions of Kakinada, Bhadrachallam North and Bhadrachallam South.

The specifications of these poles supplied are:

Electric Transmission Poles:

Length	- 8 metres to 9 metres.
Top end girth	- 42 cms to 48 cms.
Bottom girth	- 60 cms to 68 cms.

Telegraph Poles:

Length	- 6.5 metres to 8 metres.
Top end girth	- 30 cms to 35 cms.
Bottom girth	- 45 cms to 50 cms.

Using a conversion factor of 0.125 cum per pole the aggregate consumption of wood for transmission poles in the zone works out to 190 or 200 cum (r) per annum. This quantity constitutes a drain on the forests of the zone.

Contents

10. CONSUMPTION OF SAW LOGS BY SAW MILLING INDUSTRY

10.1. General:

Saw Milling, though a primary processing industry is fairly well developed in the region because of the extensive use of sawn wood for constructional activity. The occurrence of the saw mills is mostly confined to urban population centres and to big villages where the types of houses built are such that sawn wood is necessarily used. The rural landscape of the region is definitely dominated by the ubiquitous presence of the "thatched hut" where instead of sawn wood, the use of such diverse materials as poles and palmyrah rafters, Bamboos, thatch and Palmyrah leaves strike the eye. On the other end of the spectrum are the modern houses of the urban areas where again a variety of building materials like steel, cement, plywood and flush doors have tried to oust sawn wood. Yet the good old tiled house , the Madras terrace building and even the modern concrete house still employ a good deal of sawn wood which explains the number of saw mills and the production of sawn wood at the level that is observed in the region.

10.2. Number Of Saw Mills And Input Of Saw Logs:

There are at least 74 centres in the four districts surveyed where saw milling industry exists. There are 207 saw mills whose total input of saw logs is 72,000 cu.m. (r).

TABLE - 5.

Input of Saw Logs in the Saw Mills of the Zone

Unit: Cu.m.(r)

District	No. of towns or villages with saw mills	No. of saw mills	Input of saw logs
Visakhapatnam	10	38	16,000
East Godavari	39	93	34,500
West Godavari	18	54	11,500
Khammam	7	22	10,000
Total	74	207	72,000

10.2.1. Saw Mills In Visakhapatnam District:

There are 38 saw mills in Visakhapatnam District of which 13 are located in Visakhapatnam, 8 in Vijayanagaram and 6 in Anakapalli and the rest in other villages. The input of saw logs in these mills is 16,000 cu.m.(r).

TABLE - 6

Saw Mills In Visakhapatnam District

Unit: cu.m.(r)

Town/Village	No. of saw mills	Input of saw logs
Visakhapatnam	13	5,700
Vijayanagaram	8	3,400
Anakapalli	6	2,550
Yelamanchili	2	850
Narsipatnam	2	1,420
Chodavaram	2	570
Kottavalasa	2	570
Kancharapalam	1	340
Gopalapatnam	1	300
S. Kota	1	300
Total	38	16,000

Visakhapatnam town has 13 saw mills with an input of 5,700 cu.m.(r) of saw logs. 12 of the mills have 2 band-saw mills

each and in one there is a single band-saw. The input of saw logs varies from mill to mill. There is a mill with an input of 170 cum(r) though it has two band-saws. There is one with an input of 680 cum (r) though it also has 2 band-saws. These divergencies are attributable to the quality of managerial skill available with the different mills. The installed capacity of the saw mills is much more than the actual input and the reasons for such a situation are analysed elsewhere in this report.

An important feature about the saw mills of Visakhapatnam is that the saw mills do not have their own depots for stocking and selling of either round wood or sawn wood sizes. They cut the timber brought to them by timber traders or by consumers direct. There are separate timber depots in Visakhapatnam who deal in sale of wood either in round or in sawn form.

TABLE - 7.

Saw Mills of Visakhapatnam Town

Unit: Cu.m.(r)

Name of Sawmill	No. of Band saws	Input of saw logs
1. Narasimha Saw Mill	2	680
2. Vara Narasimha Saw Mill	2	170
3. T.J. Appabuarasaiah & Sons	2	450
4. C. Venkataswamy & Sons	2	710
5. Venkateswara Saw Mill	2	570
6. Durga Saw Mills	2	450
7. Ratnam Timber Co.	2	280
8. Vanka Pydikondaiah & Co.	2	570
9. Vizag Timber Yard	2	425
10. Godavari Timber & Furniture Co.	1	280
11. Vishnu Saw Mill	2	340
12. Lakshmi Saw Mill	2	340
13. R. Sun & Co.	2	425
		5,690 or 5,700

10.2.2. Saw Mills In East Godavari District:

Roughly half the total input of saw logs of the zone is claimed by the 93 saw mills located at 39 centres of East Godavari District. The total actual input of saw logs in the mills of this district is 34,500 cu.m. (r).

TABLE - 8.

Saw Mills in East Godavari District

Unit: cu.m.(r)

Name of Town	No. of Saw mills	Input of saw logs
Govt. Sawmill, Rajahmundry	1	5,660
Rajahmundry (other mills)	16	2,320
Kakinada	5	2,110
Samalkot	3	930
Tuni	2	850
Gokavaram	2	570
Pithapuram	2	570
Korukonda	2	280
Seethanagaram	1	230
Rajanagaram	2	450
Gollaprolu	2	420
Kirlampudi	1	230
Pathipadu	1	170
Jaggampeta	2	340
Talluru (Ragampeta)	2	280
Yeleswaram	1	280
Sankavaram	1	230
Peddapuram	4	990
Anaparti	2	430
Devarapudi	1	200
Ramachandrapuram	3	570
Mandapeta	5	1,130
Draksharam	1	200
Amalapuram	5	1,130
Tapeswaram	1	200
Alamuru	2	280
Teksettipalam	3	570
Rajole	2	280
Kottapeta	1	140
Palivela	2	280
Vubalanka	2	280
Hemagiri	1	170
Rangampeta	1	140
Jagapatinagaram	1	140
Tallarevu	2	280
Gollalamamidada	1	140

contd.

Contents

Name of town	No. of saw mills	Input of saw logs
Mukteswaram	1	230
Munnadivaram	1	230
Edarapalli	1	230
Thatipaka	2	340
	93	34,500

~~Note:- Figure of intake of wood (r) in cu.m. is rounded off to~~ nearest 10cu.ms.

Rajahmundry is by far the most important saw milling centre of the district with 18 saw mills besides the Government owned integrated saw mill, seasoning kiln, treatment plant and wood workshop. Whereas the annual input of saw logs at Government saw mill is 5,660 cu.m.(r) the other mills saw 12,320 cu.m.(r) of saw logs every year.

TABLE - 9.a

Saw Mills in Rajahmundry Town.

Name of Saw Mill	No. of Band saws	Unit: cu.m.(r) Input of saw logs
1. Narayana Saw Mill	1	420
2. Sri Ram Saw Mills	2	570
3. Sri Venkateswara Swamy Sawmills	2	570
4. Bheema Saw Mill	2	1,130
5. Durga Saw Mill	2	1,130
6. Deccan Saw Mill	2	1,420
7. M. Kalinga Rao Saw Mill	1	280
8. Veera Naidu Saw Mill	1	280
9. Osmania Saw Mill	1	280
10. Ananda Saw Mill	4	990
11. Veera Venkata Satyanarayana Saw Mill	2	570
12. Ramakrishna Saw Mill	2	420
13. National Saw Mill	2	420
14. Ratna Saw Mill	2	1,000
15. Gajalaxmi Saw mill	2	1,010
16. Madireddi Narsimharao & Co.	2	990
17. Sri Anjaneya Saw mill	2	420
18. Sri Gouriasankar Saw Mill	2	420
	Total:	12,320

Contents

The existing number of saw mills in Rajahmundry is no indication of the vigour and volume of saw milling in this town in recent past. A trend that is plainly discernible in last few years is that the number of saw mills in Rajahmundry is declining. Rajahmundry was the main saw milling centre which caters to the sawn wood needs of the people in three distinct regions viz:

1. The delta area of Godavari called Konaseema. It is a rich area with a developed agriculture economy and plantations of coconut and bananas. House construction activity is maximum in this area;

2. The coastal plains of West Godavari and Krishna; and

3. The uplands of Nellore and Guntur districts.

In the past the customers from these regions were buying round timber in lots from Rajahmundry depots, getting them sawn at the saw mills in Rajahmundry to required sizes and transporting the sawn timber to respective destinations. Since last two to three years small saw mill-cum-timber depot owners have established their own timber trade in the outlying districts. They now buy round timber at Rajahmundry, transport to the big villages and towns and keep stocks of saw logs. This explains the rather large balances of saw log re-export from Rajahmundry market details of which are given under para 15.3. Thus saw milling industry got dispersed geographically in recent years. The following schematic diagram shows the change in the trend of sawn timber trade.

Contents

/PAST/ RAJAHMUNDRY TIMBER DEPOTS

SAWING AT RAJAHMUNDRY SAW MILLS

Sawn timber going to customers from villages & towns.

Note:- Customers dealt directly with Rajahmundry market

/NOW/ RAJAHMUNDRY TIMBER DEPOTS

Round wood purchased by small timber traders from outlying towns.

Round timber transported and stocked at depots of villages and towns

Sawing in the sawmills of villages & towns as per orders

Sawn timber sold to customers at the villages

Rajahmundry timber market is still serving as a wholesale market for logs and deals with many small timber traders coming from districts But saw mills in Rajahmundry have declined in number and volume of sawn timber produced is less At the same time saw mills in the villages of the district have increased in number as could be seen from Table - 8.

In Kakinada, the headquarters of the district there are only 5 private saw mills. There is one saw mill with Ramdas Transport Company, who specialises in vehicle body building and one at the Boat Building Yard. The quantities sawn in these mills are accounted for under the vehicle body building industry and the boat building industry. The total input of saw logs in these mills is 2,110 cu.m.(r).

TABLE - 10

Saw Mills in Kakinada Town

Unit. Cu.m.(r)

Name of Saw Mill	No. of Bandsaws	Input of saw logs
1. Ramakrishna Saw Mills	1	280
2. Surya Saw Mills	3	570
3. Venkateswara Saw Mills	1	420
4 Dayanand Saw Mills	2	570
5. Mani Saw Mills	1	270
Total		2,110

10.2.3. Saw Mills In West Godavari District:

In West Godavari District there are 54 saw mills with an input of 11,500 cu.m.(r) saw logs located at 18 centres. A major saw milling centre is Eluru with 9 mills and an output of 2,670 cu m.(r) Nidadavolu, Tanuku, Narsapur and Tadepalligudem have four saw mills each and Bhimavaram has 5 saw mills.

TABLE - 11.

Saw Mills in West Godavari District

Unit: Cu.m.(r)

Name of Town/Village	No. of saw mills	Input of saw logs
Eluru	9	2,670
Nidadavolu	4	1,130
Tanuku	4	1,130
Penukonda	1	280
Maruteru	1	280
Palakollu	2	340
Kovvuru	2	340
Brahmanagudem	1	140
Narsapur	4	990
Bhimavaram	5	1,130
Polavaram	3	420
Chintalapudi	3	420

contd.

Contents

Unit. Cu.m.(r)

Name of Town/ Village	No. of Saw Mills	Input of saw logs
Akividu	2	260
Mudinepalli	1	140
Jangareddigudem	2	280
Aswaraopet	2	280
Tadepalligudem	4	1,130
Tallapadu	1	140
	54	11,500

TABLE - 12

Saw Mills of Eluru

Unit: Cu.m.(r)

	Name of Saw Mills	Input of saw logs
1.	Sri Krishna Welding & Sawmills	340
2	Gourisankar Sawmills	400
3.	Vani Sawmills	360
4.	Venkateswara Saw mill	400
5.	Durga Sawmills	340
6.	Sri Saibaba Sawmills	200
7.	Venkateswara Saw mill	230
8.	Govt. Furniture Shop (Industries Deptt)	200
9.	Sri Venkateswara Furniture Works	200
	Total	2,670

10.2.4. Saw Mills In Khammam District.

Though Khammam District has larger forest area than the others the number of saw mills are few because of the low level of income of the people and consequently low consumption for construction purposes. There are only 22 saw mills in the district at 7 centres. The geographical dispersal of the saw mills is not so manifest as in the other districts, specially East Godavari and West Godavari where the hinter land has rich agricultural economy and consumption of sawn wood is high Out of the 22 saw mills whose input of saw logs is 10,000 cu.m.(r) per annum, 8 are in Kothagudem, 5 in Khammam,

Contents

and 5 at Yellandu which is a coal mining centre.

Khammam District is a net exporter of wood with Kothagudem as the premier market from where wood - chiefly in log form - is exported to the thickly populated wood deficit coastal districts like Krishna, Guntur and Nellore.

TABLE - 13.

Saw Mills in Khammam District

Unit: Cu.m. (r)

Name of Town/Village	No. of saw mills	Input of saw logs
Khammam	5	3,000
Kothagudem	8	5,000
Satpalli	1	150
Yellandu	5	1,200
Paloncha	1	200
Burugampahad	1	150
Bhadrachellam	2	300
Total	22	10,000

Note: Figures rounded off.

TABLE - 14.

Saw Mills in Khammam Town.

Unit: Cu.m. (r)

Name of Saw Mill	No. of saws	Input of saw logs
Sri Uma Vijaya	3	900
Sri Subrahmaniashwara	2	600
Sri Rama Vijayam	2	570
Patel Saw Mill	2	650
Venkateswara	1	280
Total		3,000

Note: Figures rounded off.

Contents

TABLE - 16.

Saw Mills in Kothagudem Town

Unit: Cu.m.(r)

Name of Saw Mill	No. of saws	Input of saw logs
Shankar Saw Mills	2	600
Jagdamba Saw Mills	2	700
Krishna Saw Mills	2	500
Saibaba Saw Mills	2	500
Sulaiman Saw Mills	2	650
Venkateswara Saw Mill	2	700
Kalisingh Saw Mill	2	990
Ramachandra Rice & Saw Mill	1	360
Total		5,000

Note: Figures rounded off.

10.3. Species Sawn:

Out of 72,000 cu.m. of saw logs which is the input in the saw mills of the zone, 32% i.e., 23,000 cu.m.(r) are Teak saw logs. About 30% of the total volume is represented by the saw logs of the non-teak species like Terminalia tomentosa (Maddi), Pterocarpus marsupium (Yegisa), and Adina cordifolia (Bandaru) which are regarded as a cut above the other non-teak species. These 3 species will be referred to by their local names hereafter.

The other non-teak species which yield saw logs are:

Xylia xylocarpa
Anogeissus latifolia
Terminalia belerica
Schleichera trijuga
Albizzia stipulata
Diospyros melanoxylon
Garuga pinnata
Lannea grandis
Dallinia indica

Contents

Bursera serrata
Lagerstroemia parviflora
Stephygyna parviflora
Salmalia malabarica
Ougania dalbergiodes
Gmelina arborea, etc.

The volume of these other non-teak species is 14,300 cu.m.(r) which is 20% of the total volume. There is also a small quantity of 2,800 cu.m.(r) of Sal and 10,300 cu.m.(r) of non-forest species like Mangifera indica (Mango), Acacia arabica (Babul), Eugenia jambolana (Jamun), Azadirachta indica (Neem), etc., being sawn in the mills of the zone.

TABLE - 16

Species Composition of saw log input

Unit: Cu.m.(r)

Place	Saw log input by species					Total saw log volume
	Teak	Sal	MYB	OMT	NFS	
Visakhapatnam Distt:						
Visakhapatnam	400	300	3,000	1,000	1,000	5,700
Vijayanagaram	300	1,000	400	100	1,000	3,400
Anakapalli	200	-	1,000	500	850	2,550
Nafeipatnam	-	-	1,000	400	20	1,420
Other villages	100	-	400	1,400	1,030	2,930
Visakhapatnam Distt: Total:	1,000	1,300	5,800	4,000	3,900	16,000

Contents

Unit: cu.m.(r)

Place	Saw log input by species					Total saw log volume
	Teak	Sal	MYB	ONT	NFS	
East Godavari Dist.						
Govt. saw mill, Rajahmundry	-	-	2,500	2,500	-	5,000
Other Mills at Rajahmundry.	8,000	1,000	1,800	1,000	520	12,320
Kakinada	500	500	500	500	110	2,110
Villages of East Godavari Dist.	7,000	-	2,000	3,000	3,070	15,070
East Godavari Distt. Total:	15,500	1,500	6,800	7,000	3,700	34,500
West Godavari Distt.	3,000	-	4,000	2,000	2,500	11,500
Khammam District:						
Khammam	1,500	-	1,000	400	100	3,000
Kothagudem	1,500	-	3,000	500	-	5,000
Other villages	500	-	1,000	400	100	2,000
Khammam Distt. Total:	3,500	-	5,000	1,300	200	10,000
Grand Total:	23,000	2,800	21,800	14,300	10,300	72,000

Note: MYB - Maddi, Yegisa, Bandaru
ONT - Other Non-teak species
NFS - Non-Forest Species.

Out of 23,000 cu.m.(r) of teak logs that are sawn, about 15,500 cu.m.(r) are sawn in the saw mills in East Godavari District alone probably because of the nearness of Rajahmundry, an established Teak timber market in the area and also because traditionally for all jobs from door frames to drawing room furniture Teak is used by the people in this district. Majority of Teak log volume is imported from the

Contents

States of Madhya Pradesh, Maharashtra and Orissa and very little is produced in the forests of the zone itself.

10.4. Sources of Supply:

The saw log used as raw material by the saw milling industry are drawn from the following sources:

1. From the saw logs imported into the markets of the zone.

2. From out of the production from the forests of the zone.

3. From non forest areas of the zone.

In 1966 the quantity of timber imported into the zone is 60,000 cu.m.(r) (see Table 33, Para 18). The utilization of this quantity is as given below:

1.	Imported timber used by Hindustan Shipyard, Vehicle building and Boat Building Industries (Paras 5,6)	- 2,500 cum (r)
2.	Imported timber consumed as poles (Para - 16)	- 4,000 cum(r)
3.	Re-exported to places outside the zone (Table - 27)	- 20,500 cum (r)
	Total	- 27,000 cum (r)

It is obvious from the above accounts that the remaining quantity of 33,000 cum (r) is used as saw logs in the local saw mills.

As has already been stated the quantity of saw logs of non forest species is 10,300 cu.m.(r). The balance of 28,700 cu.m.(r) is the volume contributed by the forests of the zone.

To summarize the sources of supply of saw logs and the quantities emanating from each of those sources is as stated below:

1.	Imported into the zone	- 33,000 cu.m.(r)
2.	From forests of the zone	- 28,700 cu.m.(r)
3.	From non forest areas	- 10,300 cu.m.(r)
	Total	- 72,000 cu.m.(r)

Contents

10.5. Specifications Of Saw Logs:

Logs ranging in mid diameter limits of 30 cms. to 90 cms. are most commonly sawn in the mills of this region. Only in case of Teak even logs of 20 cms. mid diameter are being sawn. The lengths of the saw logs vary from 1 metre to 3 metres. Specially long sizes of even 5 metres are sawn at one mill in Visakhapatnam which is specialising in the production of plank dunnages (separating planks for compartmentalising different items of goods in the hold of a ship) for the shipyard.

When the saw millers themselves buy the logs for stocking sizes (as in Visakhapatnam and Rajahmundry markets) they avoid hollowed, cracked, and bent logs. They particularly see that there is no whiteness inside the heart wood. This is specially so in case of all non-teak logs. In such selected logs the recovery of sawn wood could be upto 70 to 80% as against the normal average recovery of 50% when no grading and selection of saw logs is done.

In view of the fact that the economics of saw milling are very much dependent on the percentage of recovery of sawn wood it would be desirable to identify saw logs into the following four categories and prepare supply schedules of such assortments:

1. Logs where sawn wood recovery could be - 70% and above.
2. " " " - 50% - 70%
3. " " " - 30% - 50%
4. " " " - 30% and below.

Contents

10.6. Production of Sawn Wood:

The recovery of sawn wood from the saw logs varies from mill to mill. It depends mainly on the quality of the logs sawn and the sizes into which the logs are converted. The technical skill of the sawyers and the efficiency of the machine have their own small part to play. There are cases where the recovery is as high as 80% and also as low as 25%. In general the recovery of sawn wood is 50%, the volume of side planks, butt ends, off cuts 45% and the volume of saw dust 5%. On this basis the production of sawn wood, offcuts and saw dust from the mills of the zone is as given below:

Sawn wood	-	36,500 cu.m.(*)
Off-cuts	-	32,850 cu.m. or 23,000 tonnes
Saw dust	-	3,650 cu.m. or 2,500 tonnes

The most important sizes produced in the mills of the zone are those useful for construction viz: Beams, Planks, Scantlings and Reepers.

In Rajahmundry the total saw mill waste in case the Andhra Pradesh Paper Mill desires to use it as raw material amounts to 8,000 cu.m.(x).

Presently almost all mills sell both the offcuts and the saw dust as fuel wood for which there is ready demand. Sometimes the offcuts are purchased by small carpenters who salvage some usable sizes and make small pieces of furniture. Offcuts are also demanded for use as fence posts in some cases. When sold as fuel wood offcuts fetch a price of Rs. 50/- per tonne and saw dust is generally sold at Re. 1/- per bag of 40 kg., or Rs. 25/- per tonne.

10.7. Equipment And Employment:

Saw mills in the zone have either one or two vertical band saw mills with either a 36" or a 42" diameter wheels. They are run on 15 to 20 horse power motors. Sometimes a horizontal saw is used as a break-down saw. There are no automatic trolly arrangements for loading logs at ramp and moving them for sawing. Logs are lifted manually, sometimes over 50 metres from the log yard and directly loaded on the bench of the mill. Sawing is done at a leisurely pace with one sawyer and two helpers at each band saw. They are paid on monthly basis. Generally 3 to 4 labourers on daily wages are employed for lifting the logs, sorting and stoning the sawn sizes and in disposal of the off-cuts and saw dust. In most saw mills a double ended bench grinder with a 10" diameter and 1½" thick stone for sharpening of blades is present.

The estimated total employment in the saw mills of the zone is 2,000 persons year round.

10.8. Profitability Of The Saw Mills:

When a saw mill is run to its full capacity or near about, it is invariably profitable. There are varying accounts of costs obtained from the different mills. Instead of cluttering up the note with too many sets of figures giving varying degrees of profitability, a single model based on the accounts of a well run mill having one band saw and converting non-teak timbers is given hereunder:

I. Land and Building:

1. Land - ¼ acre @ Rs. 8,000 per acre -	2,000
2. Construction of sheds and basements - for the machines.	8,000
	8,000

II. Machinery and Equipment:

1.	42" vertical band saw mill	- 4,500
2.	Cost of 15 H.P. motor	- 2,000
3.	Cost of starter and installation of electrical equipment	- 1,500
4.	Cost of bench grinder	- 800
5.	Furniture & Miscellaneous equipment	- 500
		9,300

III. Staff and Labour per month:

1.	Cutter @ Rs. 200 per month	- 200
2.	Sharpener @ Rs. 120 per month	- 120
3.	4 Helpers @ Rs. 3 per day	- 360
4.	Casual labour	- 200
		880

IV. Maintenance expenditure per month:

1.	Electricity bill per month	- 150
2.	Band saws (about 30 ft. of band saw per month @ Rs. 2.25 per ft.)	- 70
3.	Garbage and Miscellaneous expenditure	- 100
		320

V. Raw Materials:

600 cu.m. per year @ Rs. 100 per cu.m. (Non-teak)		- 60,000

Contents

VI. Working Capital (3 months requirements):

1.	Raw Material	- 15,000
2.	Wages	- 2,840
3.	Maintenance	- 960
		18,800

VII. Cost of Production (annual):

1.	Towards depreciation and interest on buildings @ 5% and 6%	- 880
2.	Towards depreciation and interest on machinery and equipment @ 10% and 6%	- 1,488
3.	Towards interest on working capital @ 10%	- 1,860
4.	Towards cost of Raw Material	- 60,000
5.	Towards cost of salary & wages	- 10,560
6.	Towards cost of other expenditure	- 3,840
		78,628 or 78,700

VIII. Profit and Loss Account:

a.	Total sale value of 300 cu.m. of sawn wood (50% conversion %) @ Rs. 270 per cu.m.	- 81,000
b.	Sale value of 200 cu.m. or 140 tonnes of fuel wood (off cuts) @ Rs. 50/- per tonne).	- 7,000
c.	Sale value of 70 tonnes of saw dust @ Rs. 25/- per tonne.	- 1,750
	Total	89,750

Annual Profit (Rs. 89,750 - 78,700) = Rs. 11,050.

Contents

The profit naturally will vary depending on the cost of raw material and the level of prices of sawn wood in a given situation. Economies affected in costs of sawing could improve profitability. On the other hand inefficient management, increase in wage rates, breakdowns etc., adversely affect the economy of the mill.

If the saw mill is not stocking logs, converting and selling sawn sizes but only undertakes sawing of logs brought by customers then also the venture is profitable. The rates charged for sawing should range between Rs. 26.50 per cu.m. (0.75 p. per cft.) and Rs. 35.50 (Re. 1 per cft.). These in fact are the prevailing rates for sawing.

10.9. Capacity:

The saw mills in the zone have an input capacity of 150,000 cu.m. (r) of saw logs per annum though their estimated actual input is only 72,000 cu.m.(r).

Working on a 8 hour shift basis it is possible to cut on a one band saw mill of 42" wheel diameter (power driven with a 15 or 20 H.P. motor) at least 1.7 cu.m.(r) of wood in log form. Thus the full capacity of a one band saw mill in a year could be upto 600 cu.m. of saw logs. With increased efficiency in loading, cutting and depending on the type of logs sawn and the nature of sawn wood produced the input can either increase or decrease. Most of the saw mills in the area are working only to half or even one fourth of their capacity. There are saw mills whose input of saw logs is barely 150 cu.m. per year though with one band saw mill it is possible to saw four times more wood. What are the reasons for this idle capacity? Is it shortage of raw material? Is it lack of demand?

Is it high production costs and low profits? The study revealed that none of the above reasons is really tenable in the case of the saw mills operating in the zone. Firstly they are too many in number and too small in size and are seldom run efficiently.

For most saw mill owners saw milling is only a part time occupation. They have either other lines of business like Rice milling, Oil milling, some workshop or other or just agriculture, or they work their saw mills seasonally - generally during the summer months. They have no will to modernise the mills or do vigorous marketting of their products. There is hardly any stock piling of sawn sizes even in the case of mills which indulge in trading. Of-course there are several mills which run only when the customers bring logs for sawing. Thus saw milling in the zone is truly at handicraft stage barring a few exceptions like the Government Saw Mill at Rajahmundry and a few mills in the urban centrds.

The growth of a modern and technologically competent small scale sector in saw milling should be aimed at in this region which has already a tradition in production of sawn wood. Both improvements in product and process mechanism are needed. There is neither any engineering devise developed since the inception of saw milling in this area to improve the process, nor any diversification of products has taken place. Even packing case shook manufacture is taken up only by a few mills. Sawing of standard sizes should yield place to manufacture of custom made goods like Door & Window frames, built up trusses, assembly line furniture parts and sawn goods for export. The manufacture of portable huts with sawn sizes - as is being done at Joinery Mill at Pampore, Jammu & Kashmir State - is another open line for any big saw mill in the region.

Contents

10.10. A Note On The Government Owned Integrated Saw Mill, Seasoning Kiln And Treatment Plant - Rajahmundry:

The Government Saw Mill, Rajahmundry is an integrated unit with saw mill, Seasoning Kiln and a Wood Workshop. It was started in the year 1964. The main purpose of the unit is to popularise timber species other than Teak, which are available in the forest areas around Rajahmundry but for whom there is no recognized demand till recently. The species which are popularised in recent years are:-

1.	Terminalia tomentosa	(Maddi)
2.	Pterocarpus marsupium	(Yegisa)
3.	Adina cordifolia	(Bandaru)
4.	Anogeissus latifolia	(Chirumanu)
5.	Xylia xylocarpa	(Tangedu)
6.	Eugenia jambolana	(Naredu)
7.	Terminalia arjuna	(Tella maddi)
8.	Vitex altissima	(Nemali adugu)
9.	Lagerstroemia parviflora	(Chinnangi)
10.	Albizzia odoratissima	
11.	Cugenia dalbergioides	(Chikkudu)
12.	Gmelina arborea	(Gummadi)
13.	Xanthoxylum retsa	(Retsamanu)
14.	Schrebera swaitanioides	
15.	Mangifera indica	(Mango)
16.	Boswellia serrata	(Anduk)
17.	Lannea grandis	
18.	~~Garuga pinnata~~	
19.	Dillenia pentagyna	
20.	~~Hymenodictyon excelsum~~	

The mill was started with two band saws. It has been expanded and now has 7 band saws and ancilliary machines like cross cut saws, planers, saw dectoring equipment etc. The full capacity of the saw mill is 9,000 cu.m. (about 3 lakh cft.) annually. It is not working to full capacity at present.

There is a two chamber seasoning kiln with overhead steam pipes and circulation fans. The annual capacity of the seasoning kiln is 400 cu.m. (14,000 cft.). Each charge of freshly cut timber takes about 10 to 15 days for full seasoning. The seasoning kiln is presently working to half its capacity.

Contents

There is a large fixed type treatment plant and a small mobile type plant. The main plant has a capacity of treating 1,500 cu.m. (50,000 cft.) annually. It is working to full capacity.

There is a wood working unit which specialises in fabrication of doors and windows and furniture.

The main object of the mill is to popularise Non-teak timbers. The authorities apparently succeeded in achieving this aim, as can be seen from Table - 17. In 1965-66 the percentage of non-teak timber sawn to the total was 70%. In 1966-67 it was 78% and in 1967-68 it was near about 95%. In 1968-69, 100% of the timber sawn is of non-teak species.

TABLE - 17.

Quantity of Round Timber Sawn at Govt. Saw Mill.

Unit: cu.m.(r)

Year	Teak	Non-teak	Total
1965-66	550	1300	1850
1966-67	380	1400	1780
1967-68	200	3540	3740
1968-69	-	5660	5660

Another improvement is from merely selling seasoned and treated sawn timber the unit has made remarkable progress in that it is now marketing elegants pieces of furniture manufactured from non-teak timbers. The demand for manufactured articles like Doors, Windows and furniture has increased from Rs. 18,000 in 1964-65 to Rs. 14.5 lakhs in 1968-69. The break up of the business of Rs. 14.5 lakhs in 1968-69 is as given below:

Contents

		Rs. lakhs
Total sales		14.5
Sleepers & other uses	... Rs. 7.7	
House Building (Doors, Windows & Trusses)	... Rs. 3.5	
Furniture	... Rs. 0.6	
Petty sales of Doors & Windows on retail & sale of sawn timber.	... Rs. 1.0	
Bye products (waste & Saw dust).	... Rs. 1.7	
Total	Rs. 14.5 lakhs	

The demand is on the rise from Institutions like Indian Navy, Visakhapatnam Port Trust, Hyderabad Housing Board and Madras Housing Board who have already placed their orders with the mill. More consumers are in sight. The furniture pieces made of Non-teak timbers, specially Retsa and Bursera, have become popular. The technique of using high grade polish of Nitro-cellulose, Duco clear etc., have rendered a fantastic finish to the furniture. Prices like Rs. 140/- for a 4 piece sofa set with centre table have brought the products within the buying range of many middle class families. A single cot for Rs. 20/- could be a house wife's dream in these days of escalating prices.

In view of rising demand, provided wood is available, it should be possible to step up the intake capacity of the mill to 10,000 cu.m.(r) per year by 1970. From an analysis of market for the product it is suggested that the assortments comprising 10,000 cu.m.(r) should be as follows:-

Contents

	Cu.m.(r)
1. Construction Timbers:	4,000
Terminalia tomentosa (Maddi) Pterocarpus marsupium (Yegisa) Adina cordifolia (Bandaru) Anogeissus latifolia (Chirumanu) Xylia xylocarpa (Tangedu) Eugenia jambolana (Neredu) Terminalia arjuna (Tella maddi) Bursera serratum (Erra karra)	
2. Sleepers and other industrial uses:	4,000
All the above species plus Vitex altissima (Nemali adugu) Lagerstroemia parviflora (Chinnangi) Albizzia odorotissima	
3. Furniture:	1,000
Eugenia dalbergicides (Chikkudu) Gmelina arborea (Gummadi) Zanthoxylum retsa (Retsammanu) Bursera serratum Schrebera swaitenioides	
Packing Cases:	1,000
Mangifera indica (Mango) Boswellia serrata (Anduk) Lannea grandis Garuga pinnata Dillenia pentagyna Hymenodictyon excelsum	
Total ..	10,000

Note:- The specifications are that logs should be above 30 cu.m. mid diameter and not less than 1.5 metres in length. There is an overlapping of species in items 1 and 2, but if adequate supply is there apportioning between uses can be done.

Contents

11. CONSUMPTION OF TIMBER FOR HAND SAWING

In view of the increased number and the dispersal of the saw mills which is prominently observed in the zone there is a marked decline in the quantity of timber being hand sawn. However hand sawing is not altogether absent and is chiefly seen in the villages around the forest. Hand sawn wood is used in construction of houses and in village carpentry for manufacture of carts, rudimentary furniture etc. A derivative method is adopted to quantify the hand sawn timber.

From para 18 it can be seen that the recorded removals of timber from the 8 divisions of the zone is 52,000 cum (r). The break up of the recorded production of 52,000 cum (r) for various uses is as given below:

			cum (r)
1)	Export to places outside the zone in round from Kothagudem market (See para 16.6)	...	7,000
2)	Consumption as mining timber (See para 7)	...	8,000
3)	Consumption as saw logs for sawmilling (See para 10)	...	28,700
4)	Consumption of wood for transmission poles (See para 9)	...	200
5)	Consumption for agricultural implements (See para 12)	...	1,000
6)	Consumption of small dimensioned wood as pole wood (See Para 13)	...	5,000
		Total ...	49,900

A balance of 2,100 cum (r) is left which is estimated to be the quantity of logs being hand sawn.

Contents

There is also hand sawing of non forest species like Neem, Mango, Jamun, Ficus and fallen road side avenue trees which is estimated at 1,000 cum (r). The order of magnitude of hand sawing is further affected by the quantities of unrecorded removals from forest areas which is assumed to be 900 cum (r) to arrive at a tentative figure of 4,000 cum (r) as the quantity involved in hand sawing. The figure adopted is however anybody's guess and can be confirmed only after doing a sampling of wood used in construction activity and in village carpentry as hand sawn wood not only goes into constructional activity but also into manufacture of carts and village carpentry.

12. CONSUMPTION OF WOOD FOR AGRICULTURAL IMPLEMENTS

Though the iron plough, the tractor with trailor and the truck are seen in increasing numbers neither the age old double bullock cart nor the solid wooden plough have made an exit from the agricultural scene of rural Andhra Pradesh.

In a door to door census taken in 1961 it was estimated that there are 3.12 million wooden ploughs in the State of Andhra Pradesh, and the corresponding figure in 1956 was 2.997 million (source: Hand Book of Statistics, 1965-66, Andhra Pradesh issued by Bureau of Economics & Statistics, Hyderabad).

Thus the increase in the number of wooden ploughs in a period of 5 years is 1.123 million. The average annual addition to number of ploughs in the State of Andhra Pradesh is therefore 224,600 or 225,000. In order to find out the corresponding figure for the zone, the relationship that exists between the number of cultivators in the entire State in 1961 and the number in the four districts of the zone is used. To cross check, the relationship between the net area sown in the State and in the zone is also worked out.

As per 1961 Census (Part II -B(1) Economic Tables of Andhra Pradesh) the number of cultivators in Andhra Pradesh State was 7.48 million whereas the number of cultivators in the four districts of the zone was 1.40 million or 19% of the number in the State. Alternatively net area sown in the State is 27 million acres (1961) and that in the four districts is 4 million acres (1961). The zone figure works out only to 14% of the State figure.

In view of the fact that the wood availability in the zone is a favourable factor inducing increased use of wooden ploughs it is assumed that around 20% of the wooden ploughs occurring in the State are present in the zone. On this basis the annual production of wooden ploughs in the zone works out to 1/5 of 225,000 or 45,000.

The Book "Indiganous Agricultural Implements of India" (An All India Survey by ICAR 1960) has shown that in the districts of Andhra Pradesh a plough share is manufactured out of Teak, Chloroxylon swaitenia or Babul mostly and 1 cft. of wood represents the actual measurements of the plough share. In terms of round wood at least 2 cft. will be required for plough share. Another 2 cft. is needed for the pole and the yoke. Thus it is estimated that 4 cft. of wood in round is the requirement for each plough. On this basis the aggregate quantity of consumption of wood for 45,000 ploughs in the zone is worked out as 180,000 cft. or 5,000 cum (r). Out of this it is estimated that 3,000 cum (r) - (1,000 cum (r) recorded production + 2,000 cum (r) unrecorded) - is derived from forest species and 2,000 cum (r) from non-forest species.

It is assumed that the wood required for carts is derived from the local saw mills or through hand sawing the quantification of which can be seen elsewhere in this report.

13. POLE WOOD FOR CONSTRUCTION

13.1. General:

Housing is one of the basic necessities of life along with food and clothing. Housing conditions represent to a considerable extent the different levels of living of people. Housing also constitutes an important sector of investment in the country. In the context of Five Year Plans housing has assumed greater importance and housing problems are not just confined to the population growth. The migration of rural population to urban centres, the increase in income, and a systematic change in the social customs have a bearing on the types of houses being constructed in recent years.

In the urban areas the most common construction in recent years is the reinforced concrete house using such sophisticated materials as cement, steel, plywood and flush doors. Such houses are however confined to the upper income group. The middle income group normally prefers a tiled house where the use of sawn wood is most prominent both for roof and also for doors, windows and shutters. However for a majority of the population who still live in the rural areas or for those living under subsistence conditions in the urban areas the thatched hut is the most common type of accommodation available. The use of sawn wood in the construction of houses has been quantified through a survey of the sawmills in the region by finding out the total quantity of sawn wood produced by them annually. So it now remains to account for the use of wood in round or in the shape of poles which is most commonly used in the types of houses seen in the rural areas of the four districts.

The materials used for construction in these types of rural houses and also in the slums in the urban areas are mainly wooden poles, bamboos, and palmyra rafters. As roof covering normally of palmyra leaves, paddy hay or thatch grass is used.

13.2. Type Of Houses

The type of houses found in the rural areas of the four districts largely depends upon:

1. The material available locally for construction.
2. The climatic conditions and tradition of the people.

In Visakhapatnam District one finds clusters of conical huts, closely huddled together with a very steep roof of palmyra thatch, the eaves almost reaching down to the ground. It is obvious that the constructions are so shaped so as to resist cyclones which this part of the coast is frequently subjected to. In the agency areas the tribals obtain all the material needed from the forest. The roof is generally of thatch grass obtained from the forests. The walls are made of small poles of wood padded on either side and in between with mud.

In the plains areas, the roof is made of paddy hay or palmyra leaves. The roof is generally constructed by putting up joists of country wood or split palmyra trunk over the mud walls and running thinner rafters from the central joist on to the walls and covering the frame so formed with thatch.

In East Godaveri District the pattern of construction changes distinctly. A good number of houses are country tiled or Mangalore tiled. The district has a few factories manufacturing the roof tiles which are extensively used in the area. The tatched

huts in this district are constructed in the same way as in Visakhapatnam district.

In West Godavari district the walls of the huts are basically of mud reinforced with bamboos or of bamboo mats with mud padded all round. The roof material is almost invariably paddy hay which is available in plenty in this delta district.

In Khammam district which is inhabited by considerable tribal population the construction of residential houses in rural areas conforms to the material that the tribals can get from forests. The walls are generally made of wattle plastered with earth or dung. The roof is either thatched or sometimes made of mere twigs and leaves. The houses in the agency areas here appear better built than those of Visakhapatnam probably because the tribals in this district are better settled in agriculture than the shifting cultivators of Visakhapatnam agency.

13.3. Data Used For Preparing The Accounts

During 1961 Census an attempt was made for the first time in the history of Indian Census to collect housing statistics. Data about the types of houses constructed with reference to materials used for walls and roofing is incorporated in the Census reports (vide part IV-A-Report on Housing and Establishments). The wealth of data given in these reports is the basis on which the accounts of consumption of pole wood are prepared. In the absence of a sample survey specially designed to quantify the consumption of pole wood for house construction it is opined that the use of Census data is the best of available alternatives.

In view of the fact that in the agency areas the material used for the construction of houses is obtained chiefly from forest area, separate accounts of the pole wood used in these houses are prepared. The accounts of pole wood used in the houses in the plains areas are prepared under two headings - those ocourring in rural areas and those occurring in urban areas. The accounts are confined to the quantification of only the poles or wood in round that is used and include the consumption for subsidiary structures like cattle sheds, fencing for live stock and fencing for compound. Consumption of bamboos for construction is dealt with separately.

13.4. Consumption Of Pole Wood In The Agency Areas

There is considerable area occurring in the eastern ghats and surrounded by forest which is known as 'Agency Area'. According to 1961 Census the population of the agency areas in the four districts under study is 493,031. Out of this 41% are in Visakhapatnam district, 27% in Khammam district, 9% in West Godavari and 23% in East Godavari district. According to 1961 Census the total number of occupied residential houses in the agency areas is 104,318. The variation in population between 1951 and 1961 is adopted as indicative of the rate of growth of population and the estimates of population in 1968 are prepared using this rate. It is also assumed that the number of persons per house as existing in 1961 is applicable to later years and the estimate of number of houses at the beginning of 1968 are prepared. It is seen that the estimated population of the agency areas during 1968 is 555,568 and number of houses at the beginning of 1968 are 117,669 and the number of new houses constructed in 1968 are 15,500.

TABLE - 18

POPULATION AND NO. OF HOUSES IN THE AGENCY AREAS

District	Population 1961.	No. of occupied residential houses 1961.	% variation in population per year.	% variation 1961 to 1968.	Estimated population by 1968.	Estimated No. of houses by 1968.
Agency areas of:						
Visakhapatnam	202,682	44,583	+ 2.297	+ 16.079	235,271	51,571
East Godavari	112,199	24,201	+ 1.836	+ 12.852	126,618	27,311
West Godavari	46,175	9,414	- 0.036*	-	46,175	9,414
Khammam	131,975	26,120	+ 1.681	+ 11.767	147,504	29,194
Total:	493,031	104,318			555,568	117,700

* % Annual variation in population.

(Souce: Census 1961 Vol. II - A. P. State - Part-II-A.)

The annual requirements of pole wood for construction will be for two uses:

1. for construction of new houses.
2. for repairs and replacement of parts in old houses.

13.4.1. Wood For Construction Of New Houses In Agency Areas

The rate of growth of population in these areas is 1.5% per annum. Assuming that the number of persons per household remains at the level as in 1951-61 decade, the number of new houses constructed in the Agency areas comes to 1800. From Census data it is known that 100% of houses in agency areas use polewood. It is

estimated that 1/3 cu.m*. of wood is used per house. This figure however can be arrived at with a certain degree of precision only if a sample survey on scientific line is conducted in the area. In the absence of such a survey spot checking of some houses have revealed the figure of 1/3 cu.m. per house which is being adopted in this study. On this basis the quantity of wood required in the shape of poles for the houses in the agency areas is 600 cu.m. The entire quantity is obtained from the forest areas that are under survey.

13.4.2. Wood Used For Repairs And Replacement Of Houses In Agency Areas

The estimated number of houses in the agency areas at the beginning of the year 1968 is 117,700. Assuming that once in every 15 years the pole wood has to be replaced, the number of houses in which pole wood replacement is due in 1968 is 7,850. Adopting 1/4 cu.m. per house as the requirement of pole wood for repairs and replacements, the consumption of pole wood for this use in 1968 is 1,950 or 2,000 cu.m. (r).

13.5. Consumption Of Pole Wood In Plains Areas

The population of plains areas in the four districts as per 1961 Census is 7,441,902 and the number of occupied residential houses is 1,408,948. Adopting the percentage variation in population observed during the decade 1951-61 the estimated population at the beginning of

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*Vide "Integration of Forests and Forest Industries" p.28. by J. A. Van Nonrdy, 1960.

1968 works out to 8,253,262 and the estimated number of houses to 1,580,617. (Vide Table No.19).

TABLE - 19

POPULATION AND NUMBER OF HOUSES IN PLAINS AREAS

District	Population 1961.	No. of houses.	% variation in population per year.	% variation between 1961 and 1968.	Estimated population by 1968.	Estimated No. of houses by 1968 beginning.
Plains areas of:						
Visakhapatnam	2,088,077	442,742	+0.944	6.608	2,225,890	471,962
East Godavari	2,496,176	446,715	+1.310	9.170	2,725,075	507,676
West Godavari	1,932,082	345,446	+1.700	11.900	2,161,999	386,554
Khammam	925,567	174,045	+3.317	23.219	1,140,298	214,423
Total:	7,441,902	1,408,948			8,253,262	1,580,617

(Source: Census of India 1961 Vol. II. A. P. State Part-II-A.)

The proportion of houses using pole wood in rural areas differs from that in urban areas, which means that within the plains area the rural and urban houses have to be differentiated and the number of houses using pole wood arrived at Table-20 gives these details.

TABLE - 20

NUMBER OF HOUSES USING POLE WOOD IN PLAINS

District	Estimated No. of Houses in plains in 1968.		% of houses using pole wood.		No. of houses using pole wood.	
	Rural	Urban	Rural	Urban	Rural	Urban
Visakhapatnam	387,008	64,954	87.3	51.6	337,857	43,836
East Godavari	416,295	91,383	75.5	43.4	314,302	39,660
West Godavari	316,974	69,580	78.8	53.8	249,775	37,434
Khammam	175,826	38,597	91.7	47.3	161,232	18,256
Total:	1,296,103	284,514			1,063,166	139,186
				Total:		1.2 million.

(Source: Census of India 1961 - Vol. II, A. P. State, Part IV-A.)

13.5.1. Pole Wood For New Houses In Plains

The estimated number of houses using pole wood in both rural and urban areas together at the beginning of 1968 is 1.2 million. Adopting an annual growth rate of population of 1.8% (applicable to plains areas of these four districts) and assuming that the proportion of the houses using pole wood to the total and the number of persons per household does not change significantly, we arrive at an estimate of 21,800 new houses using polewood being annually constructed in the zone. Adopting a factor of 1/3 cu.m. per house the consumption of pole wood during 1968 will be 7,200 cu.m. (r).

13.5.2. Pole Wood For Repairs And Replacements

Assuming that once in every 15 years,* the pole wood has to be

*Vide "Rural Housing and Village Planning." - National Building Organization.

replaced the number of houses in which replacement of wood will be due in 1968 is 80,000 houses. Adopting 1/4 cu.m. per house as the requirement of pole wood for repairs and replacements the consumption of pole wood for this use is estimated at 20,000 cu.m. (r).

13.6. Summary

The estimates of pole wood consumption for construction of huts, cattle sheds, fencing etc., in the different categories are summarised below:

Unit: Cu.m. (r)

Agency Area

1.	Pole wood for construction of new houses in 1968. ..	600
2.	Pole wood for repairs and replacements in 1968.	2,000
	Total of (A)	2,600

Plains Area

1.	Pole wood for construction of new houses in 1968. ...	7,200
2.	Pole wood for repairs and replacements in 1968. ..	20,000
	Total for (B)	27,200
	Total of (A + B) ..	29,800

Out of the total consumption of 29,800 cu.m. (r) only 2,600 cu.m. (r) which relates to agency area is of forest species and derived from the forest areas surveyed and constitute unrecorded removals from forests as the tribals in the agency areas have the right to remove wood free from forests for their domestic use.

The most common species obtained from the forests and used as wooden poles either for the house or for cattle shed and for fencing are given below. These are mostly inferior species other than Teak, Maddi, Yegisa and Bandaru.

1.	Chloroxylon swietenia	(Biliundu)
2.	Erythroxylon monogynum	(Devadari)
3.	Zizyphys xylopyrus	(Gotti)
4.	Albizzia amara	(Chigana)
5.	Cassis fistula	(Ralla)
6.	Bauhinia racemosa	(Are)
7.	Wrightia tinctoria	(Ankudu)
8.	Zizyphus jujuba	(Regu)
9.	Caesalpinia coriaria	(Dividivi)
10.	Acacia leucophloea	(Thellathumma)
11.	Acacia ferruginea	(Vanna-sundra)
12.	Emblica offidinalis	(Usiri)

27,200 cu.m. used in plains areas is mainly from non-forest sources. The most important species used is palmyra. The area abounds in palmyra trees which obviously forms the cheapest material available for house construction. The beams, the rafters, the roof cover and even the rope for securing all these together are all made out of palmyra. Besides palmyra use of Casuarina poles mainly derived from private farms is also observed in these areas.

From trade enquiries in various markets it is seen that the import of Teak and Non-Teak poles amounted to 4,000 cu.m. (r).

From forests the production is assumed to be 5,000 cu.m. (r) and the rest of the quantity is derived from Non-forest sources.

To summarise, the sources from where the wood is supplied for consumption as pole wood are as follows:

Contents

		cu.m. (r)
(1)	Imported into the zone -	4,000
(2)	Recorded production from forests of zone. -	5,000
(3)	Unrecorded production from forests of zone.	2,600
(4)	Pole wood of non forest species. -	18,200
	Total	29,800

Contents

14. CONSUMPTION OF FIRE WOOD

14.1. Consumption Of Industrial Firewood

Wood as fuel is fast losing ground to more efficient and lighter materials in industrial use. Yet it is not completely replaced and even a modern pulp and paper manufacturing concern like Andhra Pradesh Paper Mills, Rajahmundry is dependent on use of firewood especially for burning of lime. The present requirement of the mills in 1968 is 15,000 tonnes but very soon (in 1969-70) the mill will need 30,000 tonnes of fuel wood. The source of supply for them so far is the local fuel wood market in Rajahmundry and the suppliers are the lessees of forest coupes. Thus the entire requirement of 15,000 tonnes or 20,000 cu.m. (r) in 1968 is to be considered a drain on the forest area of the zone.

A predominant use of fire wood for industrial use is emnating from the Tobacco barns in the villages of Bhadrachellam Taluk and in the villages along the River Godavari in east and west Godavari Districts like Torredu, Mithapadu, Purushotapatnam, Seethanagaram, Duggalle and in the villages of Raghudevapuram Firka. It is estimated that the total number of Tobacco barns is 1,000 and their consumption in 1968 is 60,000 cu.m.

There are 4 tile factories near Rajahmundry which use fuel wood besides the brick kilns dotted here and there in the villages and around towns. The estimated consumption of fuel wood by them is 1,000 cu.m.

Thus the total consumption of industrial firewood in the zone is 80,000 cu.m.

14.2. Consumption Of Domestic Fuel Wood

With a predominantly rural population dependent upon local materials the use of fuel wood for domestic purposes in the region is on a considerable scale. However, the question of determining the order of magnitude of this use presents a problem because of the variety of domestic fuels and the difficulties in quantifying the proportion of the population that is using each of these fuels. The most common fuels used in the rural area are fire wood, cow dung and vegetable waste. In the urban areas there is a sizable proportion of the population which is dependent upon charcoal, kerosene, gas, or even electricity besides the use of fire wood.

It is proposed to deal here only in a qualitative way about the consumption of all other types of fuel except fire wood. In the case of fire wood quantitative estimates are attempted based on the per capita consumption figures revealed by some already conducted surveys.

The consumption of gas in the towns of the region has increased in recent years because of the Caltex Oil Company situated at Visakhapatnam and also because of the other Oil Companies such as Burma Shell, ESSO and Indian Oil trying to sell gas in the region through their agencies. The towns in the region in which gas consumption has been observed and the estimated number of households using gas (Source: Enquiries with Caltex Company, Visakhapatnam and the wholesale dealers in the town) are as given below:

1.	Visakhapatnam	- 3,000 households
2.	Vijayanagaram	- 500 "
3.	Kakinada	- 1,000 "
4.	Rajahmundry	- 2,000 "
5.	Eluru	- 500 "
6.	Khammam & Kothagudem	- 500 "
7.	Consumption in other towns in all 4 districts.	- 1,000 "
	Total	- 8,500 "

Obviously the consumption of gas is very low and is confined to the upper income brackets in urban localities. The results of National Sample Survey, Eighteenth Round (February 1963 to January 1964) show the following level of consumption of gas in Andhra Pradesh State.

TABLE - 21

QUANTITY OF CONSUMPTION PER PERSON FOR A PERIOD OF 30 DAYS

Item	Monthly household expenditure level in Rs.				
	below 50	51-100	101-150	151-300	301 & above
Gas in units	0.00	0.00	0.00	0.00	0.11

(Source: N.S.S. Ist round, I.S.I., Calcutta, April 1967)

The use of Kerosene is much more prominent than gas in all the towns, small towns and in some big villages. From the enquiries in Visakhapatnam, Kakinada, Rajahmundry and Eluru it is seen that about 10 per cent of the population are using kerosene. Next to firewood the expenditure on use of Kerosene is the highest both in

Contents

urban and rural areas according to National Sample Survey, 18th round. No doubt only a part of the consumption in rural areas is for cooking, the rest being used for lighting. In urban areas the case is the reverse as electricity for lighting is more common here. The figures of National Sample Survey quoted below show the proportion of expenditure on each of the fuels:

TABLE - 22

EXPENDITURE PER PERSON PER 30 DAYS IN A. P. STATE

Unit: Rs. P.

Item	Urban	Rural
Firewood	0.97	0.84
Kerosene	0.28	0.25
Dung cake	0.05	0.05
Charcoal	0.04	0.00
Coal	0.02	0.00
Total	1.36	1.14

The figures quoted above show that the use of kerosene comes next to the use of firewood. In terms of quantity the per capita per month consumption of kerosene is 0.43 seers according to National Sample Survey.

Cow dung is a well known substitute carrier of calorific energy and its use is seen predominantly in the rural areas of plains where the livestock population is considerable. Its high caloric content (4 tonnes of dry fire wood is equivalent to 2 tonnes of dry cow dung) and easy transportability in the form of cow dung cakes have allowed its sale door to door by hawkers even in some towns. It is a preferred domestic fuel in large segments of population because of its low price per unit of caloric energy offered, easiness in lighting fire and also because habits die hard in

the tradition bound families. There are some estimates of per capita consumption of cow dung but quantification of cow dung consumption is not considered relevent to this study.

Reverting to the issue of consumption of firewood as there is no data available regarding the proportion of the population using firewood (there are many families who use more than one kind of fuel) it is proposed to arrive at aggregate figures of consumption by multiplying the per capita estimates given by National Sample Survey 18th Round with the population estimate of the zone. The consumption estimates are prepared separately for the -

1) Agency areas of the zone;
2) Rural areas of plains; and
3) Urban areas of plains

to enable the identification of sources of supply for each of these categories and to quantify the drain on the forest area surveyed.

14.2.1. Consumption Of Firewood In Agency Area

Fire wood constitutes almost the only source of fuel for the people living in the agency areas. The population of agency areas of the zone in 1961 was 493,031. The estimated population in 1968 is 555,568. (See Table 18 page 56). National Council of Applied Economic Research conducted a survey in 1963, according to which the per capita consumption of fire wood per annum is 241.88 Kg. in Andhra Pradesh. The National Sample Survey (Eighteenth Round - Feb. 63 to Jan. 64), which is a later survey, estimates the per capita consumption per 30 days in the rural areas of Andhra Pradesh as 23.18 seers or 24.625 Kg. (1.071 seers = 1 Kg.). On this basis the per capita consumption

per annum works out to 297.90 Kg. which is higher than the level indicated by NCEAR. In agency areas the level of fuel wood consumption is likely to be higher because of:

1) Abundant availability of fuel wood.

2) The availability at no cost (the tribal population has a right to remove dead and dry wood from forests for its own use free of cost).

Yet it is proposed to adopt the per capita figure of 297.9 Kg. as the figure is applicable to all rural areas and its upward revision in the case of agency areas without a proportionate downward revision in the case of other rural areas will affect the accuracy of the aggregate estimates. Thus the consumption in agency areas during 1968 is estimated to be 165,500 tonnes or 236,500 cu.m. (r). (1.4 cu.m. = 1 tonne).

This volume is comprised of almost all available forest species and is mainly dead and dry fuel wood derived from lops, tops and branch wood belonging to trees primarily converted for timber. Twigs, small branches and decayed wood salvaged from the floor of the forest form part of this fuel wood volume. As the tribals of these areas practice shifting cultivation it is observed that part of fuel wood needs is met from the area cut for shifting cultivation. Green and billeted fire wood derived from trees primarily converted for fuel wood is seldom consumed in the villages of the agency tract, because such fire wood can be removed and transported to nearby markets at an economic price level.

However, out of 236,500 cu.m. roughly 15% of the volume approximated to 36,500 cu.m. may be considered to be from such species and of such sizes and quality that part of it may have alternative uses like pulp wood. To summarise the level and pattern of fuel wood consumption in the zone is:

1.	Total consumption per annum.	=	236,500 cu.m.
2.	Consumption of fuel wood not fit for alternative uses.	=	200,000 "
3.	Consumption of fuel wood fit for use as pulp wood.	=	36,500 "

The entire quantity is drained from the forests of the zone and is not recorded as it is removed under the rights and concessions vested in the population of agency areas.

14.2.2. Consumption Of Fire Wood In The Rural Areas Of Plains

According to 1961 Census the total population of plains (rural and urban together) is 7,441,902 (see Table No. 19 page 58). Out of this the rural population is 6,108,787. The estimated population in rural areas of plains in 1968 is 6.75 million. Adopting the per capita fuel wood consumption figure (297.9 Kg.) applicable to rural areas according to National Sample Survey, 18th Round, the aggregate annual consumption in rural areas of plains is 2 million tonnes or 2.85 million cu.m.

14.2.3. Consumption In Urban Areas Of Plains

The 1961 population of urban areas of plains is 1,333,115. The estimated population in 1968 is 1.5 million. According to National Sample Survey, 18th Round results, the per capita consumption of fuel wood in urban areas is less than the level in rural areas. The

consumption per person in 30 days as revealed by the survey is 17.76 seers, which means that the per capita consumption per year is 228.25 Kg. Using this factor we arrive at an aggregate consumption level of 342,000 tonnes or 480,000 cu.m.(r). The total consumption per year in plains (rural + urban) is 3.33 million cu.m.

14.2.4 Sources Of Supply

The urban population is generally served through the regular fuel depots or through the normal trade channels. The fuel wood to these depots is obtained either from forest coupes taken by lessees of from private farm lands when the fuel concerned is of Casuarina or of Tamarind which are two popular fuel wood species consumed in the area.

14.2.4.i. From Forests

To ascertain the quantity of fire wood derived from forest and sold through normal trade channels the records of Forest Department were consulted. They indicate the level of removals by lessees during 1967-68 as shown in Table-23.

TABLE - 23

RECORDED REMOVALS OF FUEL WOOD IN 1967-68

Unit: cu.m. (r)

Division	Firewood removed from all forests	Firewood removed from forests surveyed.
Visakhapatnam	6,100	6,100
[1]Kakinada	666,500	533,000
[2]Eluru	37,300	37,300
Bhadrachellam North	18,600	18,600
Bhadrachellam South	57,400	57,400
[3]Khammam	18,200	3,600
[4]Kothagudem	27,300	-

contd...

Table - 23 continued

Unit: cu.m. (r)

Division	Firewood removed from all forests	Firewood removed from forests surveyed.
5Paloncha	94,900	19,000
Total	926,300	675,000

(Source: Records of Forest Department)

The above compilation shows that firewood to the extent of 926,300 cu.m. is flowing into the consumption centres of the four districts from forest area of eight divisions. As all the area in eight divisions is not surveyed by the organization, it has become necessary to indicate that only 675,000 cu.m. out of 926,300 cu.m. is the supply from the forests surveyed.

Out of 926,300 cu.m. derived from the eight divisions it is estimated that around 26,300 cu.m. which is the quantity contributed mostly by Kothagudem division and partly by Khammam and Paloncha is going almost entirely to Vijayavada which is outside the zone.

Note:- The fuel wood removals include the wood removed for charcoal burning. Therefore no separate quantification of charcoal is done.

1. The Mangrove forests at the mouth of River Godavari are not surveyed. They contribute the fuel wood to Kakinada town. Hence a 10% deduction proportionate to the area omitted from survey is affected to arrive at fire wood from forests surveyed in the division.
2. 10% of volume is assumed to be coming from areas not surveyed.
3. Only about 20% of Khammam Division is surveyed.
4. No area of Kothagudem division is surveyed.
5. Only 20% of Palencha division is surveyed.

Contents

Therefore the recorded supply of firewood from forest areas is 900,000 cu.m. out of which 675,000 cu.m. is the drain on the area surveyed. This volume comprises of species and sizes that could have a competing use as pulp wood.

Besides the recorded removal of fuel wood from forest areas through lessees there is considerable removal in the shape of head loads of fuel. The head loads of fuel hawked in almost all the villages near to forest areas are derived mostly from marginal forest lands near villages generally classified as unreserves or mere waste lands. In some towns like Visakhapatnam, Kothagudem and Khammam there is considerable sale of head loads. In Visakhapatnam town a spot check in the markets of various localities revealed in one day as many as 2,000 head loads being hawked. In Tuni, a small town on one day in the market 500 head loads have been counted. In Kothagudem, a town brimming with coal miners, the sale of head loads is on epidemic proportions. Besides these the towns of Vijayanagaram, Anakapalli, Narsipatnam, Peddapuram, Pithapuram and Samalkot are known to survive on the supply of fuel wood through head loads. It is difficult to hazard a guess about the total quantity of such removals from forests that are surveyed. But the relevant point here is that this material has no other uses. It is generally of very thin, crooked dry branches and definitely not of the kind that could have use as pulp wood.

14.2.4.2. Saw Mill Waste

Another known types of firewood in villages and towns where there are saw mills are the slabs, butts, off cuts, rejected reepers

and saw dust. The estimated quantity of such material is 36,500 cu.m. (off cuts + saw dusts) (vide Para 10.6 page).

14.2.4.3. Casuarina Wood

The private farms of Casuarina contribute a significant quantity of firewood especially to satisfy the demand in major towns like Visakhapatnam, Rajahmundry, Kakinada and Eluru. Enquiries from trade sources revealed that the quantities of Casuarina fuel sold per year in Visakhapatnam market is 25,000 cu.m., in Kakinada 20,000 cu.m., in Rajahmundry 20,000 cu.m., and 15,000 cu.m. in Eluru. Besides 80,000 cu.m. of Casuarina fuel wood sold in established markets it is estimated that at least 20,000 cu.m. more of Casuarina fuel wood is being sold in other towns. The consumption of Casuarina fuel wood in the zone is therefore put at 100,000 cu.m.

14.2.4.4. Other Non-Forest Species

The trees on farm lands, private compounds, waste lands, road margins etc., contribute considerable quantities of firewood. The most favoured species is Tamarind.

14.2.4.5. Other Sources

It is difficult to enumerate the variety of materials that are burnt for domestic cooking. Salvaged wood from old fencing, old houses, sheds, packing cases, broken furniture, dry leaves of coconut, palms, peeled off bark, roots, jute stalks, agricultural waste, etc., are some of the common items used as fire wood.

14.2.4.6. Summary

		Cu.m.
- Annual consumption of fire wood for industrial use		.. 90,000
- Annual consumption of fire wood for domestic purposes		.. 3,536,500
a) Annual consumption in plains -	3,300,000	
b) Annual consumption in agency areas -	236,500	
- Total annual fire wood consumption		.. 3,626,500
- Supply of fire wood from forests which has alternate uses (900,000 recorded removals consumed in plains + 36,500 cu.m. consumed in agency and removed on free grants).		.. 936,500
- Supply from private farm lands of Casuarina		.. 100,000
- Supply from saw mill waste		.. 36,500
- Supply of fire wood from unrecorded sources like through head loads from forests, non forest species and other material.		.. 2,553,500
	Total	.. 3,626,500

An analysis of demand shows that the material which has alternative uses is demanded to the extent of 936,500 cu.m. and it is derived from forests of the four districts. The quantity supplied by the forests surveyed is 711,500 cu.m. (675,000 cu.m. of recorded removals + 36,500 cu.m. of unrecorded removal of agency areas). It is not meaningful to talk of any quantity demanded at a given time unless the species, sizes and grade of wood demanded and the price at which it is demanded are mentioned. The geographical location of

the demand is also important. To illustrate: Chirumanu (Anogeissus latifolia) fuel was demanded to the extent of 15,000 cu.m. in 1968 at Rajahmundry market at prices varying between Rs. 40/- to Rs. 50/- per tonne by the wholesalers. Fuel wood of miscellaneous species from forest was demanded to the tune of 30,000 cu.m. in Rajahmundry market in 1968 at a price range of Rs. 30/- to 40/- per tonne.

Such precise estimates of demand at a given price level at a given time for a specific product can be made only after detailed analysis of all the markets in the zone. For the present the consumption estimates have to be considered only as indicative and not as conclusive.

6. The fuel wood demanded is generally of 1 metre billets with mid diameters of billets ranging from 12 cms in case of billets derived from stem wood to even 90 cms and more in case of butt logs and stumps. Even hollowed, crooked billets are acceptable. It is not correct to say that all this wood has competing use as pulp wood. Pulp wood specifications are more rigid. Enquiries with some paper mills experimenting with hard woods (Star Paper Mills, Saharanpur and Bengal Paper Mills, Raniganj) show that they favour billets of generally 1.2 metres (4 ft.) length and not more than 40 cms (16") in diameter. They prefer billets generally free of big knots, crooks and cull. Billets with diameters lower than 12 cms are not preferred as it is expensive to debark them. Billets of more than 40 cms diameter may not be acceptable because of the size of the mouth of chipper.

15. BAMBOO FOR NON INDUSTRIAL USES

Though the cream of Bamboo production from the forests of the zone is reserved for use in the paper industry, significant supplies are made to satisfy the demand from the non industrial sector. Bamboo is used in many different ways — for construction of houses, walls, roofs and even floors. The door and window frames are made of Bamboo in some areas. The use of Bamboo mats and baskets is common. In sugar fields and banana gardens in the coastal districts bamboo supports are extensively used. In the entire zone the most important source of supply of bamboos to the villages and even towns for non industrial uses is the Rajahmundry market.

In Rajahmundry town there are 12 depots which are trading in Bamboos. The annual turn over of these 12 depots in 1968 is Rs. 40 lakhs in terms of value and 90 lakhs numbers of bamboos in terms of volume. At 300 bamboos per tonne this works out 30,000 tonnes of bamboos. The quantity is going for various purposes other than pulping to the villages and to small towns around Rajahmundry besides satisfying demand at Rajahmundry itself.

Enquiries revealed that the sources from which the bamboos are obtained and the quantities obtained are as given below:

		No. of Bamboos	Tonnes
1.	Bastar ..	15,00,000	5,000
2.	Chinfûr (Bhadrachellam South)	5,00,000	1,666
3.	Other places in agency	70,00,000	23,334
	Total:	90,00,000	30,000

The Bamboos received in Rajahmundry are re-exported to the villages around. Such re-export is of the order of 88 lakh bamboos per year as shown in the Table-24.

TABLE - 24

BAMBOOS RE-EXPORTED FROM RAJAHMUNDRY. (1968)

Month	No. of consignments.	No. of Bamboos.
January	393	10,64,673
February	265	6,42,768
March	384	9,08,531
April	532	12,30,603
May	375	5,64,222
June	353	6,95,468
July	297	7,80,928
August	385	8,41,457
September	265	6,85,005
October	163	3,87,240
November	207	4,69,584
December	199	5,40,155
Total	3,836	88,10,034

(Source: Records of Forest Department).

The estimates of Bamboo trade in other important centres of the zone show the following figures as annual turn over for non industrial uses:

		Tonnes (air dry)
Visakhapatnam	..	3,000
Kakinada	..	2,000
Eluru	..	3,000
Kothagudem	..	5,000
Khammam	..	2,000
Other towns	..	5,000
	Total ..	20,000

From the above accounts the consumption of Bamboo in the zone for non industrial uses is put at 50,000 tonnes (air dry).

The demand of 30,000 tonnes Bamboos for non industrial uses exists at Rajahmundry at the following retail prices (Dec: 1968).

Variety of Bamboo	Price per ton of green bamboo
Medara Bongu (used for Basket weaving)	Rs. 80/-
Sadanam (for construction of huts)	Rs. 60/-
Baruveduru (")	Rs. 50/-
M. P. Vasam (for mats)	Rs. 15/-

Prices vary with lengths. Upto 15' length prices are Rs. 500/- per 1000. Above 15' and upto 25' prices are Rs. 675/- per 1000.

TIMBER TRADE IN THE ZONE

The four districts of Andhra Pradesh which form the demand study zone have a total population of about 8 million (1961) which is less than a fourth of the total population of the State. Visakhapatnam is industrially developed, East Godavari and West Godavari districts are agriculturally advanced and Khammam district though economically less developed has the biggest coal mines in South India. The industrial and agricultural economy of the region has already been discussed under Para-3. In view of the growing economy of the region it is natural to expect a developed timber trade in the zone. The most important timber market in the zone is Rajahmundry which has not only a situational advantage of being by the side of River Godavari but also has a long tradition as a timber market. Next in importance is the Kothagudem timber market which is situated in close proximity to wood rich region and is connected by road and rail with the supply sources on one hand and the demand centres on the other. Both these markets serve not only the regions around them but also far flung places along the coast and also Telengana region. Timber markets of lesser importance are: Vijayanagaram, Visakhapatnam, Kakinada, Eluru and Khammam.

These 7 timber markets are estimated to handle a total quantity of 92,000 cu.m. of round wood annually. The estimates are specially relevant to the year 1968. The estimates are considered reliable as they have been obtained through direct enquiry from the timber dealers of all the 7 centres and cross checked with the figures of Timber Merchants' Associations wherever they are present

(Visakhapatnam, Kakinada, Rajahmundry and Kothagudem). Another source frequently consulted are the records of the forest department check posts at Rajahmundry and Kothagudem.

The summary figures of volume of trade by species compiled from data of seven markets presented in foregoing pages during 1968 is as given in Table-25. They show that 45% of the volume of trade is in Teak, 29% in the main non-teak species of Maddi, Yegisa and Bendaru, 22% is of other non-teak species and about 4% of Sal.

TABLE - 25

TIMBER TRADE BY SPECIES IN 7 MAJOR MARKETS OF THE ZONE

Unit: cu.m.(r)

	Teak	Maddi, Yegisa, Bendaru	Other Non-Teak	Sal	Total
Vijayanagaram	300	1,000	1,000	1,200	3,500
Visakhapatnam	-	4,200	1,000	300	5,500
Rajahmundry	36,000	6,000	3,500	1,000	46,500
Kakinada	2,500	3,000	1,000	500	7,000
Eluru	500	800	200	-	1,500
Kothagudem	2,000	10,000	13,000	-	25,000
Khammam	500	2,000	500	-	3,000
Total	41,800	27,000	20,200	3,000	92,000

(Source: Direct enquiries in the markets)

Out of 92,000 cu.m.(r) traded in these markets it is estimated that 57% of the volume is imported from sources outside the State of Andhra Pradesh. Bastar of Madhya Pradesh State is a major supplier contributing about 44% of the volume traded. Details are given in Table-26.

Contents

TABLE - 26.

SUPPLY SOURCES OF TIMBER TRADED IN THE 7 MARKETS OF THE ZONE

Unit: cu.m.(r)

Market	Bastar	Orissa	Maha-rashtra	From forests of other Divns. of A. P.	Total Qty. imported into zone (2+3+4+5)	From forests of 8 divns. of zone.	Total quantity traded.
1.	2.	3.	4.	5.	6.	7.	8.
Vijayanagaram	-	3,130	-	-	3,130	370	3,500
Visakhapatnam	3,500	1,000	-	-	4,500	1,000	5,500
Rajahmundry	32,000	-	3,870	-	35,870	10,630	46,500
Kakinada	5,000	-	-	-	5,000	2,000	7,000
Eluru	-	-	500	-	500	1,000	1,500
Kothagudem	-	-	2,500	5,000	7,500	17,500	25,000
Khammam	-	-	1,000	1,000	2,000	1,000	3,000
Total	40,500	4,130	7,870	6,000	58,500	33,500	92,000

Out of the total timber received, an analysis by specifications show that 54,550 cu.m. (r) are saw logs and 4,000 cu.m.(r) are poles and ballies which are used in the round.

Export and Re-export:- The Rajahmundry market mainly serves as a gateway for imports and from here there is re-export of imported timber to the districts of Krishna, Guntur and Nellore mainly. There is export of timber produced in the zone from Kothagudem along with some re-export. The quantities re-exported or exported from various markets are given below:

TABLE - 27

EXPORTS AND RE-EXPORTS FOR ZONE

Unit: cu.m.(r)

Market	Re-export	Export	Total
Vijayanagaram	500	-	500
Rajahmundry	15,000	-	15,000
Kothagudem	5,000	7,000	12,000
Total:	20,500	7,000	27,500

(Source: Records of Forest Department)

Contents

16.1. Timber Trade In Vijayanagaram Town

From enquiries made at Vijayanagaram from timber dealers it is seen that the total out-turn of timber trade in the town is of the order of 3,500 cu.m. The species wise break up of this trade is as given below:

Teak	..	300 cu.m.
Maddi, Yegisa, Bandaru	..	1,000 "
Other non teak species	..	1,000 "
Sal	..	1,200 "
Total	..	3,500 "

A little less than 90% of the timber (3,130 cu.m. (r) is imported into the town from Koraput district of Orissa through the Orissa Forest Corporation and a little more than 10% i.e., 370 cu.m. is coming from the forests of Andhra Pradesh.

There is re-export of timber from Vijayanagaram to the villages in Srikakulam District which is outside the demand study zone. Such re-export is estimated to be of 500 cu.m. especially of sal timber. Thus the net consumption within the zone through Vijayanagarem market is of the order of 3,500 cu.m.

Both Teak and other species are mainly used for construction of buildings and to a minor extent for the making of furniture.

The average prices of timber in 1968 in Vijayanagaram market for round timber of girths ranging from 60 to 90 cms are as given below:

		Units Rs./cu.m.
Teak	..	490
Sal	..	280
Maddi	..	210
Yegisa	..	280
Bandaru	..	280
Other non teak species		100

Timber Trade In Visakhapatnam

There are 14 timber depots in Visakhapatnam. They can be categorised depending on the magnitude of the trade into the following groupings:

6 merchants with a turn over of Rs. 2 lakhs annually.

3 merchants with a turn over of Rs. 1 lakh annually.

5 merchants with a turn over of Rs. 60,000 annually.

Thus the turn over in timber trade annually is Rs. 18 lakhs. In terms of volume an estimated quantity of 6,000 cu.m.(r) represents the trade here.

An analysis of timber trade by species shows that less than 5% of the total volume traded is of Teak whereas 95% is constituted by species other than Teak.

Among the non-teak species Maddi, Yegisa and Bandaru are the more important ones. The species of country wood that are generally sold are Modugu, Chirumanu, Semal and Salai. The trade distributed by species has the following break up:

Teak	.. 500 cu.m.	(imported from Rajahmundry market)
Maddi, Yegisa and Bandaru	..4,200 "	
Other non teak species	..1,000 "	
Sal	.. 300 "	
Total..	6,000 "	(Net trade only 5,500 cu.m.(r). 500 cu.m.(r) accounted for in Rajahmundry market).

Out of the total turn over of timber trade in Visakhapatnam 75% or 4,500 cu.m. is imported from Orissa (3,500 cu.m.) and Bastar (1,000 cu.m.) and only 25% or 1,500 cu.m. is from forests of Andhra

Pradesh, especially from Sileru area. There is 500 cu.m. (r) import from Rajahmundry market also.

The most important stations in Orissa from where the timber is booked are Rayagarh, Kariar Road, Naupada, Rupera Road, Langigarh, Titilagarh, Kantabanji and Jagdalpur in Madhya Pradesh. During season it is very difficult to get lorries for transporting timber from Jagdalpur. There is competition from the traders dealing in Tamarind, Rice, etc. Generally the transportation charges from Jagdalpur to Visakhapatnam vary from Rs. 60 to 75 per cu.m. Sometimes the transportation charges are upto Rs. 100/- per cu.m. because of competition from other lines.

The timber traders of Visakhapatnam systematically visit these places and buy timber from the station yards either by selecting the logs or in lots. The prices paid at these places (before transportation to Visakhapatnam) are:

			Rate per cu.m.(r)
1.	Terminalia tomentosa (Maddi)	3' girth and below	Rs. 185 by selection
		3' to 4' girth	Rs. 200 "
		4' girth & above	Rs. 230 "

In lots Maddi can be obtained at rates ranging from Rs. 90 to Rs. 140 per cu.m.(r)

2.	Adina cordifolia (Kamba)	3' girth & below	Rs. 176
		3' to 4' girth	Rs. 212
		4' to 5' girth	Rs. 247
		5' and above	Rs. 282

In lots Adina cordifolia can be obtained for the prices ranging between Rs. 195 to Rs. 212 per cu.m. By selecting the logs the buyers generally avoid hollowed, cracked and bent logs.

They also see that there is no whiteness inside the hard wood. Generally pieces above 3 metres in length are selected. In all the selected logs 70-80% outturn is expected. When bought in lots several logs may be having cracks or hollow or other defects and the outturn may not exceed 40-50%.

Teak logs are mainly imported from Jagdalpur. In the beginning of 1969, buyers paid prices ranging from Rs. 350 to 400 for Teak logs at Jagdalpur. Some buyers import sawn sizes of Teak from Rajnandgaon (50 miles north of Raipur) or from Raipur or even bring from Rajahmundry. The prices of sawn sizes of Teak in May 1969 are as given below:-

Scantlings of Teak:	Below 6'	-	Rs. 847 per cu.m.(s)
	Above 6'	-	Rs. 980 "
Planks of Teak:	6" width	—	Rs.1060 per cu.m.(s)
	8" "	—	Rs.1400 "
	12" "	—	Rs.1760 "
	15" "	—	Rs.2110 "
Reepers:	1½' to 2½' length	-	Rs. 353 per cu.m.(s)
	6' and up "	--	Rs. 706 "

The rates of sawn sizes of other species in Visakhapatnam market in May 1969 are given below:

Species	Rate Rs./cu.m. Scantling	Beams	Planks
Shorea robusta (Sal)	424	459	494
Terminalia tomentosa (Maddi)	388	424	424
Adina cordifolia (Haldu)	424	-	530
Anogeissus latifolia (Chirumanu)	-	318	318
Boswellia serrata (Salai)	-	-	212
Mangifera indica (Mango)	247	-	282

The demand for sawn timber in Visakhapatnam market mainly arises from people constructing houses and from industrial firms. The demand for sizes required for construction purposes and for packing cases is more obvious in this market. Because of the presence of shipyard there is some demand for specialised categories of timber sizes like plank dunnages (separating planks for categorising items in the holds of the chip).

The net outturn of 5,500 cu.m.(r) is being consumed within the zone. (Out of 6,000 cu.m.(r) total trade, 500 cu.m. (r) have been accounted for in Rajahmundry).

16.3. Timber Trade In Rajahmundry

Volume of Trade:- There are about 50 timber depots in Rajahmundry town including those with saw mills, whose total turn over in timber is more than Rs. 1 crore 20 lakhs. Though Rajahmundry has a population of only 1.3 million (1961) it is a very important market in coastal area. It imports timber logs from Bastar in Madhya Pradesh and Chanda in Maharashtra and distributes to the various consuming centres and markets in coastal Andhra Pradesh. 90 per cent of the timber that is received in the market is floated down the River Godavari. Timber is also received by road but not of significant quantities. By volume the turn over of timber per annum is 45,000 cu.m. according to trade sources like the Timber Merchants' Association and enquiries with timber dealers. However according to the forest department's records which show the arrivals of Timber into Rajahmundry market, the annual trade in the market is 46,500 cum(r).

The figures of the forest department are very nearly tallying with those from trade sources when we make allowances for stock on hand. The forest department figures are adopted for subsequent accounts. Table-28 gives details of receipts of timber in Rajahmundry in 1968.

TABLE - 28

RECEIPTS OF TIMBER INTO RAJAHMUNDRY MARKET IN 1968

	Teak logs	Teak Poles	Total Teak	Non-teak logs	Non-teak poles	Total non-teak	Total timber (Cols. 3 + 6)
	1.	2.	3.	4.	5.	6.	7.
From:							
Bastar	24,500	1,800	26,300	5,000	700	5,700	32,000
Maharashtra	2,300	550	2,850	1,000	20	1,020	3,870
Forests of zone in A.P.	6,350	500	6,850	3,350	430	3,780	10,630
Total	33,150	2,850	36,000	9,350	1,150	10,500	46,500

(Source: Records of Forest Check Post, Rajahmundry)

Species:- By far the most important species traded in the market is Teak. Next in importance are Maddi, Yegisa, Bandaru, Mango and Jamun which are considered as the more important among the non teak timbers. There is very little trade in the miscellaneous species like Xylia xylocarpa, Anogeissus latifolia, Lagerstroemia spa., Chloroxylon sweitenia, Bursera serratum, etc. The total volume of the trade in the town broken up by species is as given below:

Contents

Teak	..	36,000 cu.m.
Maddi, Yegisa, Bandaru	..	6,000 "
Other non teak species	..	3,500 "
Sal	..	1,000 "
Total	..	46,500 "

Out of 36,000 cu.m.(r) of Teak timber received in the market 73 per cent i.e., 26,300 cu.m.(r) is from Bastar (M.P.), 19% i.e., 6,850 cu.m.(r) is from forests of the zone in Andhra Pradesh and the 8% i.e., 2,850 cu.m.(r) is from Maharashtra State (Mainly Chanda area).

Specifications:- All the timber received in the market falls into one or the other of the 6 size classes adopted by the trade circles in these parts. The specifications of these categories are:

Pole	- 01 to 30 cms mid girth under bark.	
Vasam	- 31 to 45 cms	"
Basu	- 46 to 60 cms	"
Dulam	- 61 to 90 cms	"
Karra	- 91 to 120 cms	"
Palaka	- 121 cms and above	"

In the case of poles and vasams the lengths are above 5 metres generally. In all other categories the average length is not more than 4 metres but generally 2½ to 3 metres. Longer sizes are also obtainable but rare.

Out of the total annual trade of 46,500 cu.m.(r), it is seen that poles and vasams amount to 4,000 cu.m.(r) of which 2,850 cu.m.(r) are of Teak and the rest of non teak (see Table 28). The volume of trade in saw logs which constitute the rest is of the order of 42,500 cu.m. (r). The trade in saw logs by species is:

Teak saw logs	..	33,150 cu.m.(r)	
Non teak saw logs	..	9,350 cu.m.(r)	
Total	..	42,500 cu.m.(r)	(See Table 28)

Pattern of Trade:- In Rajahmundry timber market generally three types of traders are encountered with:

1. Commission Agents who finance the forest lessees and operate depots in the town on behalf of forest lessees. The Commission agents do not participate in auctions and undertake no risk regarding the cutting and the transportation of the timber. They charge 6% commission over the total timber turn over in the depot, for running the depot. They also act as financiers and over the capital they advance to lessees they charge around 12% interest.

2. Forest Lessees who finance their own business either with borrowed capital or their own capital and who own timber depots in Rajahmundry. They participate in the auctions of the Government and organise their own supply and sale of timber.

3. Retailers:- There are some retail timber merchants who buy the timber in Rajahmundry market itself and sell it in retail to various customers either in round or after sawing. The institution of brokers also operates in Rajahmundry market. The parties coming from outlying villages and towns contact the brokers who in turn arrange for the supply with one or the other depot in Rajahmundry. The brokerage charges are generally 1½% of the value of trade brought by the broker and are paid by depot owners.

Markets:- Rajahmundry as has already been stressed serves as a distribution centre of timber to the various villages and towns in all the coastal districts of Andhra Pradesh. The most important destinations are:

1. All the villages in East Godavari District, especially the rich agricultural hinter land of "Konaseema".

2. Eluru, Nidadavolu, Moruteru, Bheemavaram, T.P. Gudem and Tanuku in West Godavari district.

3. Tenguturu, Ongole, Cheerala, Bapatla of Guntur district.

4. Destinations in Krishna and Nellore districts.

Though at one time Rajahmundry was attracting buyers from Madras, it is seen that in recent years that Madras buyers are in negligible number. They are getting more of their requirements from Kerala and Mysore or go to Mancherial in Andhra Pradesh from where

Contents

through trains run to Madras. A recent development (perhaps stopped after the separate Telengana movement has started) is the trade between Rajahmundry and Hyderabad city. There are at least 2 traders in Rajahmundry who sent consignments of timber to Hyderabad competing with the dealers of Warangal and Mancherial who have the advantage of being nearer to Hyderabad. The reason is the lower price for certain qualities of Teak timber at Rajahmundry than at Warangal or Mancherial. The price difference is such that extra costs involved in transportation could be absorbed. To illustrate:

		Rs. per cu.m.
Average prices of Teak saw logs at Warangal and Mancherial	..	420
Transportation to Hyderabad	..	53
Cost at Hyderabad	..	473
Average prices of Teak saw logs at Rajahmundry	..	350
Transportation to Hyderabad by lorrys.	..	80
Cost at Hyderabad	..	430

Thus in some cases, for certain sizes, it becomes profitable to buy timber at Rajahmundry and sell it at Hyderabad.

Having established the fact that Rajahmundry does not merely serve the consumers of the four districts constituting our zone but reaches out even to far flung markets it now becomes necessary to quantify the re-export of timber from Rajahmundry to places outside the zone. The following table gives accounts of consumption inside zone and exports to places outside.

TABLE - 29

ACCOUNTS OF CONSUMPTION INSIDE ZONE AND EXPORTS TO PLACES OUTSIDE

Unit: cu.m.

Item	Consumption inside zone	Re-export to places outside zone.	Total trade.
Teak poles	2,850	-	2,850
Non teak poles	1,150	-	1,150
Teak logs	20,150	13,000	33,150
Non teak logs	7,350	2,000	9,350
Total	31,500	15,000	46,500

(Source: From permits issued by Forest Department Checking Post at Rajahmundry).

Prices:- Prices in Rajahmundry market are very much dependent on those at Bastar - the main supply source - as the auction prices at Bastar determine the costs of production at Rajahmundry. On the other hand the roydlty rates that the traders from Rajahmundry willingly offer at Bastar auctions depend on the size of demand at Rajahmundry and the prices that the consumers are willing to offer at Rajahmundry. Once timber is bought at a particular price at Bastar it is reasonable to expect that Rajahmundry prices are arrived at after adding transportation, handling, profit, interest and supervision costs to the Bastar prices.

To illustrate: Teak logs of 90 cms - 120 cms in girth (3 metre length) are obtained from Dantowara and Sukma in Bastar at Rs. 350 per cu.m. for quality - I logs and Rs. 280/- per cu.m. for quality-II logs. Rs. 40/- is spent on transport and handling. The prices for the same produce at Rajahmundry ranges from Rs. 318 to Rs. 440. Detailed price list

Contents

for various species, sizes and qualities as on January, 1969 at Rajahmundry market is given in Table-30.

TABLE - 30.

TIMBER PRICES AT RAJAHMUNDRY (JANUARY 1969)

Unit: Rs. per cu.m.

Species	Mid girth (U.B.)	A-Class 3-4 m.	B-Class 3-4 m.	C-Class 3-4 m.	A-Class 2½-3 m.	B-Class 2½-3 m.	C-Class 2½-3m.
Teak	above 120 cms	545	440	388	440	388	350
	91 - 120	440	388	350	388	350	318
	61 - 90	370	325	318	318	282	265
Yegisa	above 120 cms	300	247	195	211	176	160
	91 - 120	230	195	176	195	176	141
	61 - 90	176	141	125	141	125	125
Bandaru	above 120 cms	282	230	211	230	176	141
	91 - 120	230	176	141	160	141	105
	61 - 90	141	125	105	125	105	90
Maddi	above 120 cms	230	211	176	195	160	141
	91 - 120	176	141	125	141	125	105
	61 - 90	141	125	105	125	105	90
Non Teak	above 120 cms	125	105	100	105	95	90
	91 - 120	105	90	75	90	75	60
	61 - 90	90	75	65	95	90	60

(Source: Enquiry at Rajahmundry Market).

In the end it is necessary to mention about market for Sal. The import of Sal timber has started only in the last 3-4 years initially on an insignificant scale but gradually grew to be a volume of 1,000 cu.m. in 1968. This is a very healthy indication pointing to a diversification of species which is imminent in the timber trade of this locality. There has been considerable consumer resistence towards Sal till recently. This is being broken and Sal is entering into the market in a big way of late. The most important reasons for

this is the price factor Sal is purchased in auctions in the various divisions of Bastar at Rs. 90 to Rs 105 per cu.m. delivered at the depots in Bastar The cost of transport and handling from Bastar to Rajahmundry generally work out to Rs 35 to Rs 40. In Rajahmundry the rates prevailing of Sal at the beginning of 1969 are as given below

Logs 6' girth and above	- Rs	211 per cu m.
Logs 3' girth and above	- Rs	176 "
Logs 1½' to 3'	- Rs	105 "

16.4. Timber Trade In Kakinada

The coastal town of Kakinada (population 1 25 million 1961) which is the headquarters of East Godavari District has 15 timber depots with a turn over of Rs. 2 to 3 lakhs per year, 5 with an annual turn over of Rs. 1 5 lakhs each and another 5 depots with an annual turn over of Rs. 75,000 each

In terms of volume, the trade is of 7,000 cu m.(r) during 1968 The species wise break up of the volume is:

Teak	2,500 cu m
Maddi, Yegisa and Bandaru	3,000 "
Other non teak species	1,000 "
Sal	500 "
Total	7,000 "

As regards sources from where the timber is derived, enquiries revealed that around 5,000 cu m is imported from Bastar (M P) direct Out of the imported timber 50% (2,500 cu.m) is of Teak. About 2,000 cu m (r) of Maddi, Yegisa and Bandaru and 500 cu.m.(r) of Sal logs are also being imported.

There are 10 prominent timber merchants of Kakinada who participate in timber auctions at Bastar mainly in West Bastar, East Bastar and South Bastar Divisions. Teak prices in Bastar in 1968 varied from Rs. 300 to Rs. 400 per cu.m. (r) depending on the quality and size of logs. Maddi prices ranged between Rs. 150 to Rs. 180 per cu.m.(r). The Sal log prices, of the quality preferred by Kakinada merchants are at Rs. 80 to Rs. 100 per cu.m.(r) in Bastar.

The transport of the logs is done via River Godavari upto Rajahmundry and from there through the canal from Rajahmundry to Kakinada. The handling and transportation charges vary between Rs.80 to Rs. 120 per cu.m. (r) depending on the lead in Bastar from depot site to the river side.

The ruling prices of logs of some species at Kakinada market in May, 1969 are:

Teak (Ist class) - above 150 cms girth and 3 metre length.	-	Rs. 500 to 550 per cum (r)	
Maddi from Bastar ...	-	Rs. 250 to 300	"
Maddi from Andhra Pradesh ..	-	Rs. 175 to 200	"

The main customers for timber are the people from the neighbouring villages and the people of the town itself who want constructional timber. There is no particular demand for packing cases and the demand by furniture makers is limited to buying Teak and Rosewood (when available). There are a few bulk customers like the Boat building yard, vehicle body building firm and the polytechnic school who mainly buy logs.

The use of Sal is gradually increasing and the prospects are that larger quantities of Sal may get absorbed in this market in times to come.

To sum up: Out of 7,000 cu.m (r), 500 cu m (r) is imported and 2,000 cu.m.(r) is derived from forests of the zone All the 7,000 cu.m (r) is consumed within the zone.

16 8. Timber Trade In Eluru

Eluru, the district headquarters of West Godavari District with a population of 1 08 million (1961) is not only the biggest town in the district but also the largest timber market of the district. There are 13 timber depots in the town All of them have been visited and the accounts of trade are prepared. The annual turn over of trade by species is indicated below:

Teak		800 cu m (r)	per year
Maddi, Yegisa, Bandaru	..	900 cu m (r)	"
Other non teak species	.	300 cu m. (r)	"
Total	..	2,000 cu m.(r)	"

The important sources from which timber is arriving into Eluru market and the quantities transported yearly from these sources is indicated below:

From Rajahmundry	-	500 cu m (r)
From Balharshah	-	300 cu.m (r)
From forests of zone	-	1,000 cu.m (r)

500 cu m (r) of timber that is coming from Rajahmundry has been accounted for in the balances of Rajahmundry trade The import from Balharshah to Eluru is direct and so are the timber arrivals from forests of the zone In view of the above facts the net trade (not

Contents

accounted for in other markets of the zone) in Eluru market is 1,500 cu m (r) per annum.

The timber is generally sawn at the mills in Eluru town or in the saw mills in the nearby villages The most important customers are the people constructing houses and the furniture industry The entire volume of 1,500 cum (r) traded at Eluru is consumed within the zone.

16 6. Timber Trade In Kothagudem:-

Kothagudem has 36 timber depots and 8 saw mills. Enquiries with the president of the Kothagudem Timber Merchants' Association revealed that the total out turn of trade in the market is of 25,000 cum (r) per year The species distribution of this volume is as given below:-

Teak	2,000 cum (r)
Maddi, Yegisa, Bandaru	10,000 "
Other non teak species	13,000 "

The sources from which the wood is received in the market are as indicated below:

A	From divisions of Warangal, Karimnagar etc which are outside zone	5,000 cum (r)
	Teak - 1,000 cum Non teak - 4,000 "	
B	From Bhadrachellam area and the ~~forests~~ of Khammam Palancha & ~~Kothagudem~~ divns	17,500 "
	Teak - 1,500 cum Non teak- 6,000 "	
C.	From Balharshah and Chanda	2,500 "
	Teak - 500 cum Non teak - 2,000 "	
	Total	25,000 "

In Kothagudem itself as has already been stated there are 8 saw mills where nearly 5,000 cu.m. of saw logs are being sawn annually 8,000 cu.m. used in Mining (see para 7) and the rest about 12,000 cu.m.(r) is exported to various destinations throughout Andhra Pradesh. It is estimated that out of 12,000 cu.m.(r) exported from Kothagudem market, 5,000 cu.m.(r) is derived from Maharashtra and from divisions of Andhra Pradesh area not inside the zone. Therefore, this quantity is considered a re-export. 7,000 cu.m.(r) is the export from out of the production from the forests. The most important consuming centres outside the 4 districts which form the demand study zone, are listed below:

Krishna District.	Vijayavada, Gudivada, Machilipatnam, Hunumdan junction, Vuyyur, Pamarru, Gannavaram, Jaggayyapet, Avanigadda.
Guntur District.	Guntur, Ongole, Narsaraopet, Pidigu-ralla, Chilakaluripet, Ponnur, Chirala, Bapatla, Mangalagiri. Macharla.
Nellore District.	Nellore, Kandukuru.
Kurnool District.	Kurnool.
Khammam District.	All Villages.
Hyderabad District.	Hyderabad City.
Malgonda	All villages.

Except in the case of Kurnool, timber is transported to the various destinations by trucks. In the case of Kurnool it is seen that there is movement of timber by train especially of the species Hardwickia binata. Thus the consumption inside the zone from cut of the timber traded at Kothagudem is 5,000 cu.m. (r).

The Teak timber that is available in Kothagudem is generally of a lower quality than the timber that is imported from Bastar, Balharshah, or Chanda. The prices are therefore lower than those of the imported logs.

The prices in Kothagudem market in June 1969 are as given in the statement below:

Timber prices of Kothagudem market in 1969.

Unit: Rs /cu m.

Species	Girths 30 to 120 cms.
Teak	200 - 420
Pterocarpus marsupium	75 - 200
Terminalia tomentosa	100 - 200
Adina cordifolia	75 - 200
Chloroxylon swietenia	100 - 212
Cleistanthus collinus	45 - 90
Anogeissus latifolia	75 - 100
Dillenia pontagyna	60 - 90
Lagerstroemia parviflora	40 - 75
Diospyros melanoxylon	60 - 90
Other miscellaneous sps.	60 - 90

Note.- Lengths vary from 1.8 metres to 4 5 metres and the rates are adjusted according to langth. Prices here represent averages.

16 7 Timber Trade In Khammam

There are 15 timber depots in Khammam town, 5 of them having their own saw mills and other 10 being small depots without saw mills The biggest timber depot in the town is Patel Timber Depot having an annual turn over of Rs 4 lakhs and who sell around 300 cum (r) of Teak, 700 cum (r) of Maddi, Yegisa and Bandaru and only a small quantity around 200 cum (r) of other species, which include Hardwickia pinnata.

Shri Subrahmaniaswara Timber Depot with a turn over of Rs. 2½ lakhs per year is another big depot in the town whose turn over of Teak per annum is 200 cum (r) and 800 cum (r) of Maddi, Yegisa and

Contents

and Bandaru All the other depots put together have an annual turn over of 800 cum (r)

Summing up the situation the annual outturn of timber in Khammam is around 3,000 cum (r) out of which 500 cum of Teak, 2,000 cum (r) is of Maddi, Yegisa and Bandaru and 500 cum (r) is of other non teak species.

The sources from which timber is brought to Khammam are varied. It is seen that out of the total volume, 1,000 cum (r) is imported into the district from Balharshah in Madhya Pradesh and 1,000 cum (r) from the other districts of Andhra Pradesh like Warangal and Mancherial divisions. Only 1,000 cum (r) is derived from forests of the zone.

The timber is generally sawn in the local saw mills and is sold to customers The entire quantity of 3,000 cum (r) is consumed within the zone.

The prices of various sawn sizes of various species in Khammam in April 1969 are as given below

TABLE - 31

SAWN WOOD PRICES IN KHAMMAM MARKET.

Units: Rs./cum.

Species	Scantlings	Beams	Planks	Reepers
Teak	635	882	776 to 1059	353
Maddi	353	459	-	-
Yegisa	423	528	-	-
Soft woods	212	-	212	-

Contents

17. SUMMARY OF PRESENT CONSUMPTION OF WOOD AND BAMBOOS IN THE ZONE

The aggregate consumption of industrial wood in the zone is 121,500 cum (r). The figure is relevant for the year 1968. Out of this by percentages the use by each category in order of magnitude is:

Saw logs for Saw Milling	-	58.0%
Pole wood for construction	-	24.5%
Wood for mining	-	6.5%
Wood for agricultural implements	-	4.0%
Wood hand sawn	-	3.0%
Wood for minor industries	-	2.0%

(Total does not tally due to rounding)

The following table gives the quantities:

TABLE - 32

SUMMARY OF ESTIMATES OF CONSUMPTION OF INDUSTRIAL WOOD IN 1968

Sl. No.	Category	Consumption of				Total consumption.
		Imported wood	Recorded production from forests.	Unrecorded production from forests	Non forest species	
1.	Ship building	1,500	-	-	-	1,500
2.	Boat building	500	-	-	-	500
3.	Vehicle body building.	500	-	-	-	500
4.	Mining	-	8,000	-	-	8,000
5.	Transmission poles	-	200	-	-	200
6.	Saw Milling	33,000	28,700	-	10,300	72,000
7.	Hand Sawing	-	2,100	900	1,000	4,000
8.	Agricultural implements	-	1,000	2,000	2,000	5,000
9.	Pole wood for construction	4,000	5,000	2,600	18,200	29,800
	Total	39,500 (2)	45,000 (1)	5,500	31,500	121,500

(1) 7,000 cum (r) recorded production is exported bringing up the total of recorded production to 52,000 cum (r).

(2) 20,500 cum (r) of imported wood is re-exported. If this is added to 39,500 cum (r) shown above the total of imported wood works out to 60,000 cum (r).

		cum (r)
Consumption of Industrial Wood within zone	-	121,500
Re-export of imported timber or export of wood produced inside zone	-	27,500
	Total	149,000
Consumption of industrial fire wood in the zone	-	90,000
Consumption of fire wood for domestic uses	-	3,536,000
	Total	3,626,500

The break up by sources is explained under para 14.2.

Consumption of Bamboos for industrial uses	-	100,000 tonnes
Consumption of Bamboos for non industrial uses	-	50,000 tonnes
Total	-	150,000 tonnes

Out of 100,000 tonnes used by the pulp and paper industry 74,000 tonnes are derived from the forests of zone and the rest is imported. The entire quantity of 50,000 tonnes consumed for non industrial uses is from forests of zone.

18. SUPPLY OF INDUSTRIAL WOOD

The main sources of supply of industrial wood to the zone are:

1) Imports from the States of Madhya Pradesh, Maharashtra, Orissa and from divisions of Andhra Pradesh outside the demand study zone.

2) Production from the forests of the 8 divisions in the zone.

3) Non forest areas of the zone.

Imports:- Imports of wood into the zone have been quantified species wise and source wise under para 16. The quantity imported into the markets of the zone is 58,500 cum (r) in 1968. There is a direct import of 1,500 cum (r) by the Hindustan Shipyard at Visakhapatnam. Thus the total imports into the zone adds up to 60,000 cum (r). Out of this 58% in Teak, 37% is of non teak species and 5% is of Sal. Table-33 gives the quantities.

TABLE - 33

IMPORT OF TIMBER INTO ZONE

Unit: cum (r)

Item	Teak	Sal	Non-teak	Total
Imported into markets	34,450	3,000	21,050	58,500
Imported by Shipyard	340.	-	1,160	1,500
Total	34,790	3,000	22,210	60,000

Production From The Forests Of Zone:

The figures of recorded removals of timber from the 8 forest divisions that lie in the zone fluctuate from year to year. However these fluctuations do not represent a conscious manipulation of annual cut to synchronise supply with the shifts in demand. They are mostly

a consequence of regulating the yield by area or faults in accounting For the purpose of this study which is mainly a preparation of consumption accounts in 1968, the figures pertaining to 1967-68 are taken as valid representation of supply from recorded sources. The recorded removals from all 8 divisions amount to 52,000 cum (r) The inventory work is not carried out in all the forests of these divisions Parts of some divisions are outside the survey area The recorded removals from the surveyed area comes to 22,000 cum (r) Table 34 gives the details:

TABLE - 34

RECORDED PRODUCTION FROM FORESTS OF ZONE 1967-68

Unit: cum (r)

Division	Total quantity	Quantity from forests surveyed	Quantity from forests not surveyed
Visakhapatnam	1,000	1,000	-
Kakinada	5,700	5,700	-
Eluru	2,000	2,000	-
Bhadrachellam North	6,000	6,000	-
Bhadrachellam South	2,500	2,500	-
Khammam	5,000	1,000	4,000
Palancha	19,000	38,000	15,200
Kothagudam	10,800	-	10,800
Total:	52,000	22,000	30,000

(Source: Records of Forest Department)

Besides the recorded production, it is estimated that there is an unrecorded production from forests to the tune of 5,500 cum (r) This is quantity derived after preparation of accounts of consumption from end use side The reason for unrecorded production is mainly the removals of timber by the population in agency areas for domestic needs which is permitted by law

Contents

Supply Of Wood Of Non Forest Species

It is estimated that 31,500 cum (r) is the supply of wood of non forest species and it is a derived quantity from consumption accounts.

To summarise the supply of industrial wood in 1968 in the zone is:

	cum (r)
1) Imported	60,000
2) Recorded production from forests of zone.	52,000
3) Unrecorded production from forests of zone,	5,500
4) Wood of non forest species,	31,500
Total	149,000 cum (r)

19. FORECAST OF FUTURE DEMAND FOR WOOD IN THE ZONE

19.1. General

In order to formulate sound forest policies it is necessary to establish what levels of wood production should be achieved in the future. This exercise involves study of the evolution of every sector of wood consumption. The level of production of wood and wood products depends on the relationship between demand and supply. The cost of supplying the forecasted volumes must be consistent with the prices that the future market is likely to pay.

In forecasting future demand a great variety of projection techniques are available. Extension of consumption time trends is the simplest method of demand forecasting. However, recent methods relate requirements of forest products to the evolution of the economy and to one or two principal demand shifting variables like population, per capita income, price and user technology and taste.

The effect of population upon consumption is generally assumed to be uniform and quantification is done in terms of per capita consumption. The effect of income over consumption is more pronounced and the relationship is called income elasticity of demand. A cross sectional analysis of consumption of sawn wood and income in the different parts of the world indicates that there is positive relationship between the two. Higher the level of per capita income, the higher the consumption of per capita sawn wood at least upto a level where the impact of sustitutes is strongly felt and the curve may flatten out. The elasticity coefficient for income can be derived from the formula:

$$\text{Elasticity coefficient} = \frac{\%\ \text{change in quantity}}{\%\ \text{change in income}}$$

The value to be adopted in this formula can be obtained only if a historical or cross sectional series of quantities consumed and per capita income are available.

Price is another demand shifting variable. Any realistic forecast should mention at what level of prices the forecast is tenable. This relationship is called price elasticity of demand. Generally this role of price is by-passed by assuming that there is no change in relationship between price of the product and the price of its closest substitute.

The other demand shifting variables like changes in technology and consumer preferences are evaluated only subjectively and their effect indicated in general terms.

It is proposed to make a forecast of demand for 1975 and 1980. It is assumed that any industrial proposal even if conceived in 1969 will not materialise by 1975 in which case a forecast of demand for wood in the zone by that year becomes important to assess the supply possibilities. As an outer limit 1980 is selected as the target year.

19.2. Population Estimates

The population of the zone (4 districts) in 1961 is 7.934 million. The annual growth rate of population during the decennium 1951 to 1961 was 1.25%. Adopting the same rate of growth of population we arrive at the following estimates of population for the zone in 1975 and 1980.

Population in 1975	- 9.3 million
Population in 1980	- 10.0 million

19.3. Income Estimates

A complete series of per capita income at fixed prices upto 1968 are not available. From the available figures (see para 3.5) the rate of growth of income per annum between 1950 and 1965 is only 1.5%. In view of the promised development during IV Plan period it is estimated that per capita income will grow at least by 2% annually between 1968 and 1975 and by 3% between 1975 and 1980. On this basis the estimated per capita income figures of 1975 and 1980 are as given below:

Per capita income in	1968	-	Rs. 338/-
" "	1975	-	Rs. 408/-
" "	1980	-	Rs. 469/-

19.4. Forecast Of Industrial Wood

Out of 121,500 cu.m.(r) of industrial wood 72,000 cu m (r) is consumed as saw logs by mills and 4,000 cu m.(r) used up for hand sawing The wood consumed by industries is very little and is merged with sawn wood for purposes of forecasting. The following categories of wood use are recognised for forecasting:

1) Sawn wood (used for ship building, boat building, vehicle body building, saw mills, hand sawing)

2) Wood for Agricultural implements

3) Wood for Mining

4) Wood for Transmission Poles

5) Pole wood for construction.

19.4.1. Forecast For Sawn Wood

The actual sawn wood consumption will for quite some time to come dominate the field of consumption of industrial wood. It will mostly be used in urban housing and in vehicle building. There is growing need for sawn wood as other more sophisticated packaging materials will only slightly gain ground, due to their relatively high price. It is very likely that sawn wood would find even a higher demand over the next 2 decades if only the availability which is traditionally bad in some areas could be improved. Modernization of sawmilling may help to some extent but the structure of the sawmilling industry is such that no fundamental improvements may be expected.

However, the effect of growth in income on consumption of sawn wood is pronounced and has to be quantified to arrive at a consumption forecast for 1975 or 1980. As no historical series of consumption figures are available it is not possible to work out separate income elasticity co-efficient specially applicable to the zone. It is proposed to adopt an income elasticity of 0.8 which is the factor arrived by F.A.O. for India (vide: Indicative World Plan). For calculation of demand in target years the formula used by F.A.O. for India (Communication from Mr. J.E.M. Arnold to Dr. H.V. Henle in 1967) which is given below is adopted:

$$\text{Log } \frac{y^1}{y} = 0.4343 \times I.E \left(1 - \frac{x}{x^1}\right)$$

where -

y^1 = per capita consumption at target date.

y = per capita consumption at starting point.

I.E = Income Elasticity.

x = per capita income at starting point.

x^1 = per capita income at target date.

The constant 0.4543 is derived by FAO from cross sectional data. Knowing the starting points and the income elasticity it is possible to derive per capita consumption values at future dates. The total consumption is then calculated on the basis of population projections.

Year	Consumption of Sawn wood in Zone
1975	94,400 cum (r)
1980	110,600 cum (r)

19.4.2. Forecast For Agricultural Wood

The essentially rural character of the Indian society with a peasant population of more than 80% on a very low income level makes it necessary for the agriculturists to use inexpensive and, if possible, hand-made and self-fabricated tools, carts and all other sorts of implements. There is very little likelihood that the situation will change profoundly, although marginally in some more prosperous areas more and more industrially fabricated metal tools will be introduced. It can be assumed that the increasing scarcity of appropriate wood, both in species and sizes, may limit the increase of consumption much rather than the availability of industrially manufactured modern tools.

For agricultural wood a calculation was made which was based on the 1968 level of consumption as starting point. In this year the consumption amounted to about 5,000 cum (r) which gives a per capita consumption of 0.000567 cum (r). As there are no historical series on the wood consumption in the field, an elasticity co-efficient for countries of the same income-bracket as India in the FAO study for the World Indicative Plan (I.F.) is used. Accordingly, the evolution in

total consumption was calculated as being the following:

1975 - 6,000 cum (r)

1980 - 7,000 cum (r)

19.4.3. Forecast Of Wood For Mining

8,000 cu.m. (r) is present consumed to mine 1,500,000 tonnes of coal. The generally accepted factor relating wood consumption and coal mined is 6 cu.m.(r). There are no definite plans to increase the productivity of coal by Singareni Collieries. However it is expected that 25% more wood will be required by 1975 and another 25% rise is expected between 1975 and 1980. On this basis we arrive at the following figures:

Demand forecast for mining timber in 1975 - 10,000 cu.m. (r)

" " " 1980 - 12,500 cu.m. (r)

These estimates should be revised as and when definite plans of future production of coal at the Singareni Collieries becomes known.

19.4.4. Forecast Of Wood For Transmission Poles

The consumption currently is only 200 cu.m. (r) and demand is dependent on the programmes of the Post & Telegraph Department and is also constrained by supply in view of the rigid specifications. However the following guestimates are adopted:

Demand in 1975 - 400 cum (r)

Demand in 1980 - 600 cum (r)

4.5. Demand For Pole Wood For Construction

No historical series of consumption figures are available. As the use is the same as for the bulk of sawn wood, namely construction, the same elasticity, 0.8 was applied. The starting point

was calculated on the basis of the 1968 consumption estimate and came to 0.003383 cum.(r). The same function as for sawn wood and agricultural wood was used. On this basis, the total consumption were worked out as shown below:

Demand in 1975 - 36,000 cu.m. (r)

Demand in 1980 - 42,300 cu.m. (r)

19.4.6. Summary For Forecasts For Industrial Wood

The following statement presents a summary of the forecasts:

Unit: cum.(r)

Item	Demand in 1975	Demand in 1980
1) Sawn wood (used for ship building, boat building, vehicle body building, saw mills, handsawing).	94,400	110,600
2) Wood for Agricultural Implements.	6,000	7,000
3) Wood for Mining.	10,000	12,500
4) Wood for Transmission Poles.	400	600
5). Pole wood for construction.	36,000	42,300
Total	146,800	173,000

19.5. Forecast Of Demand For Fuel Wood

Despite the fact that consumption of fuel wood is more voluminous than consumption in other categories it has already been brought out in the report that a large percentage of the material is such that it has no alternate uses. The forecast of fuel wood requirements in 1975 and 1980 may also be viewed in the light of the above statement.

Fuel wood is an inelastic material and the growth in its demand is directly related to growth in population. Using the per capita consumption in 1968 as the starting point the demand in 1975

and 1980 are calculated. The effect of substitutes (alternate fuels) is taken into consideration only through percentage deductions in the projected demand figure. A 10% reduction in 1975 estimates and in 1980 estimates is made to account for effect of substitutes.

Estimated demand for fuel wood in 1975 - 3.5 Mill. cum. (r)

Estimated demand for fuel wood in 1980 - 3.8 Mill. cu.m.(r)

Industrial firewood will continue to maintain the present level.

Note:- Per capita consumption factor in 1968 = 298 Kg. converted to cu.m. by using factor 1 tonne = 1.4 cu.m.

(3A)
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Dy Director (Data)
Forest Survey of India
85-Subhash Road, Dehra Dun

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38

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Contents