



GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS
(DEPARTMENT OF ENVIRONMENT, FORESTS & WILDLIFE)

**REPORT
ON
WOOD CONSUMPTION STUDY
IN
BELLARY DISTRICT
[KARNATAKA]**

FOREST SURVEY OF INDIA
SOUTHERN ZONE
BANGALORE
APRIL, 1989



GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS
(DEPARTMENT OF ENVIRONMENT, FORESTS & WILDLIFE)

**REPORT
ON
WOOD CONSUMPTION STUDY
IN
BELLARY DISTRICT
[KARNATAKA]**

FOREST SURVEY OF INDIA
SOUTHERN ZONE
BANGALORE
APRIL, 1989

C O N T E N T S

<u>S.No.</u>	<u>Particulars</u>	<u>Page No.</u>
1.	Introduction	1
2.	Objectives	1
3.	Geographical location	3
4.	Topography	3
5.	Climate	3
6.	Population	4
7.	Forests	4
8.	Methodology	5
9.	Sampling Design Adopted	5
10.	Data Collection	6
11.	Method of Estimation	6
12.	Future Forecast	7
13.	Per Capita Wood Consumption	8
14.	Total Existing Consumption of Wood	9
15.	Future Forecast of Wood for the District	9
16.	Existing Wood Supply in the District	10
17.	Gap between Demand and Supply of Wood	10
18.	Forest Based Industries in the District	11
19.	Supply and Demand for Bamboo	11
20.	Ways to meet the Demand and Supply Gap	12

.....

LIST OF TABLES

<u>Table No.</u>	<u>Particulars</u>	<u>Page No.</u>
1	Present Per Capita Wood Consumption in the District.	13
2	Present Per Capita Annual Consumption of Wood.	13
3	Total Existing Consumption of Wood per annum.	14
4	Projected Demand for Wood in 1991.	14
5	Departmental Supply of Wood and Bamboo in the District.	14
6	Gap between Demand and Supply of Wood and Bamboo in the District.	15
7	Existing and Projected Demand for Bamboo.	16

.....

APPENDICES

Appendix-A	: Details of Villages Selected for Data Collection in the Rural Areas.	17
Appendix-B	: Details of Sampling in Urban Areas.	17
Appendix-C	: Format used for Data Collection purpose.	18-20
	Map of Bellary District	21

.....

P R E F A C E

Wood Consumption Survey has become an integral part of the timber resource inventory. The timber resource inventory on the one hand gives a picture of the existing stock qualitatively as well as quantitatively and on the other the consumption survey indicates the consumption pattern and compares supply with the demand.

The Wood Consumption Survey in Bellary District was conducted during 1983-84. The survey reveals that the consumption of wood during the year was 25,818 M³ of round wood and 2,20,625 tonnes of firewood. The requirement of wood in 1991 is estimated at 33,046 M³ of round wood and 2,82,350 tonnes of firewood. As the production of wood in the district is much less than the consumption, it has to be closely monitored.

The staff of Forest Survey of India, Dehradun and that of Southern Zone, Bangalore deserve commendation for their efforts in compiling the report.

Dehradun,

Dated: 4-4-'89.

J.B. Lal,
Director,
Forest Survey of India.

CHAPTER - I

1. Introduction

The Forest Survey of India (Southern Zone) undertook the work of inventory data collection in April 1983 in Bellary District of Karnataka State. The wood consumption study is also conducted simultaneously in the survey zone. In Bellary district the wood consumption survey was conducted by the headquarter's staff after completion of the inventory work. The survey was conducted for households in rural as well as urban sector with the objective of collecting qualitative and quantitative data on wood consumption to prepare a report which will serve as a basis for developmental planning in the forestry sector in the district.

2. Objectives

The main objectives of wood consumption study in Bellary district were as follows:-

- 2.1 To study the trend in production of wood and bamboo resources in the district.
- 2.2 To conduct the wood consumption study to assess the existing consumption of wood and bamboo in rural and urban sector separately and for the district as a whole for various purposes such as:
 - house construction;
 - furniture making;
 - agricultural implements;
 - firewood needs for cooking, heating etc.

- 2.3 To make projection in demand for wood and bamboo for the year 1991 for various purposes in rural as well as urban sector.
- 2.4 To work out the gap in demand and supply of wood and bamboo resources, existing as well as projected gap.
- 2.5 To suggest ways to bridge the gap in demand and supply in a phased manner.
- 2.6 To find out the industrial supply of wood and bamboo resources if any.

CHAPTER - II

GENERAL DESCRIPTION OF THE SURVEY ZONE

1. Geographical Location

Bellary district of Karnataka is situated between north latitude $14^{\circ} 30'$ and $15^{\circ} 50'$ and east longitude $75^{\circ} 40'$ and $77^{\circ} 11'$. The district is bound by Anantapur district of Andhra Pradesh on the eastern side, Dharwar district on western side, Raichur district on northern side, Chitradurga district of Karnataka on the southern side. The district comprises of 8 taluks and covers an area of $9,562 \text{ km}^2$. The total forest area in the district is $1,174 \text{ km}^2$ which comes to about 12.27% of the total geographical area whereas the total forest area in the state is about 20.15% of the total geographical area of the State.

2. Topography

The topography of the area is mostly plain interspersed with hillocks with big boulders and rocky slopes. The elevation from M.S.L. varies from 1161.29 metres in Sandur taluk to 490.73 metres in Bellary taluk. The soil is mostly derived from gneiss and quartzites and varies from clayey to sandy at places. The soil is very poor in fertility.

3. Climate

The climate of the district is very hot. The summer starts from late February and extends upto June and is very severe. The maximum temperature reaches upto 40°C . The rainfall occurs mostly during July and averages to about 731.6 mm. In most of the areas the rainfall is about 341.4 mm.

4. Population

The population of Bellary district as per 1981 census is 14.87 lakh. Rural and urban population being 9.96 lakh and 4.91 lakh respectively. The population projection for 1991 has been made as 12.75 and 6.28 lakh in rural and urban sector respectively. The existing general literacy rate is 30.37%.

5. Forests

The district has 1,17,416 ha area under forest cover out of 9,56,220 hectares geographical area, which comes to about 12.27%. The forest area varies from 0.30% in Sirguppa taluk to 26.7% in Hospet taluk. The forests of Bellary district are classified as under:-

- (i) Southern Tropical Dry Mixed Deciduous Type.
- (ii) Southern Tropical Dry Deciduous Type.
- (iii) Southern Tropical Hardwickia forests.

The forests mostly have sparse growth of vegetation. Good vegetation can be seen in Sandur forests where rainfall is slightly better and sub soil water level is nearer to the surface. In other places the forests consist of scattered and bushy growth with barren land consisting of boulders and very shallow soil at places. The climatic conditions in the district are very severe for vegetative growth. Very hardy species such as Neem, Prosopis, Babul, Cassia siamia and Eucalyptus grow in the area. The department is taking up large scale plantations especially of fuelwood species to cope up with the acute firewood problem.

CHAPTER - III

1. Methodology

The wood is consumed in rural areas for various purposes such as house construction, furniture, agricultural implements and fuel. In urban areas the consumption is mostly for house construction, furniture and fuel. Considerable quantity of wood is consumed in rural sector for making and repairing agricultural implements. The wood consumption survey has been conducted both for rural as well as urban sector separately. The per capita consumption has been worked out and on the basis of population projection the wood and bamboo requirements in 1991 have been estimated for various purposes both for the rural as well as urban sector separately and for the district as a whole.

2. Sampling Design adopted

A list of villages of each of the eight taluks was taken and the villages were selected from each taluk on the basis of random sampling without replacement giving due representation to their distances from the forests. Three to four villages were selected from each taluk. Altogether twenty villages were selected out of 589 villages in the district which comes to around 3.4%. In the second stage sampling the households in each selected villages were selected randomly, giving due representation to various income groups. Five to eight households were selected from such village, thus in all 112 households were selected out of 1.423 lakh households which comes to 0.08%. In case of urban sector 40 households

out of 70,138 households were selected from Bellary town in such a way that proper representation is given to each income group. The households were selected on the basis of simple random sampling without replacement.

3. Data Collection

After selection of the households, the field data was collected in the prescribed proforma by putting a minimum number of questions to the house-owner and by direct measurement. The data was collected on wood and bamboo consumption on various items such as construction, furniture, agricultural implements and fuelwood. The village-wise information with respect to population, number of households etc., was also collected.

4. Method of Estimation

The raw data collected on wood consumption for various categories have been processed using the regression method of estimation. The average consumption per household has been calculated by using the formula:-

$$\hat{Y}_{reg} = \bar{Y} + t (X - \bar{X})$$

where X , Y are size and wood consumption of the selected households. \bar{X} is the average number of persons per household in the population.

The standard error and variance have been calculated using the formula given below:-

$$V(\hat{Y}_{reg}) = \frac{N-n}{N} \frac{s_e^2}{n}$$

From the above the per capita wood consumption have been calculated so as to arrive at the total consumption.

5. Future Forecast

The future forecast for wood and bamboo have been made on the basis of population growth as there is a positive relationship between the wood consumption and the population upto a stage where the demand for substitutes is strongly felt.

CHAPTER - IV

RESULTS AND DISCUSSION

1. Per Capita Wood Consumption

On analysis it is found that the per capita wood consumption in rural sector in Bellary district at present is as follows:-

(a) House Construction	..	0.3134 M ³
(b) Furniture	..	0.0162 "
(c) Agricultural Implements	..	0.0426 "
(d) Firewood	..	0.1488 Tonnes

whereas in urban sector it is estimated as follows:-

(a) House construction	..	0.2638 M ³
(b) Furniture	..	0.0501 "
(c) Firewood	..	0.1475 Tonnes

The total per capita wood consumption in rural sector is 0.3722 M³ of round wood and 0.1488 tonnes of firewood and in urban sector it has been assessed as 0.3139 M³ of round wood and 0.1475 tonnes of firewood. The study shows that wood consumption per capita in rural areas for house construction is 18.8% more than the consumption in urban area which is due to the fact that in rural areas wood is used mostly as round wood whereas in urban areas people use sawn wood for house construction. The per capita wood consumption for furniture in rural areas is around 32.3% of the per capita consumption for furniture in urban areas. A considerable amount of wood is consumed in rural areas for making and repairing of agricultural implements and the same has been worked out as 0.0426 M³ per capita.

The firewood consumption in rural as well as in urban areas in Bellary district has been found to be almost equal due to the fact that the supply of other forms of energy materials are considerably low. The species used as firewood are mostly Eucalyptus hybrid and Prosopis juliflora. Eucalyptus is being grown by the department and also being encouraged to be grown on private farm lands. Prosopis juliflora is growing gregariously in the district and forms a major source of firewood.

2. Total Existing Consumption of Wood

On study, it has been assessed that the total wood consumption per year in the district at the present moment is 25.818 thousand cu.m of round wood and 220.625 thousand tonnes of firewood. Of this consumption 20.516 and 5.302 thousand cu.m round wood is consumed in rural and urban sector respectively and 148.203 and 72.422 thousand tonnes of firewood is consumed in rural and urban sector respectively.

3. Future Forecast of Wood for the District

Future forecast of wood consumption has been made on the basis of population growth. The present population of the district is 14.87 lakh, of which 9.96 lakh in rural areas and 4.91 in the urban areas and the population is expected to go to 19.03 lakh in 1991 with 12.75 lakh in rural areas and 6.28 in urban areas. Basing on this the future wood requirement in 1991 for the district has been assessed as 33.046 thousand cu.m of round wood and 282.35 thousand tonnes of firewood. Of the total round wood required 48.5% will be for house construction, 40.9% of agricultural implements, 10.5% for furniture making.

Total round wood requirement in rural and urban areas for domestic consumption has been assessed as 26.264 and 6.782 thousand cu.m and the same for firewood as 189.72 and 92.63 thousand tonnes in rural and urban areas respectively.

4. Existing Wood Supply in the District

There is no production of major forest produce in the district because the forest of the district comprises of dry mixed deciduous and scrub type. Mostly thorny species grow. The forest of the division produce only firewood and small timber. During 1981-82 recorded production of firewood was 5.628 thousand tonnes, Eucalyptus 2,313 thousand cu.m and Bamboo supply 4.775 thousand tonnes. Bamboo is not available in the forests of the district but brought from other divisions for supply to the public. Eucalyptus available from the plantations has been supplied to M/s Harihar Polyfibres. Firewood has been consumed locally in the district. The main species used are Eucalyptus, Babul, Pongamia pinnata, Cassia siamia, Rain tree, Prosopis juliflora and Neem etc. The existing supply of forest produce is so meagre that large tract of the district is denuded of vegetation.

5. Gap between Demand and Supply of Wood

The study has revealed that there is a vast gap between demand of forestry produce and the supply from the department. The existing gap has been assessed as 25.818 thousand cu.m of round wood and 214.997 thousand tonnes of firewood. The shortfall is met from supplies from other sources such as supplies from outside the district as the wood purchased by the merchants

in auction sales is brought to the district and partly from private lands and unrecorded sources. The gap between demand and supply in 1991 is expected to rise to 33.046 thousand cu.m of round wood and 276.722 thousand tonnes of firewood.

6. Forest Based Industries in the District

There is no large scale forest based industries in the district. However, some small scale paper manufacturing units by hand process do exist and they mostly use grasses such as Cymbopogon celeratus, Cymbopogon martinii and Heteropogon contortus. There is a straw board factory at Munirabad. There are 30 registered saw mills in the district. Their out-turn is below their installed capacity due to non-availability of raw material. Similarly the carpenters are also not working at their full capacity due to the prohibitive cost of raw material in the market as most of the wood comes from distant places outside the district and becomes costly on reaching the consumption centres. The wood mostly comes from the auction sales conducted at Dharwar, Belgaum, Chikamagalur, North Canara etc.

7. Supply and Demand for Bamboo

There is no production of bamboo in the district but the bamboo is brought from other divisions mostly Bhadravathi to meet the local requirement. Bamboo is mostly used in house construction especially for thatched houses. It is used in round as well as split form. The per capita and total annual bamboo consumption in the district has been shown in Table-7.

The study has revealed that the annual existing consumption of bamboo of length 6 M in the district is 1.439 thousand tonnes of which 0.996 thousand tonnes in rural areas and 0.443 thousand tonnes in urban areas respectively. The bamboo consumption in rural and urban areas will reach to about 1.276 thousand tonnes in rural areas and 0.564 thousand tonnes in urban areas at the rate of existing use.

8. Ways to meet the demand-supply gap

In order to supply the wood from the plantations of the district, it is necessary to raise large scale plantations in a phased manner. The conditions for vegetation growth in the district are extremely severe, if it is assumed that a 10 year old plantation will give roughly 20 tonnes of wood per hectare then approximately 998 ha or say 1000 hectare of plantations with quick and hardy species will have to be raised every year. This may involve an expenditure of about 40 lakh rupees per annum at the rate of 4000 rupees/hectare.

Table-1 : Present Per Capita Wood Consumption in Bellary District

Sl. No.	Category	Unit	Rural Sector		Urban Sector	
			Quantity	SE%	Quantity	SE%
1.	House Construction	M ³	0.3134	12.6	0.2638	16.4
2.	Furniture	"	0.0162	17.0	0.0501	19.3
3.	Agricultural Implements	"	0.0426	8.9	-	-
4.	Total (1 to 3)	"	0.3722	-	0.3139	-
5.	Firewood	Tonnes	0.1488	9.7	0.1475	15.8

Table-2 : Present Per Capita Annual Consumption of Wood in Bellary District

Sl. No.	Category	Unit	Rural Sector	Urban Sector
1.	House Construction.	M ³	0.0089	0.0075
2.	Furniture	M ³	0.0011	0.0033
3.	Agricultural Implements	M ³	0.0106	-
4.	Total (1 to 3)	M ³	0.0206	0.0108
5.	Firewood	Tonnes	0.1488	0.1475

Table-3 : Total Existing Consumption of Wood Per Annum
In Bellary District

Sl. No.	Category	Unit	Rural sector	Urban sector	Total
1.	House Construction	000 M ³	8.864	3.682	12.546
2.	Furniture	"	1.095	1.620	2.715
3.	Agricultural Implements	"	10.557	-	10.557
4.	Total (1 to 3)	"	20.516	5.302	25.818
5.	Firewood	000 tonnes	148.203	72.422	220.625

Table-4 : Projected Demand for Wood in 1991 in Bellary District

Sl. No.	Category	Unit	Rural sector	Urban sector	Total
1.	House Construction	000 M ³	11.347	4.710	16.057
2.	Furniture	"	1.402	2.072	3.474
3.	Agricultural Implements	"	13.515	-	13.515
4.	Total (1 to 3)	"	26.264	6.782	33.046
5.	Firewood	000 tonnes	189.720	92.630	282.350

Table-5 : Department Supply of Wood & Bamboo during 1981-82
in the District

S.No.	Produce	Unit	Quantity
1.	Eucalyptus	000 M ³	2.313
2.	Firewood	000 tonnes	5.628
3.	Bamboo (brought from outside the district)	000 tonnes	4.775

Table-6 : Gap between Demand and Supply of Wood and Bamboo in Bellary District

Sl. No.	Category	Unit	Existing supply for domestic purpose	Existing Demand/Consumption	Existing Gap	Projected demand in 1991	Projected Gap in 1991
1.	Round Wood	000 m ³	-	25.818	25.818	33.046	33.046
2.	Firewood	000 tonnes	5.628	220.625	214.997	282.350	276.722
3.	Bamboo	"	4.775	1.437	-	1.840	-

Table-7 : Existing & Projected Demand for Bamboo in Bellary District

Sl. No.	Category	Unit	Rural Sector		Urban Sector		Total	
			3-6 cm dia	7-9 cm dia	3-6 cm dia	7-9 cm dia		
1.	Per Capita Annual Consumption	No.	0.05	0.05	-	0.08	0.01	-
2.	Total Existing Consumption	000 tonnes	0.498	0.498	-	0.393	0.050	1.439
3.	Projected Demand in 1991	"	0.638	0.638	-	0.502	0.062	1.840

Note:- The length of bamboo has been taken as 6 metres.

APPENDIX-A

Details of Villages Selected for Data Collection in the Rural Sector

Sl. No.	Name of the village sampled	Popula-tion	Total No. of house-holds	Total No. of house-holds selected	Total popu-lation of selected households
1.	Erangiligi	2798	337	6	36
2.	Gittigunur	1436	151	5	47
3.	Nowli	1590	228	7	59
4.	Dasarahalli	1535	227	7	65
5.	Madur	1271	194	5	70
6.	Hutikutti	1436	206	5	44
7.	Kunchur	3006	426	6	48
8.	Chiraethahalli	1770	259	6	56
9.	Danapur	299	30	5	28
10.	Metri	2879	439	5	29
11.	Krishnapur	114	8	6	41
12.	Guntinahalli	17	4	5	38
13.	Lokikere	1067	177	5	46
14.	Kodihalli	1135	149	5	53
15.	Malapur	688	138	5	25
16.	Ramsagar	216	30	6	61
17.	Chikkakeriga-halli	1021	203	5	23
18.	Kotehale	1598	110	5	25
19.	Mattisugur	325	100	5	39
20.	Bachingonda-halli	3514	416	8	78

APPENDIX-B.

Details of Sampling in Urban Areas

1.	Name of the Town	.. Bellary
2.	Total Population	.. 201579
3.	Total No.of households in the town.	28797
4.	No. of households sampled	.. 40
5.	Population of sampled households..	297

.....

FOREST SURVEY OF INDIA
25, SUBHASH ROAD, DEHRADUN

WOOD CONSUMPTION SURVEY
GENERAL INFORMATION (DOMESTIC)

Schedule-A

1. Name of the owner of the house:
2. Total No. of houses in the village:
3. Name of the village/town/city:
4. Name of Tehsil and Forest Range:
5. Name of the District and Forest Divn.:
6. Type of Building actually visited as a sample unit. Katcha/pucca/multi-storeyed.
7. No. of storeys - total and used for living only (to be filled in if more than one storey).
8. Serial No. of the building out of the total building to be visited in the village.
9. Ward No. - House No. in Municipal area and cities wherever available.
10. No. of Households living in the building.
11. Total No. of Persons living in the building.
12. Distance from the house to the nearest forest or jhum kheti area which is under the control of the Forest Department. Actual if it is less than 10 kms.
13. Average Annual Income of the Family - Nature of occupation (service/cultivation/business).
14. Average plinth area occupied by each house - includes verandah covered by roof and floor.
15. a) No. of living rooms -
b) No. of storage rooms -
c) No. of common rooms -
d) Other category viz. bath rooms, latrines, kitchen, cow-shed etc.

Camp:

Date

Signature

Name of Surveyor.....

Designation

FORM-I : EXISTING USE OF WOOD IN HOUSEHOLD

Year of Construction:

Item	No.	Size L x W x thickness	Quantity of wood/ Bamboo used in M ³	Source: Forest/ Market
1. Door (Wooden) Door Ply.				
2. Window (Glass) Wooden				
3. Roof wooden with planks & beams (Bamboo)				

What are the important tree/bamboo species mostly used for construction purposes?

Doors & windows include the Frames and Panels.

FORM-II : EXISTING FURNITURE ITEMS

Year of Manufacture:

Item	Numbers	Approximate quantity of sawn wood M ³	Remarks
1. Chairs			
2. Tables			
3. Wooden Almirah			
4. Cots			
5. Others (Specify)			

What are the important tree/bamboo species most used for furniture manufacture?

FORM-III : AGRICULTURAL IMPLEMENTS

Item	No.	Quantity of wood used
1. Plough with Yoke		
2. Bullock Cart		
3. Leveller		
4. Tool Handles (Axes, sythe spal etc.)		
5. Others (Specify)		

FORM-IV : FUEL CONSUMPTION

Item	Unit	Quantity/Day	Quantity per year
1. Wood	Kg.		
2. Agri. waste	Kg.		
3. Charcoal	Kg.		
4. Coal	Kg.		
5. Kerosene	Lts.		

Signature

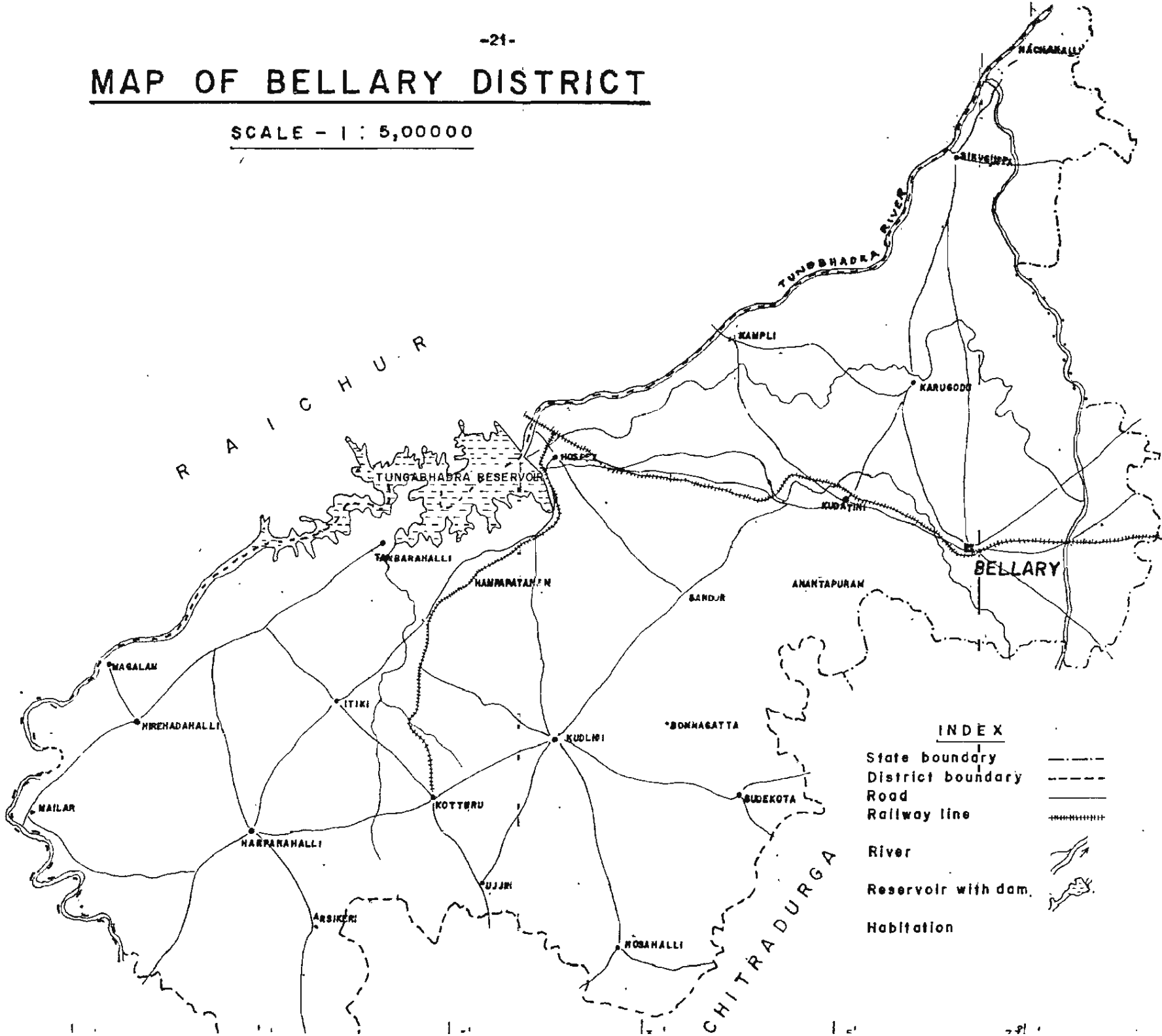
Name of Surveyor

MAP OF BELLARY DISTRICT

SCALE - 1 : 5,00000

18° 45'
30'
15'
15° 0'
45'

A N D H R A P R A D E S H



INDEX

- State boundary
- District boundary
- Road
- Railway line
- River
- Reservoir with dam
- Habitation

CHITRADURGA