Assessment of Trees Outside Forests(ToF) Adilabad District - Andhra Pradesh

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Introduction:

✓ Trees are valuable resource. Their value can be judged by the fact that they are the biggest source of the basic needs of mankind. Trees affect the ambience in a favorable manner.

✓ The environmental services provided by trees outside forests, in rural and urban areas, include protection of soil and water resources, the conservation of biological diversity, support to agricultural productivity and sustainability, the buffering of desertification and resource degradation processes in arid and semi-arid zones, amenity and recreation, and improvement of livelihoods.

Introduction :

- ✓ Cities and human settlements, whatever their size, face several environmental problems such as shortage of water supply, air pollution and sewage management. Deforestation and changes in land use in ever-widening circles around cities are particularly accentuated in arid and semi-arid zones. Indeed, consumption patterns and basic needs of the urban population for products such as fuel wood and construction material are important causes of forest and land degradation.

- ✓ This results in the degradation of soil fertility and the diminution of the tree-cover which contributes to the erosion of the diversity of the gene pool. The negative impact of forest resource degradation on the nutrition and livelihood of poor urban dwellers is often overlooked in urban development.

The significance of TOF

ECOLOGICAL REASONS:
- Biomass
- Carbon sequestration
- Micro climate
- Biodiversity (Ecosystem, Species, Gene)
- Watershed functions (soil and water conservation)
- Pollution control (Air, Noise)
- Wind break/shelter belts

ECONOMIC REASONS:
- Wood, fuel wood, small timber, poles, bamboo
- NWFP (Food, Medicines, Pesticides, Fruits, Fodder, flower, etc.)
- Services (Ecotourism)

SOCIAL/CULTURAL REASONS
- Religion
- Subsistence
- Aesthetic
- Recreation
- Education
- Employment

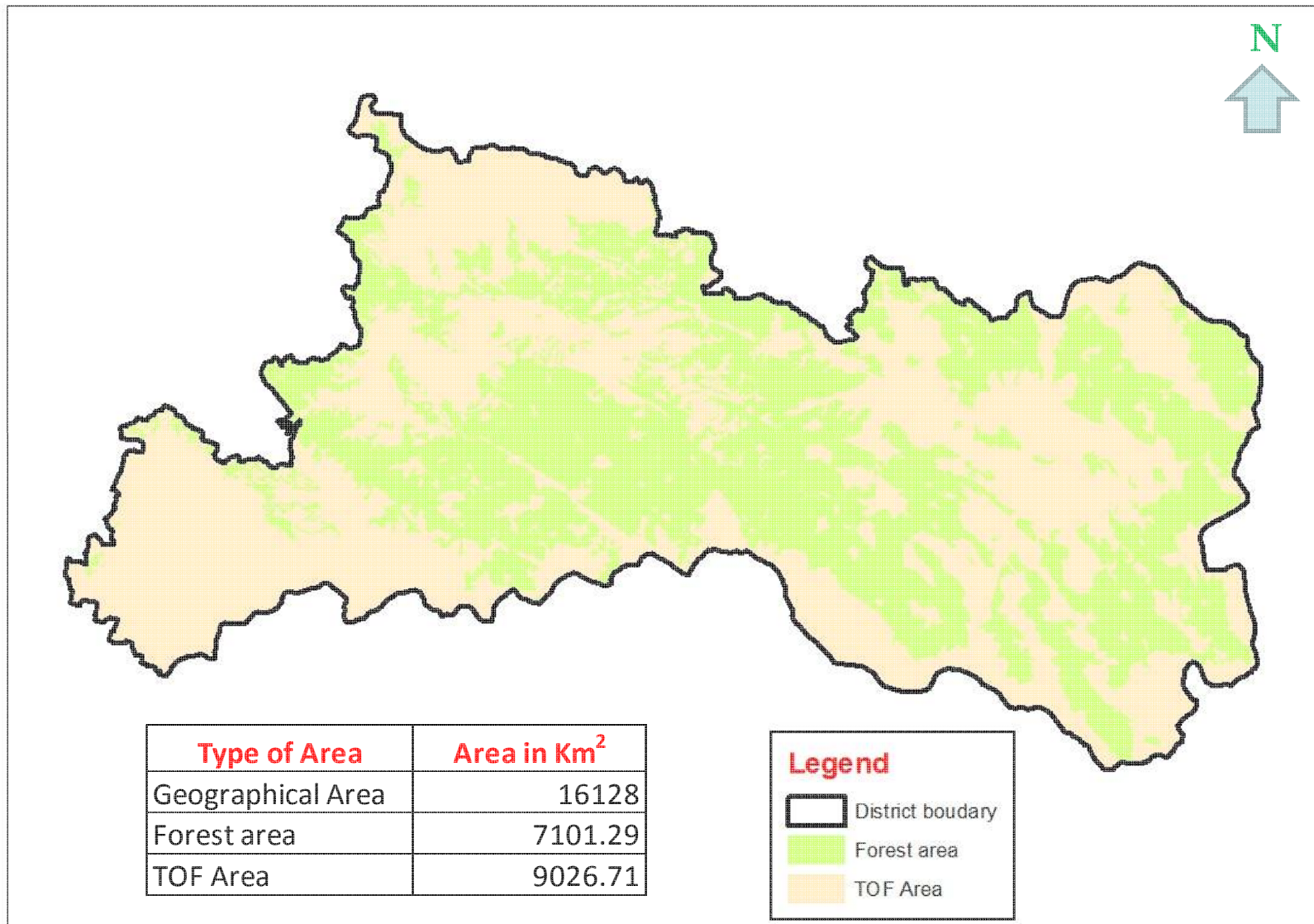# Objectives of the assessment of trees outside forest

The main objectives of the field inventory are to collect qualitative and quantitative information about the trees outside forest resources within precision limits in preparing reports to serve data needs of development planning.

- To estimate the total number of trees in TOF

- To estimate the volume of standing trees outside the forest area.

- To estimate carbon sequestered in TOF

- To evaluate the role of TOF in the context of timber production

- To evaluate the role of TOF in the context of fuel wood, fodder and NTFP.

- To estimate the contribution of TOF in tree cover

- for developing management options to maintain tree cover and plan wood production

METHODOLGY

Distribution of TOF Area in Adilabad District

Type of Area	Area in Km^2
Geographical Area	16128
Forest area	7101.29
TOF Area	9026.71

Legend

District boudary

Forest area

TOF Area

TOTAL TOF AREA STRATIFIED IN TO 6 STRATA

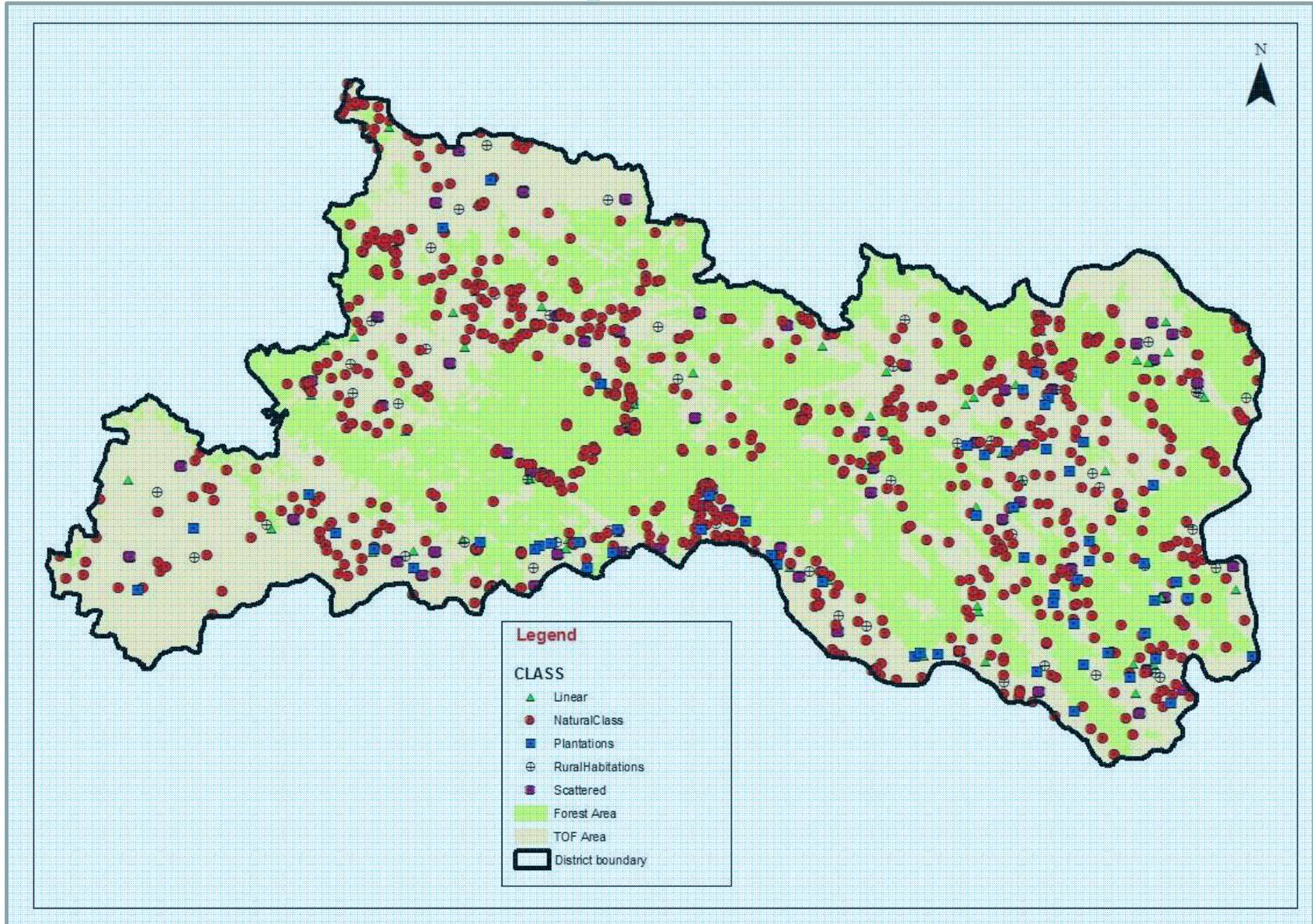## (Data Used for Stratification: Cartosat 1 of 2.5 m resolution)

S.no	Stratum	Sub stratum	Class	No. of plots	Area in Ha	Equivalent Notional Forest area-Ha
1	Natural forest	Block	Moderate Dense	96	5785.77	5785.77
			Open	291	17120.04	17120.04
			Scrub	371	40652.82	40652.82
		Linear		36	2536.83	2536.83
2	Plantations	Block		60	5372.90	5372.90
		Linear		24	527.87	527.87
3	Habitations	Rural		60	15021.43	750
		Urban		36	4965.92	421
4	Scattered			60	810686.69	26509
Grand Total				1034	902670.27	99676.23

TOTAL TOF AREA STRATIFIED IN TO 6 STRATA

(Data Used for Stratification: Cartosat 1 of 2.5 m resolution)

S.No	STRATA & SUB STRATA	
1	Natural Forests (Canopy Density based)	Dense, Open, Scrub
2	Urban Habitations (Area Based – 5 classes)	$>50km^2$; $35-50km^2$; $20-35km^2$; $10-20km^2$; $5-10km^2$
3	Rural Habiatations (Area Based – 4 classes)	$3-5\ km^2$; $1-3km^2$, $50Ha-1km^2$; $25-50Ha$

Distribution of TOF plots in Adilabad District

Legend

CLASS
- ▲ Linear
- ● NaturalClass
- ■ Plantations
- ⊕ RuralHabitations
- ▣ Scattered
- Forest Area
- TOF Area
- District boundary

MAP SHOWING CLASSES OF TREES OUTSIDE FORESTS
(Cartosat-1 Imagery 2005 of Bellampally Division)

N

1:5000

79°35'0"E 79°35'30"E 79°36'0"E

18°59'0"N

18°58'30"N

18°58'0"N

Reseved Forest

Plantation

Scrub

Rural Habitation
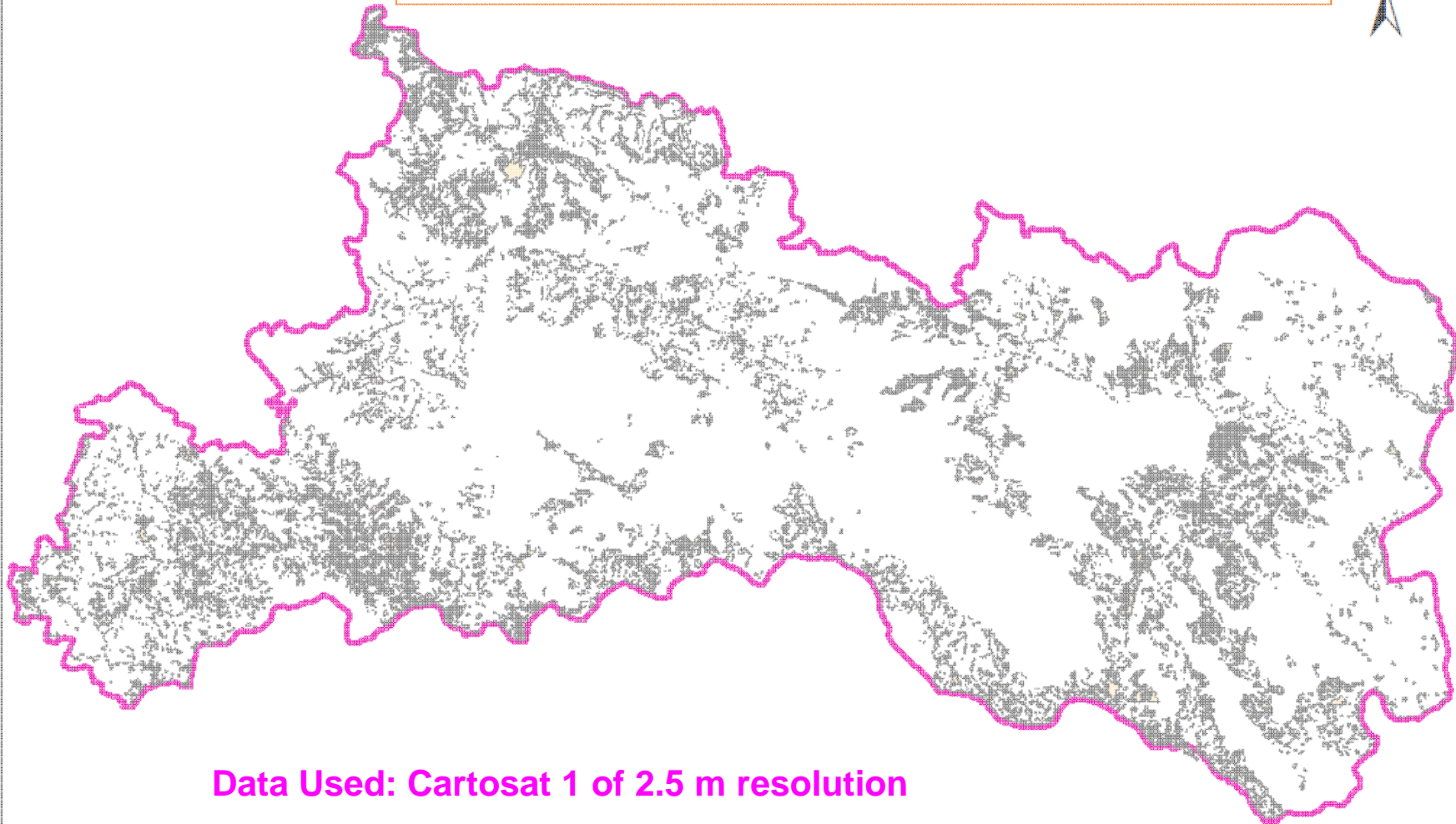
Legend

TOF Classes
- DENSE
- OPEN
- SCRUB
- LINEAR
- PLANTATION
- GROWTH ALONG STREAMS
- HABITATIONS(RURAL)
- HABITATIONS(URBAN)
- MISCELLANEOUS
- Reserve Forest
- Trees Outside RF Polygons

Datum : Indian Bangladesh

0.25 0.125 0 0.25 0.5 0.75

Kilometers

79°35'0"E 79°35'30"E 79°36'0"E
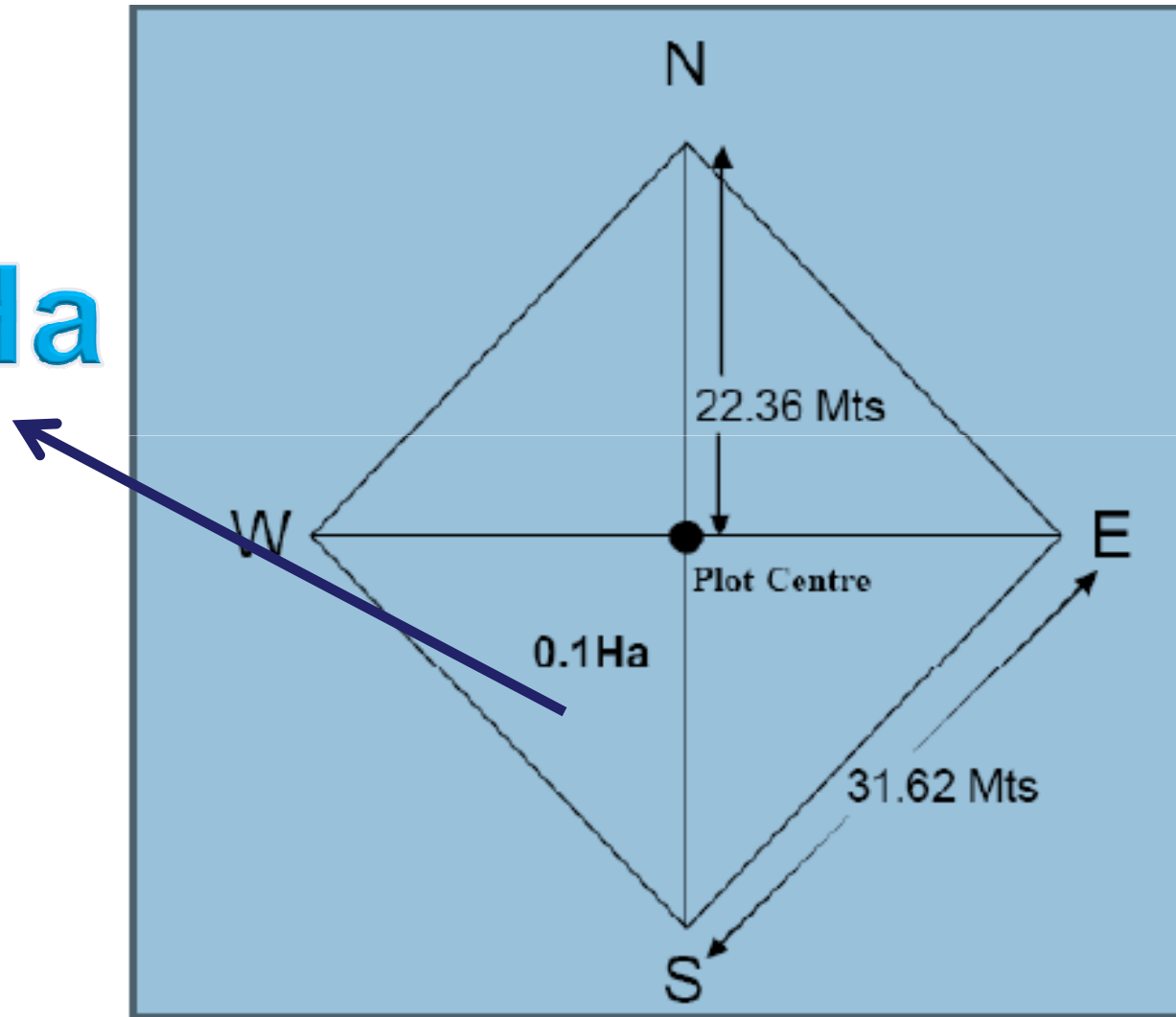
Polygonization of ToF Area into various strata

Data Used: Cartosat 1 of 2.5 m resolution

Laying of Sample plots

For Natural Forests and Block plantations
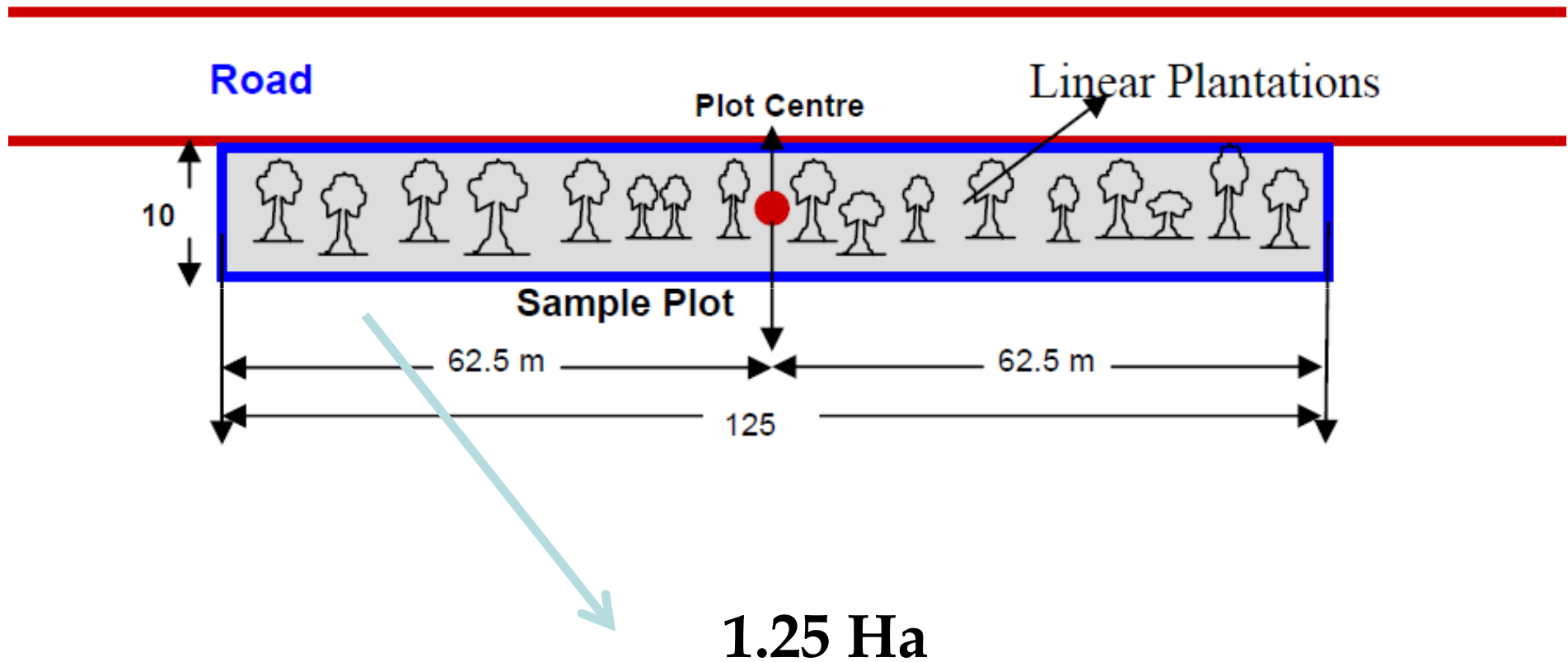
0.1 Ha

Trees on field bunds

Mango Orchard

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Subabul Plantation

For Linear Plantations

Tree growth along the Roads

For Scattered Trees

3 Ha
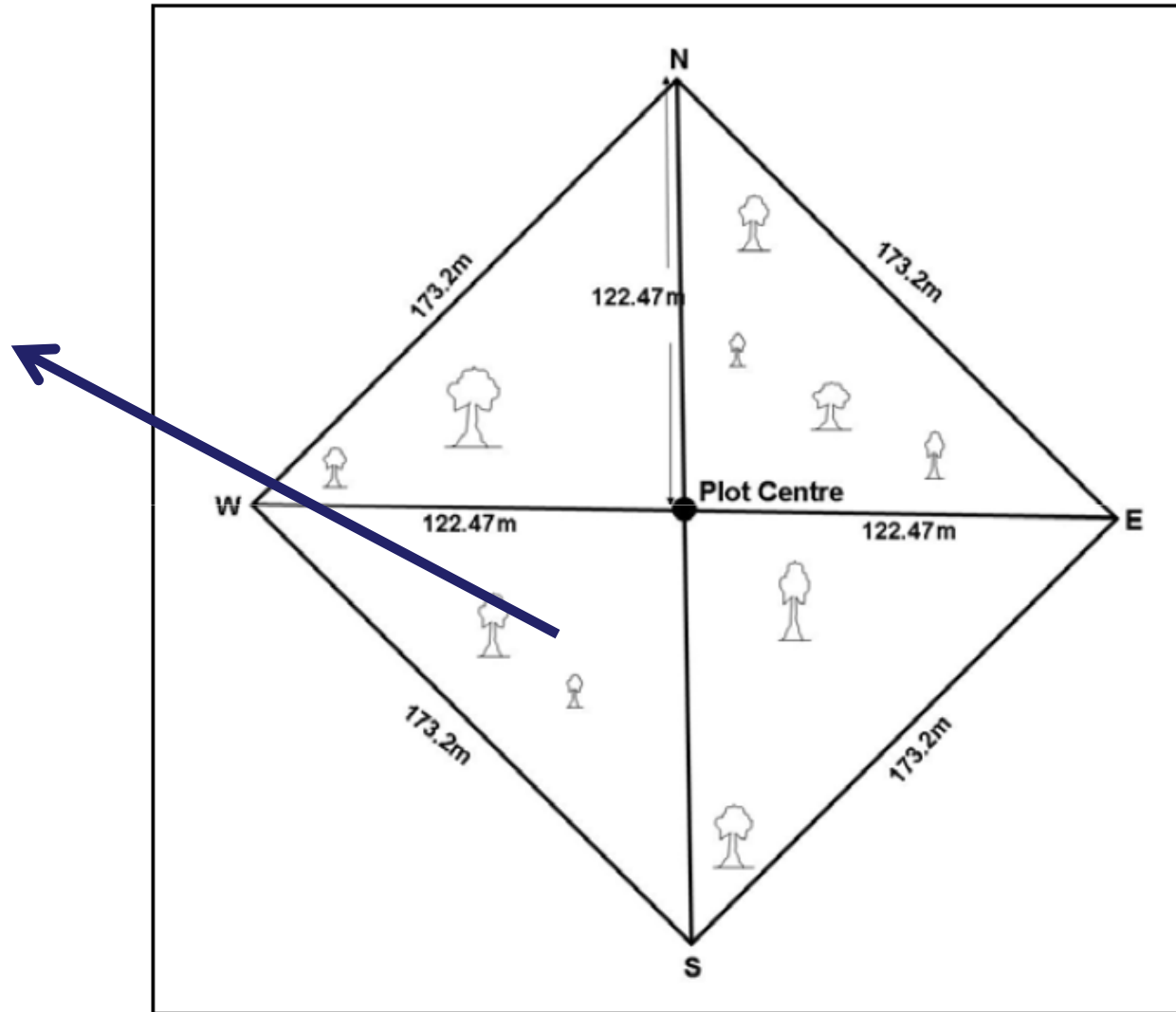
Rural Habitations : Total Enumeration in selected Habitataion

Urban segmentation in Mancherial Town : Enumeration in given segments

Segmentation Map of Ramakrishnapur Town

Circle: Adilabad
Division: Mancherial
Range: Mancherial

1:7500

Segment_ID	Longitude	Latitude
22	79.46767	18.93871
23	79.46795	18.93356
24	79.47290	18.92875

Legend
Segmentations
Habitation Boundary

0   0.15   0.3   0.6   0.9   1.2
                                          Kilometers
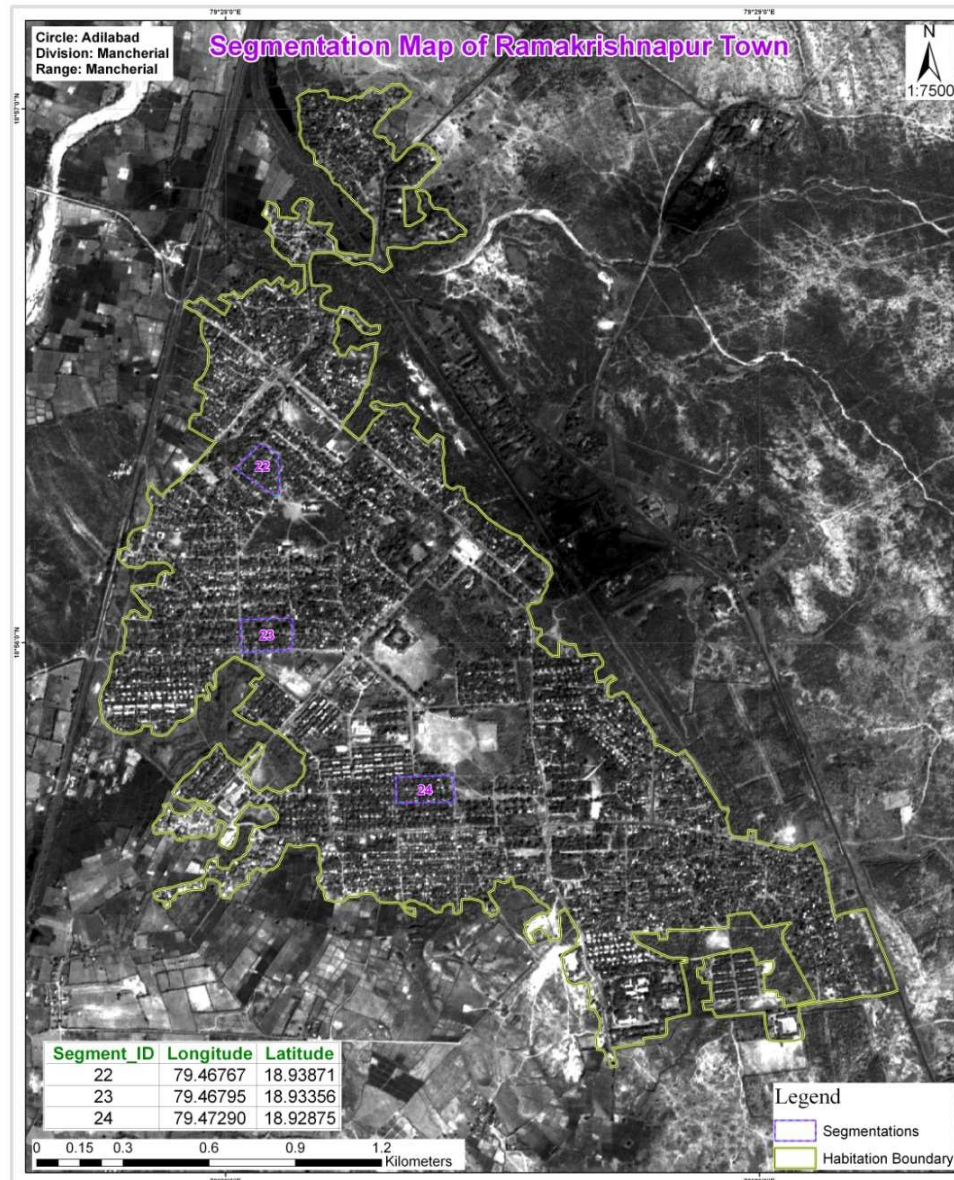
ToF points and stratum wise areas

S.no	Stratum	Sub stratum	Class	No. of plots	Area in Ha
1	Natural forest	Block	Moderate Dense	96	5785.77
			Open	291	17120.04
			Scrub	371	40652.82
		Linear		36	2536.83
2	Plantations	Block		60	5372.90
		Linear		24	527.87
3	Habitations	Rural		60	15021.43
		Urban		36	4965.92
4	Scattered			60	810686.69
Grand Total				**1034**	**902670.27**

Division wise ToF points

Division	Natural Forests	Linear Plantations	Block Plantations	Rural Habitations	Scattered	Urban Habitations	Total
Adilabad	213	13	4	13	13	6	262
Bellampelli	130	11	15	10	11	6	183
Jannaram	87	8	6	8	8	0	117
Kagaznagar	95	8	4	9	8	0	124
Mancherial	104	9	17	9	8	18	165
Nirmal	129	11	14	11	12	6	183
Grand total	758	60	60	60	60	36	1034

Providing Field trainings

RESULTS

Stratum wise unit volumes

S.no	Stratum	Sub stratum	Class	Volume in cum / Ha
1	Natural forest	Block	Moderate Dense	58.88
			Open	33.03
			Scrub	22.01
		Linear		75.15
2	Plantations	Block		130.50
		Linear		77.79
3	Habitations	Rural		9.33
		Urban		11.28
4	Scattered			7.83
Grand Total				**10.28**

Stratum wise unit volumes
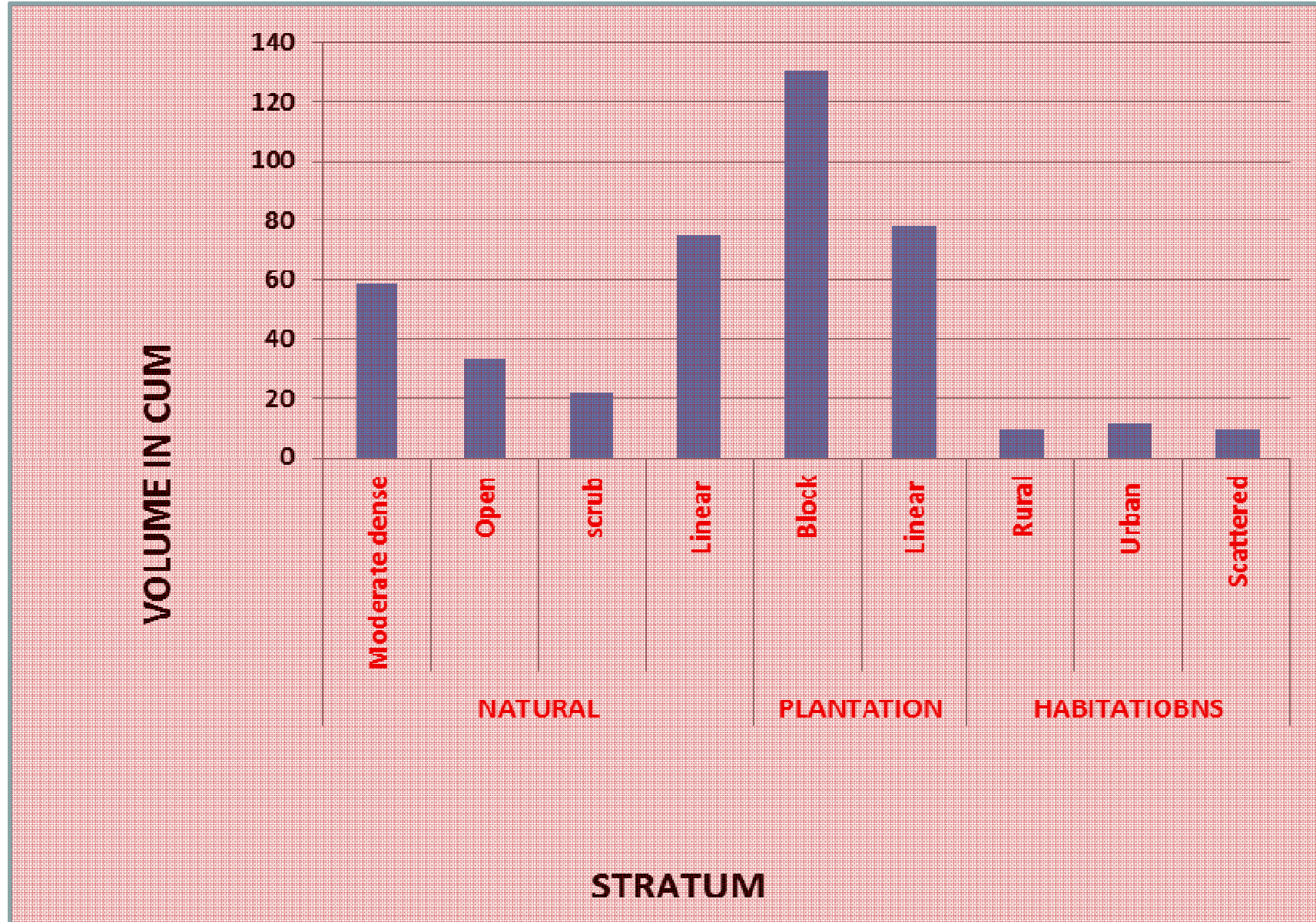
Stratum wise Estimated volumes

S.no	Stratum	Sub stratum	Class	Total volume in cum
1	Natural forest	Block	Moderate Dense	340651
			Open	565560
			Scrub	894870
		Linear		190632
2	Plantations	Block	Mangifera india	701172
		Linear		41062
3	Habitations	Rural		140114
		Urban		56023
4	Scattered			6350818
Grand Total				**9280906**

Stratum wise stems per ha

S.no	Stratum	Sub stratum	Class	Stems per ha
1	Natural forest	Block	Moderate Dense	99
			Open	97
			Scrub	89
		Linear		111
2	Plantations	Block		287
		Linear		60
3	Habitations	Rural		10
		Urban		17
4	Scattered			6.55
Grand Total				**14.75**

Stratum wise stems per ha

STEMS PER HA

350
300
250
200
150
100
50
0

Moderate dense | Open | scrub | Linear | Block | Linear | Rural | Urban | Scattered

NATURAL   PLANTATION   HABITATIOBNS
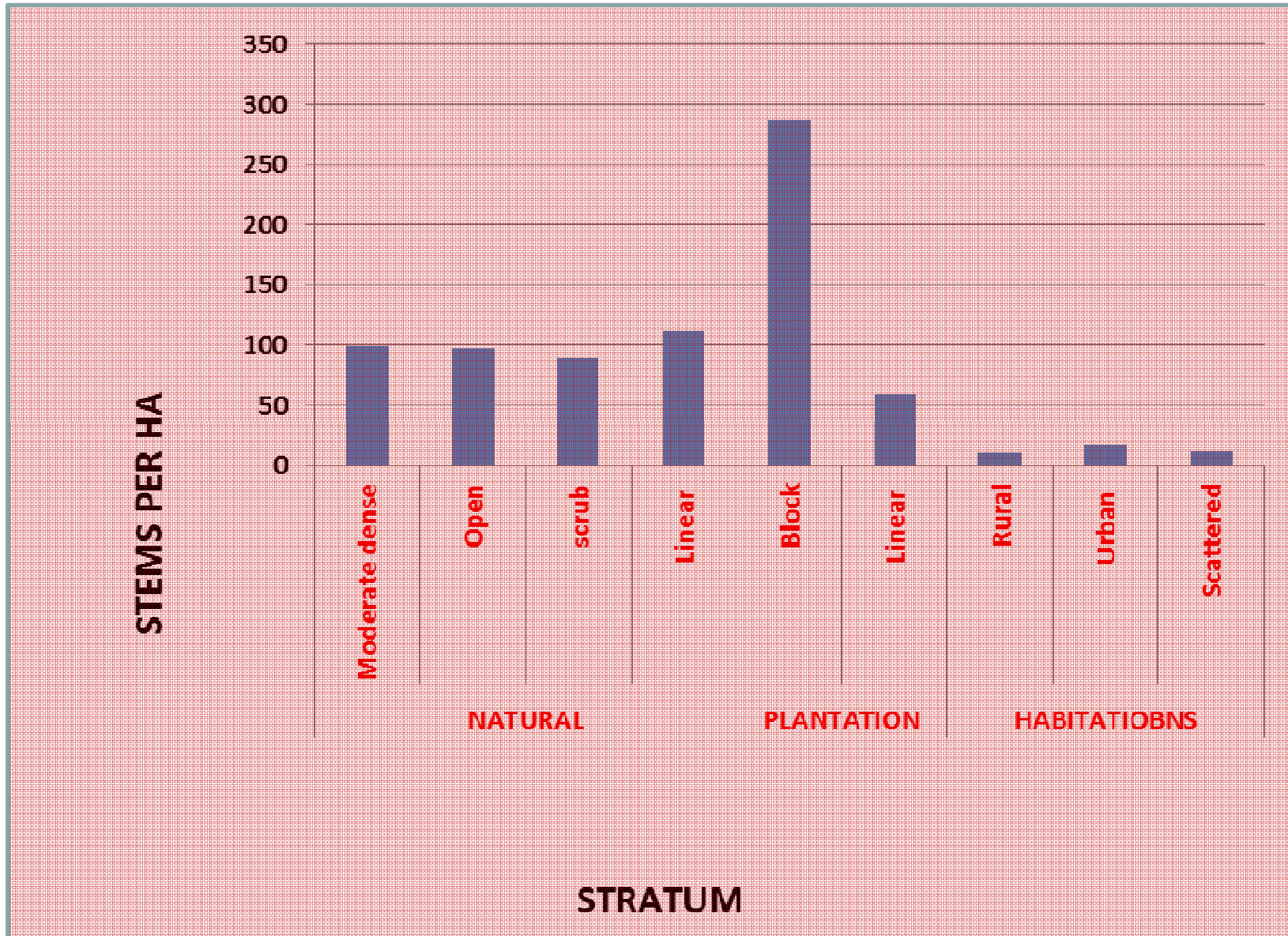
STRATUM

Stratum wise Estimated stems

S.no	Stratum	Sub stratum	Class	Total Stems
1	Natural forest	Block	Moderate Dense	573021
			Open	1673995
			Scrub	3646184
		Linear		283515
2	Plantations	Block	Mangifera india	1546835
		Linear		31728
3	Habitations	Rural		162567
		Urban		87673
4	Scattered			5312893
Grand Total				**13318411**

Top 10 species based on Volume

S.No	Species name	Volume in cum
1	Madhuca indica	2,343,003.34
2	Borassus flabellifer	1,698,435.52
3	Mangifera indica	1,208,420.48
4	Bute monospema	789,208.86
5	Azadirachta indica	522,691.66
6	Tectona grandis	388,254.28
7	Borassus flabelliformis	232,657.15
8	Tamarindus indica	185,526.86
9	Ficus racemosa	164,852.56
10	Terminalia arjuna	140,393.38

Top 10 species based on Volume

Top 10 species based on Volume, showing Volume in cum (y-axis) against Species name (x-axis):

Species name	Volume in cum (approx.)
Madhuca indica	2,340,000
Borassus flabellifer	1,700,000
Mangifera indica	1,210,000
Bute monospema	800,000
Azadirachta indica	530,000
Tectona grandis	400,000
Borassus flabelliformis	240,000
Tamarindus indica	190,000
Ficus racemosa	170,000
Terminalia arjuna	150,000
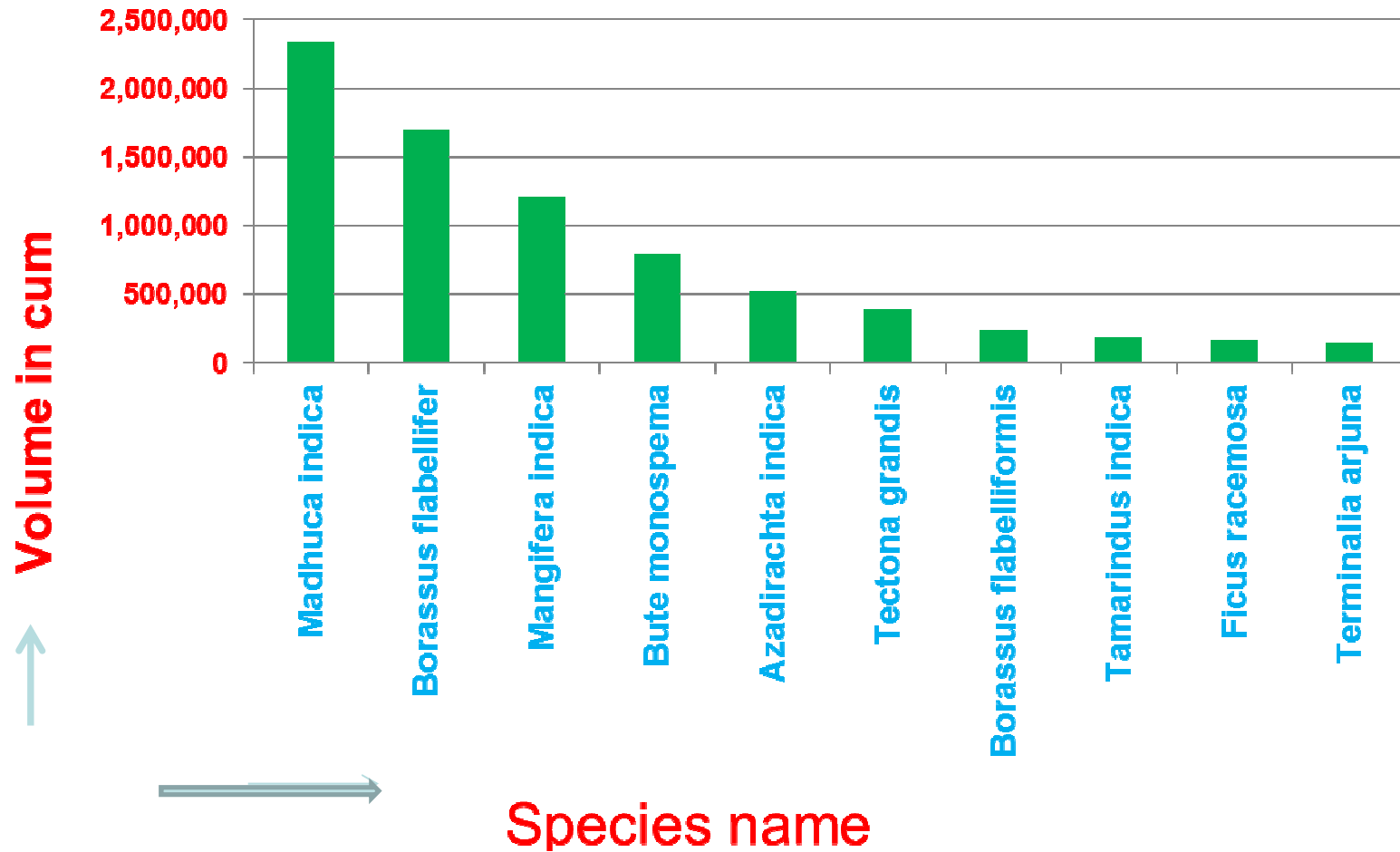
Top 10 species based on stems

S.no	Species name	Stems in No's
1	Madhuca indica	2343003
2	Borassus flabellifer	1698436
3	Mangifera indica	1208420
4	Bute monospema	789209
5	Azadirachta indica	522692
6	Tectona grandis	388254
7	Borassus flabelliformis	232657
8	Tamarindus indica	185527
9	Ficus racemosa	164853
10	Barringtonia acutangula	34668

Top 10 species based on stems
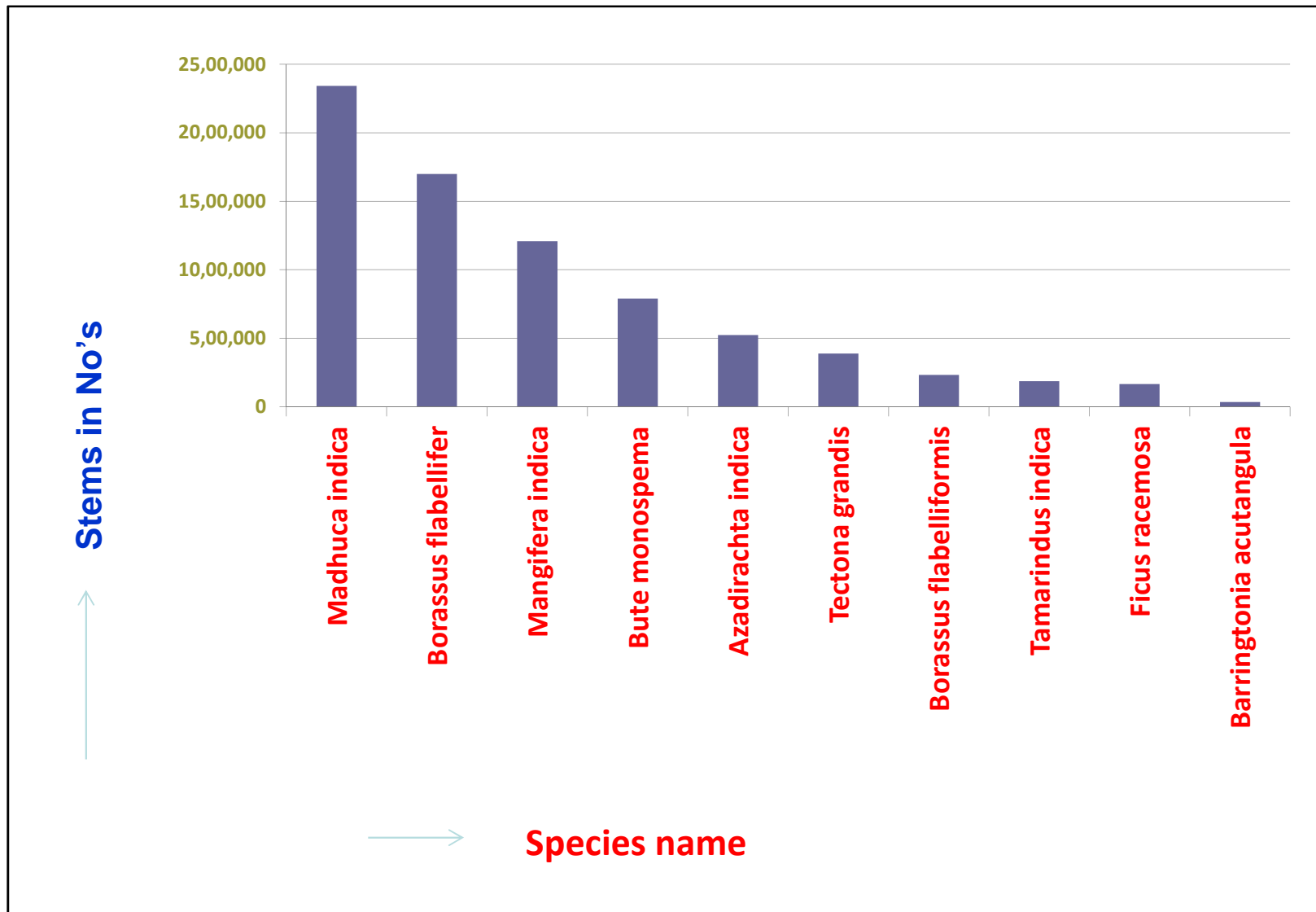
Observations

1.Blocks of Natural forests more than 10Ha

There are 119 polygons in Natural forests, with more than10 ha and with density >0.4 with area of 2029.49 ha. They may be considered as deemed forests under forest conservation act.1980

2. Tank foreshore plantations:

There are 721 tanks in this division. The total area of tanks is 24,753.57 Ha. Of this total area approximately 10.43% of the area, i.e 2583.17 Ha may be considered for tank foreshore plantations.

3.Bund plantations in Agriculture lands:

In this district, major agriculture fields observed are approximated to 100m*100m size fields. So total scattered was divided into 100m *100m grids. It comes to total 2,42,186 km length of bund .Out of this, it observed that, only 5.18 percent area is covered with the trees i.e 12.563 km, and remaining 2,29,624 km length of bund is fit for planting the trees spp like fodder species. Even if we consider east west direction planting only to avoid sun light deficiency for crops 1,14,812 Km can be planted.(fig.3). Assuming 10m spacent 1,18,81,200 seedling can be planted.

4.Road , Railway and rivers/canals side linear vegetation

a) National High way: NH.no.44 &16 are passing through this district, The length of this road is 192 kms . It is observed that only 38.34 kms length is covered with trees along the road in single row. Thus there is   good scope for planting the National high way.

b).State high way:
   The length of this state highway is 218.52 kms.   There is 53.83 kms length is with the trees along   the road with single side. Balance 164.69 kms. length   need by planting.

c) Black top Roads
    The length of this road is 631.97 kms in this district. Only 197.36 km length is there with the trees in single side only. There is huge scope of planting the block top roads.

d) Railway track: The length of this track is 118.50km in this division.9.72km length is there with single side trees. The railway track can be planted in reaming   balance 108.78 kms length.

e) Rivers and canals: There is 1454.90 km length of rivers. There is only 10.52 km length   with trees in both sides of rives. The length of canals is 149 kms and only 4.16 kms   observed with trees in single side of canals. Both sides of streams can be planted up to control floods.