

GROWTH STATISTICS OF FOREST PLANTATIONS IN MADHYA PRADESH



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PREFACE

Growth Tables have a great importance in the management of forest Crops. These tables, in the form of yield Tables and Volume Tables, are available for natural Crops. However the species covered are limited only. Growth tables for plantation crops, however, are not available at present (but for scattered information). So, this endeavour. This compilation is, in fact, a preliminary, effort and there is quite much scope for further improvement.

The entire data used in the preparation of this booklet is related to the research plantations of SFRI, Jabalpur, located in various parts of the State.

We hope this book will be useful for the forest managers and researchers.

The Co-operation rendered in the preparation of this book by Shri Bhawani Singh Ms Pratiyogita Shrivastava, Ms. Manjeet Bhalla and Mr. Y.K.Dwivedi, all Research Scholars, and Shri R.P. Kachhi, Forester is gratefully acknowledged.

Authors

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1. INTRODUCTION

Information on growth statistics of tree species is a vital need of forest managers, forest planners and others dealing with tree crops. Growth Tables in the form of Yield Tables and Volume Tables of selected species have been prepared by various Research Institutes, like FRI, Dehradun, to fulfill this need, but these pertain to only natural crops of those species. On the plantation crops, such information is quite meagre.

In India, and particularly in Madhya Pradesh, till the end of sixth decade of this century, the forest managers focussed their attention to few major species only, but later on with increasing demand of wood and other forest products they had also to pay attention to other species called "miscellaneous species." At present when the forest areas has shrunk to a great extent and the remaining areas have considerably degraded, tree planting on revenue lands and also on private lands is being encouraged by the Government. This trend is getting momentum also, plantations are also being raised to cater the need of raw material for industries. All such plantations are raised under a definite planning, keeping the economic aspects as the main consideration. For such plantations, the knowledge of growth statistics of species planted, or to be planted is of utmost importance.

The State Forest Research Institute, Jabalpur, is engaged in forestry research since its inception in the year, 1963. In the seventies and onwards, research plantations of a large number of species were raised by the Institute in different agroclimatic zones of the State of Madhya Pradesh. The present work is based on the growth data collected from these plantations from time to time.

2. PLANTATION FORESTRY IN M.P.

Madhya Pradesh is one of the State of Indian Union where afforestation works started in the first five year plan itself. In the begining, the aim of taking up plantations was to replace less valuable species with more valuable ones. The main species planted was Teak. Later on plantations of *Eucalyptus* species were done under various schemes to cater the need of fuelwood and also of paper mills. Under the Social Forestry Projects, huge targets of plantations of miscellaneous species, e.g. Sissoo, *Eucalyptus*, Khamer, *Peltophorum* etc. were achieved in the ninth decade. Upto 1990-91, as much 19,89,814 ha. area was planted up in the State under various schemes (Anon. 1995).

Thus, plantations cover a substantial area of the State and planting and management of plantations has been an important part of forest management. The plantations done in the beginning are now quite old and are themselves sources of valuable information. For raising plantation, of a species the knowledge of growth statistics is quite important.

3. FUTURE MAN MADE FORESTS

Despite the incoming of a number of alternatives of wood and fuel, the demand of wood is increasing year after year. This is because of the rapid increase in the population and the fact that the rural people are still dependent on wood for so many purposes. The existing forests are incapable of meeting the demands in the present conditions because most of the forests are degraded to a miserable extent and some area are completely deforested. For meeting up these ever increasing demands, raising of plantations by the Government departments as well as private persons, is the only remedy.

Looking to the huge extent of deforested and barren areas, the Government, as a policy measure, has decided to cover these areas with suitable plantations. As a priority measure the plantations are to be done on coverless forest areas and on wasteland. As per an estimate, the total area of wasteland in India is 1296 lakh ha, out of which 937 lakh ha. area is non forest area (Anon, 1995). The non forest area invariably needs to be covered by plantations.

The farmers and industrialists are also coming ahead for tree planting on their own lands and it seems that they will play an important role in the creation of plantation forests.

At present, although about 20 tree species are being planted in different parts of India, but still the number is likely to increase. This is due to researches on the efficient utilization of a large number of species for different purposes. The species hitherto considered as of limited uses or useless are being put to different uses now.

4. NEED OF GROWTH STATISTICS OF PLANTATIONS

Knowledge of growth statistics of tree species is the basic need of the forest managers and other tree growers. For plantation crops, the information available on this is quite little. Some of the important areas of its use are described below :

(i) Forest Management

Major part of the forests is occupied by the natural crops and Growth Tables for natural crops of some species already exist. But, plantations also form a substantial portion of forests, and in future, plantation forestry is likely to expand rapidly. For the estimation of yield from the plantations of different species at different ages, the plantation Growth Tables will be needed by the forest managers because the Growth Tables prepared for natural crops will not be necessarily applicable to the plantation crops.

(ii) Wood Based Industries

The paper industry depends on forests for their requirement of raw material. Some of the paper mills have already raised their own plantations for meeting up their demand. The government has decided that the wood based industries should themselves arrange for their requirement of raw material by raising plantations. So, in future, industrial plantations will be raised in a big way.

In case of industrial plantations, the yield from a given crop is forecasted in the beginning and the plantations are managed under a strict schedule. For the purpose, the Growth Tables of various species will make the task easy.

(iii) Forest Extension

So far, the Forest Department has been the key organisation involved in the tree growing. Because of various compulsions, the people have to be now encouraged and convinced for taking up tree cultivation. To serve this purpose, the Forest Department has to demonstrate the physical advantages of tree cultivation. In this connection, people are required to be informed about the tree dimensions at different ages. The Growth Tables will be required by the extension personnels to educate the people.

5. THE PRESENT COMPILATION

In the present compilation, growth data of 56 tree species are included.

Plantations of these species were raised by the State Forest Research Institute, Jabalpur in various parts of the State of Madhya Pradesh. These include the plantations of age 2 years to 27 years. The growth data of each year, however, could not be availed. In cases of some species, the data of only few years were available but as the compilation of this sort was lacking these were compiled for information.

The plantations whose growth data have been used here, were raised in Bilaspur, Raipur, Shahdol, Morena, Seoni, Jabalpur, and few in Khandwa districts. All the plantations were not from the same agroclimatic zone and so, heterogeneity in data was obvious. To overcome this situation, graphs of individual species were prepared using this data for both height and girth. This exercise was done with the species whose data for more than 5 ages were available. In this case, the figures read from the graphs were compiled.

In the cases, where growth data for less than five years were available, graphs were not prepared and the data were tabulated as such and included in the compilation. This meagre data is also useful as it gives clue about the growth behavior of the species concerned.

6. APPLICABILITY OF RESULTS

As already stated, the growth data of species used in this compilation does not represent all the agroclimatic zones, particularly, Bundelkhand region, Vindhyan plateau, Malwa plateau and Gird regions are either unrepresented or less represented. The results should be referred to as such.

Another important thing is that the results have been derived for 15 to 30 years age only, as per the availability of data. Much extrapolation in the graph cannot be done as the behaviour of the species varies with age, so, the information for the whole period of the commercial or economic rotation could not be provided. However for the fuelwood species or species like *Eucalyptus*, the information provided is more than enough.

7. FURTHER WORKS NEEDED

This compilation is a sort of initial work. This is an attempt to fillup the gap as far as possible. To have sufficient growth statistics of plantation crops of various species, the following works are needed to be done:

- (i) Growth Tables for each agroclimatic zone or at least for each crop zone (i.e. Teak zone, Moist Sal Zone, Dry Sal Zone etc.) are needed to be prepared.
- (ii) In case of the species whose data for old crops is available, and for various ages also available, the Yield Tables and Volume Tables should be prepared.
- (iii) Growth Tables for complete rotations of the remaining species should be prepared at the earliest possible time.
- (iv) Growth Tables for the species left out need also be prepared.

8. SPECIESWISE INCREMENT TABLES

The specieswise increment tables are given below. The tables have been divided into two groups-part A and Part B. Part A contains the increment tables derived from the graphs (i.e. ample data was available of those species) and Part B is comprised of the Growth Tables having the original field data because only meagre data was available in cases of these species.

PART-A

1. Acacia catechu

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	355	17	71.00	3.40	71.00	3.40
10	550	23	55.00	2.30	39.00	1.20
15	662	28	44.13	1.86	22.40	1.00
20	720	33	36.00	1.65	11.60	1.00

2. Acacia auriculæformis

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	460	16	92.00	3.20	92.00	3.20
10	690	30	69.00	3.00	46.00	2.80
15	804	33	53.60	2.20	22.80	0.60
20	825	37	41.20	1.85	4.20	0.80

3. Acacia tortilis

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	245	10	49.00	2.00	49.00	2.00
10	360	16	36.00	1.60	24.00	1.20
15	473	23	31.50	1.50	22.00	1.40
20	587	28	29.35	1.40	22.80	1.30

4. *Acacia nilotica*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	225	8	45.00	1.60	45	1.60
10	345	15	34.50	1.50	24	1.40
15	465	25	31.00	1.66	24	2.00

5. *Albizia lebbek*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	385	20	77.00	4.00	77	4.00
10	715	34	71.50	3.40	66	2.80
15	870	40	58.00	2.66	31	1.20
20	925	47	46.25	2.35	11	1.40

6. *Albizia procera*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	325	15	65.00	3.00	65	3
10	630	30	63.00	3.00	61	3
15	850	45	56.66	3.00	44	3
20	1025	60	51.25	3.00	35	3
25	1170	85	46.80	3.40	29	5

7. *Azadirachta indica*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	220	18	44.00	3.60	44	3.60
10	435	30	43.50	3.00	43	2.40
15	600	48	40.00	3.20	33	3.60
20	740	57	37.00	2.85	28	1.80
25	850	80	34.00	3.20	22	4.60

8. *Cassia siamea*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	525	20	105.00	4.00	105.00	4
10	868	35	86.80	3.50	68.60	3
15	1120	50	74.66	3.33	50.40	3

9. *Cleistanthus collinus*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	285	10	57.00	2.00	57.00	2.00
10	530	18	53.00	1.80	49.00	1.60
15	735	25	49.00	1.67	41.00	1.40
20	943	32	47.15	1.60	41.60	1.40

10. *Dalbergia sissoo*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	265	13	53.00	2.60	53.00	2.60
10	545	25	54.50	2.50	56.00	2.40
15	785	40	52.33	2.66	48.00	3.00
20	1028	55	51.40	2.75	48.60	3.00

11. *Emblia officinalis*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	285	10	57.00	5.00	57	2.00
10	535	20	53.50	2.00	50	2.00
15	750	30	50.66	2.00	45	2.00
20	945	37	47.25	1.85	37	1.40

12. *Eucalyptus camaldulensis*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	598	18	119.60	3.60	119.60	3.60
10	998	30	99.80	3.00	80.00	2.40
15	1200	45	80.00	3.00	40.40	3.00
20	1302	60	65.10	3.00	20.40	3.00
25	1410	73	56.40	2.92	21.60	2.60

13. *Eucalyptus citriodora*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	545	17	109.00	3.40	109	3.40
10	1020	30	102.00	3.00	95	2.60
15	1300	40	86.66	2.66	56	2.00
20	1485	55	74.25	2.75	37	3.00
25	1650	65	66.00	2.60	33	2.00

14. *Eucalyptus grandis*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	535	20	107.00	4.00	107	4
10	865	30	86.50	3.00	66	2
15	1150	40	76.66	2.67	57	2

15. *Eucalyptus hybrid*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	500	15	100.00	3.00	100	3.00
10	925	27	92.50	2.70	85	2.40
15	1270	37	84.66	2.46	69	2.00
20	1525	45	76.25	2.25	51	1.60
25	1725	58	69.00	2.32	40	2.60

16. *Gmelina arborea*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	455	17	91.00	3.40	91	3.40
10	715	25	71.50	2.50	52	1.60
15	905	28	60.33	1.86	38	0.60
20	1090	33	54.50	1.65	37	1.00

17. *Grevillea pteridifolia*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	398	20	79.60	4.00	79.60	4.00
10	530	25	53.00	2.50	26.40	1.00
15	665	29	44.33	1.93	27.00	0.80
20	800	32	40.00	1.60	27.00	0.60

18. *Grevillea robusta*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	342	15	68.40	3.00	68.40	3.00
10	681	27	68.10	2.70	67.80	2.40
15	1020	40	68.00	2.67	67.80	2.60
20	1350	52	66.00	2.60	66.00	2.40

19. *Hardwickia binata*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	242	10	48.40	2.00	48.40	2.00
10	450	18	45.00	1.80	41.60	1.60
15	660	27	44.00	1.80	42.00	1.80
20	867	38	43.35	1.90	41.40	2.20

20. *Leucaena leucocephala* K-28

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	705	20	141.00	4.00	141	4.00
10	1050	30	105.00	3.00	69	2.00
15	1285	37	85.66	2.46	47	1.40
20	1445	48	72.25	2.40	32	2.20

21. *Leucaena leucocephala* K-8

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	600	16	120.00	3.20	120.00	3.20
10	927	27	92.70	2.70	65.40	2.20
15	1145	39	76.33	2.60	43.60	2.40
20	1315	51	65.75	2.55	34.00	2.40

22. *Pinus caribaea*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	360	25	72.00	5.00	72	5.00
10	725	40	72.50	4.00	73	3.00
15	1120	52	74.66	3.40	79	2.40
20	1460	65	73.00	3.25	68	2.60
25	1765	80	70.60	3.20	61	3.00
30	2070	90	69.00	3.00	61	2.00

23. *Pinus gragii*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	580	24	116.00	4.80	116	4.80
10	975	43	97.50	4.30	79	3.80
15	1265	55	84.33	3.67	58	2.40
20	1560	68	78.00	3.40	59	2.60

24. *Pinus khasya*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	460	19	92.00	3.80	92	3.80
10	725	30	72.50	3.00	53	2.20
15	975	45	65.00	3.00	50	3.00
20	1225	60	61.25	3.00	50	3.00
25	1470	70	58.80	2.80	49	2.00
30	1685	85	56.16	2.83	43	3.00

25. *Pinus oocarpa*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	425	20	85.00	4.00	85	4.00
10	755	37	75.50	3.70	66	3.40
15	1065	52	71.00	3.46	62	3.00
20	1330	70	66.50	3.50	53	3.60
25	1500	95	60.00	3.80	34	5.00

26. *Pinus petula*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	335	17	67.00	3.40	67.00	3.40
10	657	35	65.70	3.50	64.40	3.60
15	910	48	60.66	3.20	50.60	2.60
20	1160	62	58.00	3.10	50.00	2.80
25	1410	75	56.40	3.00	50.00	2.60

27. *Pinus roxburghii*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	275	15	55.00	3.00	55	3.00
10	525	33	52.50	3.30	50	3.60
15	775	50	51.66	3.33	50	3.40
20	1025	65	51.25	3.25	50	3.00
25	1260	83	50.40	3.32	47	3.60

28. *Pongamia pinnata*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	280	12	56.00	2.40	56	2.40
10	430	20	43.00	2.00	30	1.60
15	535	25	35.66	1.66	21	1.00
20	640	30	32.00	1.50	21	1.00
25	765	35	30.60	1.40	25	1.00

29. *Santalum album*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	220	9	44	1.80	44	1.80
10	365	14	36.50	1.40	29	1.00
15	460	18	30.66	1.20	19	0.80
20	540	24	27	1.20	16	1.20

30. *Shorea robusta*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	115	7	23.00	1.40	23.00	1.40
10	225	15	22.00	1.50	22.00	1.60
15	310	21	20.67	1.40	17.00	1.20
20	399	27	19.95	1.35	17.80	1.20

31. *Soymida febrifuga*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	227	10	45.40	2.00	45.40	2.00
10	445	16	44.50	1.60	43.60	1.20
15	607	23	40.46	1.50	32.40	1.40
20	768	30	38.40	1.50	32.20	1.40

32. *Tectona grandis*

AGE	HEIGHT CMS	GIRTH CMS	MAI		CAI	
			HEIGHT CMS	GIRTH CMS	HEIGHT CMS	GIRTH CMS
5	296	15	58.00	3	58	3
10	575	30	57.50	3	57	3
15	865	45	57.60	3	58	3

PART-B

33. *Acacia campylocantha*

Age (Years)	Height	Girth	Mean Annual Increment (cm)	
	cm	cm	Height (cm)	Girth (cm)
2	341.00	8.80	170.50	4.39
3	426.80	16.80	142.25	5.60
5	203.20	8.00	40.63	1.61

34. *Albizia amara*

Age (Years)	Height	Girth	Mean Annual	
	cm	cm	Increment (cm)	
			Height (cm)	Girth (cm)
12	433.60	18.60	36.13	1.55

35. *Anogeissus pendula*

Age (Years)	Height	Girth	Mean Annual	
	cm	cm	Increment	
			Height (cm)	Girth (cm)
7	360.90	10.60	51.56	1.52

36. *Anacardium occidentale*

Age (Years)	Height	Girth	Mean Annual	
	cm	cm	Increment	
			Height (cm)	Girth (cm)
15	666.70	39.80	44.44	2.65
19	417.70	29.50	1.55	1.55

37. *Anogeissus latifolia*

Age (Years)	Height	Girth	Mean Annual Increment (cm)	
	cm	cm	Height (cm)	Girth (cm)
7	426.30	14.70	60.90	2.10

38. *Anthocephalus cadamba*

Age (Years)	Height	Girth	Mean Annual Increment	
	cm	cm	Height (cm)	Girth (cm)
7	260.50	6.40	37.22	0.92
18	1226.60	73.30	62.59	4.07

39. *Barsera delpichiana*

Age (Years)	Height	Girth	Mean Annual Increment	
	cm	cm	Height (cm)	Girth (cm)
6	437.00	17.00	72.83	2.83
7	464.00	21.00	66.28	3.00
27	350.00	30.00	12.96	1.11

40. *Buchnanian lanzan*

Age (Years)	Height	Girth	Mean Annual Increment	
	cm	cm	Height (cm)	Girth (cm)
19	729.30	35.50	38.38	1.86

41. *Casuarina equisetifolia*

Age (Years)	Height	Girth	Mean Annual Increment	
	cm	cm	Height (cm)	Girth (cm)
4	1047.00	21.10	261.75	5.28
5	396.80	13.00	79.36	2.56
11	693.80	22.00	63.06	1.99
13	774.00	27.50	59.53	2.11

42. *Dalbergia latifolia*

Age (Years)	Height	Girth	Mean Annual Increment	
	cm	cm	Height (cm)	Girth (cm)
15	987.80	30.40	65.85	2.02

43. *Gliricidia sepium*

Age (Years)	Height	Girth	Mean Annual Increment	
	cm	cm	Height (cm)	Girth (cm)
8	379.00	14.80	47.40	1.85

44. *Holoptelea integrifolia*

Age (Years)	Height	Girth	Mean Annual Increment	
	cm	cm	Height (cm)	Girth (cm)
4	206.00	7.70	51.50	1.92
7	353.90	15.10	50.55	2.15
12	292.90	15.40	24.41	1.28
13	503.80	38.80	38.75	1.53

45. *Lagerstroemia speciosa*

Age (Years)	Height	Girth	Mean Annual Increment	
	cm	cm	Height (cm)	Girth (cm)
11	432.20	17.50	39.29	1.58

46. *Lagerstroemia parviflora*

Age (Years)	Height	Girth	Mean Annual	
	cm	cm	Increment	
			Height (cm)	Girth (cm)
7	323.20	12.40	46.17	1.77
8	323.00	13.20	40.37	1.64
9	355.00	14.40	39.44	1.60
20	545.50	25.30	27.27	1.26

47. *Madhuca latifolia*

Age (Years)	Height	Girth	Mean Annual	
	cm	cm	Increment	
			Height (cm)	Girth (cm)
7	258.90	9.80	36.98	1.39

48. *Melia azadirach*

Age (Years)	Height	Girth	Mean Annual	
	cm	cm	Increment	
			Height (cm)	Girth (cm)
15	330.00	15.80	21.99	1.05

49. *Pithecellobium dulce*

Age (Years)	Height	Girth	Mean Annual Increment	
	cm	cm	Height (cm)	Girth (cm)
12	672.50	28.30	56.04	2.35

50. *Schleichera trijuga*

Age (Years)	Height	Girth	Mean Annual Increment	
	cm	cm	Height (cm)	Girth (cm)
7	252.200	7.40	36.03	1.06

51. *Sterculia urens*

Age (Years)	Height	Girth	Mean Annual Increment	
	cm	cm	Height (cm)	Girth (cm)
14	91.80	10.90	6.55	0.77

52. *Tamarindus indica*

Age (Years)	Height	Girth	Mean Annual Increment	
	cm	cm	Height (cm)	Girth (cm)
19	561.30	34.70	29.54	1.82

53. *Terminalia bellirica*

Age (Years)	Height	Girth	Mean Annual Increment	
	cm	cm	Height (cm)	Girth (cm)
23	471.70	31.00	20.51	1.34

54. *Toona ciliata*

Age (Years)	Height	Girth	Mean Annual Increment	
	cm	cm	Height (cm)	Girth (cm)
13	279.40	18.90	21.48	1.45

55. *Wrightia tinctoria*

Age (Years)	Height	Girth	Mean Annual Increment	
	cm	cm	Height (cm)	Girth (cm)
20	305.00	11.30	15.25	0.56

56. *Ziziphus rotundifolia*

Age (Years)	Height	Girth	Mean Annual Increment	
	cm	cm	Height (cm)	Girth (cm)
19	468.50	26.00	24.65	1.36

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