

Result of Sample Tree Enumeration of Bhore Sub Division

Bhore forest sub Division is the one of the forest divisions of Pune Circle. its civil district is Pune. The entire forest area of Bhore Sub Division lies between 18°-26.5' to 18°-1.5' North Latitude and 74°-34.5' to 74°-18.5' East Longitude.

The track is bounded as follows:-

North :- Paud, Haveli, Daund Ranges of Pune Forest Division - Pune District .

East :- Mahad Range of forest Division - Raigad District.

South :- Khandala and Mahabaleshwar ranges of Satara Forest Division . River Nira forms the partial delineation line - Satara District.

West :- Indapur Forest Range of Pune Forest Division - Pune District.

Configuration of the Ground:- Geographically the forest areas of Bhore sub Division can be divided into two distinct regions.

1. Hill areas of Western Ghats.
2. Drought Prone Rain shadow region.

Geology, Rock and Soil:- Geologically the entire tract is covered by basaltic flows commonly known as Deccan trap of cretaceous Eocene age and laterites of still younger age form conspicuous rock units. In fact, except the thick lateritic capping on the plateau tops forming the western edge of Sahyandri and the thick alluvial soil spread along the banks of rivers, the entire area is covered by lava flows, which are several hundred meters in thickness.

Climate:- Possessed of high altitude and prevalence of westerly breezes Bhore sub Division has a climate dry and invigorating.

The physical and climatic conditions area mainly influenced by the Sahyandris by their spurs, catchments, plateau and plains. The topography determines the moisture condition, temperature, humidity, wind etc. The climate of the tract is generally agreeable and pleasant in the hilly western zone. It is agreeable and pleasant in the Velha and Bhore Tahsils and hot, dry and oppressive in the Purandhar Tahsil.

The Forests:- The Forest can be grouped under the following forest types as per the “Revised classification of Indian Forest Types ” by Champion and Seth

Sr.No.	Type	Forest Type Description
1	8A/C2	Western Sub Tropical Hill Forests
2	3B/C2	Southern Moist Mixed Deciduous Forests
3	5A/C3	Southern Dry Mixed Deciduous Forests
4	6A/C1	Southern Thorn Forests

Forest Area:-According to Management & Legal Status, the total forest area of Reserved Forest, Protected Forest, Acquired Forest land / unclassified Forest of Bhor Sub-Division, of Pune District is as under.(figure as per A.A.R. 2011-12)

Table No-1
Classification of Forest area according to Management & Legal status
(Area in Sq. km.)

Sr. No.	Controlling Agency	Reserved forest	Protected forest	Un-classed forest	Total
1.	Area in charge of Forest Department	214.79	0.10	129.39	344.28
2.	Area in charge of F.D.C.M.	---	---	---	---
3.	Private Forest brought under possession of Forest Department	2.71	---	---	2.71
4	Area in charge of Revenue department	0.70	---	---	0.70
	Total	218.20	0.10	129.39	347.69
	% to total forest area	62.76%	0.03%	37.21%	100

The Bhor Sub Division consist of three ranges namely 1) Bhor 2) Saswad and 3) Narsapur.

The area under Scientific Management as recorded in Working Plan by Shri Y.L.P. Rao I.F.S. , Dy. Conservator of Forests Working Plan Division Pune for the period 2003-04 to 2012-13 is as under.

Table No.2

Sr. No.	Name of working circle	Population area in ha
1	Protection Working Circle	20259.504
2	Improvement Working Circle	1454.365
3	Soil & Moisture Conservtion cum Afforestation Working Circle	12407.336
4	Kuran Working Circle	509.53
5	Miscellaneous Regulations-Survey & Demarcation Works	1310.655
	Total	35941.392

The Conservator of Forest, Working Plan Pune has proposed following working circlewise forest area, for sample tree enumeration.

Table No.3

Working Circle wise Area proposed for tree enumeration

Sr. No.	Name of working circle	Population area in ha
1	Improvement Working Circle	1454.365
2	Kuran Working Circle	509.53
3	Miscellaneous Working Circle	42.915
4	Protection Working Circle	20258.635
5	Soil & Moisture Conservtion Working Circle	12407.336
	Total	34672.781

Sampling plan of Tree Enumeration

In fact, the tree enumeration work was done by Sub Divisional officer, Bhor Sub Division in 2011-12. The entire forest sub division's area was considered for sampling enumeration plan. The trees are enumerated in girth classes started from 15-30 cms to Above 150 cms. The girth is measured at breast height (g.b.h.).

The statistical sampling method namely "Systematic Line Plot Sampling with Random Start" was used for tree enumeration. The plot size 60 meters x 60 meters, was found to be suitable with the least standard error. The complete

enumeration of trees, seeding, coppices, Grass and Medicinal species were carried out in these plots. Similarly qualitative measurements were also carried out.

On Scrutiny of data the Stock per hectare was calculated and the results are being reported in the form of following statements.

Statement I : Estimated growing stock- No. of Sound trees.

Statement II : Estimated growing stock- No. of Sound trees per ha.

Statement III : Percentage distribution of total stock of species over all girth classes.

Statement IV : Percentage of stock of species in a girth class to the total stock in that particular girth class.

Statement V : Estimated growing stock - volume in cubic mt./ha

Some noteworthy result on current enumeration is described in following Table.

Table No. 4 (a)

Statement showing estimated No. of trees per ha. for Current tree enumeration (2011 -12)

Sr. No.	Name of Working Circle	Current enumeration No. of trees per ha.
1	Improvement Working Circle	105.856
2	Kuran Working Circle	24.365
3	Miscellaneous Working Circle	91.785
4	Protection Working Circle	182.074
5	Soil & Moisture Conservation Working Circle	94.900
Weighted Average		145.253

It is observed that the total estimated number of trees per hectare in current enumeration (2011 -12) is 145.253.

Table 4 (b)

Estimated percentage of trees in 15 U 30 and 31 U 45 girth class.

Working Circle	Girth class-wise estimated percentage of number of trees (%)			
	15U30	31U45	Remaining Girth Classes	Total estimated No. of trees
Improvement Working Circle	51.971	24.854	23.175	100
Kuran Working Circle	58.769	29.821	11.410	100
Miscellaneous Working Circle	24.27	24.752	50.978	100
Protection Working Circle	42.171	29.506	28.323	100
Soil & Moisture Conservation Working Circle	55.805	25.136	19.059	100
Weighted Average	47.684	27.847	24.469	100

Working circlewise estimated, numbers of sound trees per hectare are as follows.

Table No.5
No. of sound trees per ha

Sr. No.	Name of Working Circle	Total	General utility species	Special utility species	Minor forest produce species	Other species
1	2	3	4	5	6	7
1	Improvement Working Circle	105.856	63.966	17.514	1.772	22.604
	% of stock to total stock	100	60.43	16.55	1.67	21.35
2	Kuran Working Circle	24.365	6.412	5.771	7.266	4.916
	% of stock to total stock	100	26.32	23.68	29.82	20.18
3	Miscellaneous Working Circle	91.785	2.773	5.103	16.195	67.714
	% of stock to total stock	100	3.02	5.56	17.64	73.78
4	Protection Working Circle	182.074	11.922	13.062	44.563	112.527

	% of stock to total stock	100	6.55	7.17	24.48	61.80
5	Soil & Moisture Conservation Working Circle	94.90	18.314	11.479	17.484	47.623
	% of stock to total stock	100	19.30	12.10	18.42	50.18
Total weighted average		145.524	16.301	12.565	32.495	83.893
% of stock to total stock		100.00	11.22	8.65	22.37	57.76

Highlights from the results of tree enumeration as given in table No.5, are summarised below:

1) Improvement Working Circle:

Catagorywise percentage of Species to total growing stock in this working circle is as given below

Sr. No.	Category of Species	Name of Species	% to total growing stock
1	A:- Species of General Utility	Ain, Teak	63.966
2	B:-Species of Special Utility	Dhawada, Hiwar, Kalamb, Khair, Sawar and Shivan	17.514
3	C:-Species of Minor Forest Produce	Apta, Bor, Chinch, Neem, Nilgiri and Ritha	1.772
4	D:-Other Species	Bilava, Dhaman, Gadhan, Ghoti, Girandoli, Kranj, Maharukh, Mogir, Pangara, Satfal and other etc.	22.604

2) Kuran Working Circle:-

Catagorywise percentage of Species to total growing stock in this working circle is as given below

Sr. No.	Category of Species	Name of Species	% to total growing stock
1	A:- Species of General Utility	Ain and Teak	6.412
2	B:-Species of Special Utility	Dhawada, Hiwar, Khair, Sawar	5.771
3	C:-Species of Minor Forest Produce	Neem, Nilgiri and Palas	7.266

4	D:-Other Species	Bilava, Ghatbor, Gliricidia, Lalai, Maharukh, Mogir, Pangara, Salfal and Waras etc.	4.916
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3) Miscellaneous Working Circle:-

Catagorywise percentage of Species to total growing stock in this working circle is as given below

Sr. No.	Category of Species	Name of Species	% to total growing stock
1	A:- Species of General Utility	Teak	2.773
2	B:-Species of Special Utility	Anjan	5.103
3	C:-Species of Minor Forest Produce	Hirda and Jambhul	16.195
4	D:-Other Species	Alav, Asana, Bhoma, Bhuta, Bilava, Dhaman, Gela, Goyanda, Hadka, Kumbha, Nivdung, Parjambhul, Pisa, Rameta, Umbar, Vargad and Waras.	67.714

4) Protection Working Circle:-

Catagorywise percentage of Species to total growing stock in this working circle is as given below

Sr. No.	Category of Species	Name of Species	%to total growing stock
1	A:- Species of General Utility	Ain, Teak and Tiwas	11.922
2	B:-Species of Special Utility	Anjan, Dhawada, Hiwar, Kalamb, Khair, Salai, Salai, Sawar and Shivan.	13.062
3	C:-Species of Minor Forest Produce	Amba, Apta, Awala, Behada, Bor, Chinch, Fanas, Hirda, Jambhul, Kadipatta, Kaju, Karwand, Moha, Neem, Nilgiri, Palas, Ritha and Shiras	44.563

4	D:-Other Species	Aalu, Ahim, Alav, Asana, Babhul, Bahawa, Bhoma, Bhuta Bokada, Chandada, etc.	112.527
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5) Soil and Moisture Conservation Working Circle:-

Catagorywise percentage of Species to total growing stock in this working circle is as given below

Sr. No.	Category of Species	Name of Species	% to total growing stock
1	A:- Species of General Utility	Ain, Teak and Tiwas	18.314
2	B:-Species of Special Utility	Dhawada, Hiwar, Kalamb, Khair, Salai, Sawar and Shivan.	11.479
3	C:-Species of Minor Forest Produce	Amba, Apata, Awala, Behada, Bor, Chandan, Chinch, Hirda, Jambhul, Karwand, Moha, Neem, Nilgiri, Palas, Titha, Shiras, Sitafal and Tendu	17.484
4	D:-Other Species	Aalu, Asana, Babhul, Bahawa, Bhongir, Bhuta, Dhaman etc.	47.623

Table No.6

**Availability of Teak in previous Enumeration (Enumeration period)
As per previous Working Plan.**

Sr. No	Name Working Circle	Total growing Stock	Teak/Ha	% of stock of trees to the total stock
1	2	3	4	5
1	No previous Enumeration report available			
	Weighted Average	---	----	-----

Table No.6(A)

Availability of Teak (Enumeration period of 2011-12) in Current enumeration.

Sr. No	Name Working Circle	Total growing Stock	Teak/Ha	% of stock of Teak trees to the total stock
1	2	3	4	5
1	Improvement W. C.	105.856	56.559	53.43
2	Kuran W.C.	24.365	4.702	19.30
3	Miscellaneous W.C.	91.785	2.773	3.020
4	Protection W. C.	182.074	1.471	0.810
5	Soil & Moisture Cons.	94.900	14.513	15.290

	W. C.		
Total (Weighted Average)	145.250	8.500	5.85

Estimated growing stock of Medicinal plant, Natural regeneration and Grass root per Ha.

Table No. 7

A) Medicinal plant, per ha (Sample plot size 5 Mtr.X 5 Mtr.)

Sr. No.	Working Circle	Population area (Ha.)	No. of sample plots	Sample area (Ha.)	No. of Medicinal Plants in sample area	No. of Medicinal Plants per Ha.
1	2	3	4	5	6	7
1	I.W.C.	1454.365	36	0.09	92	1022
2	K.W.C.	509.53	13	0.033	01	33
3	M.W.C.	42.915	6	0.015	02	133
4	P.W.C	20258.635	374	0.94	490	521
5	S.M.C.W.C.	12407.336	307	0.77	363	471
	Total	34672.781	736	1.85	948	512

B) Natural Regeneration plant, per ha (Sample plot size 5 Mtr.X 5 Mtr.)

Sr. No.	Working Circle	Population area (Ha.)	No. of sample plots	Sample area (Ha.)	No. of NR Plants in sample area	No. of NR Plants per Ha.
1	2	3	4	5	6	7
1	I.W.C.	1454.365	36	0.09	66	733
2	K.W.C.	509.53	13	0.033	0	0
3	M.W.C.	42.915	6	0.015	03	200
4	P.W.C	20258.635	374	0.94	1904	2025
5	S.M.C.W.C.	12407.336	307	0.77	373	485
	Total	34672.781	736	1.85	2346	1268

G) Grass Species, per ha (Sample plot size 1 Mtr.X 1 Mtr.)

Sr. No.	Working Circle	Population area (Ha.)	No. of sample plots	Sample area (Ha.)	No. of Grass roots in sample area	No. of Grass roots per Ha.
1	2	3	4	5	6	7
1	I.W.C.	1454.365	36	0.0036	995	276388
2	K.W.C.	509.53	13	0.0013	0	----
3	M.W.C.	42.915	6	0.0006	05	8333
4	P.W.C	20258.635	374	0.0374	4743	126818
5	S.M.C.W.C.	12407.336	307	0.0307	3763	122573
	Total	34672.781	736	0.0736	9506	129158

Statistical Analysis: -

The Statistical personnel of the office of the Chief Forest Statistician, Maharashtra State, Nagpur, have carried out the statistical analysis of the data. The percentage of . Standard error is calculated for each Working Circle is given in the following table No. 8

Table No.8
Working Circle-wise Standard Error

Sr. No.	Name of working circle	Population area in ha	Sample area in ha	Intensity of sampling %	% Standard Error
1	2	3	4	5	6
1	I.W.C.	1454.365	12.96	0.891	12.22
2	K.W.C.	509.53	4.68	0.919	9.89
3	M.W.C.	42.915	2.16	5.033	8.66
4	P.W.C	20258.635	134.64	0.665	6.51
5	S.M.C.W.C.	12407.336	110.52	0.891	10.12
	Total	34672.781	264.96		

**Chief Forest Statistician,
Maharashtra State, Nagpur.**

