

## **Result of Sample Tree Enumeration of Hingoli Forest Division**

Hingoli forest division is one of the forest divisions of Aurangabad circle. The forest extends over an area of 290.81 sq. kms. Most of the areas lie on the north eastern part of Marathwada adjoining Vidarbha. The track is bounded as follows :-

North :- Washim and Buldhana Districts .

East :- Nanded and Yavatmal District.

South :- Parbhani District.

West :- Parbhani and Buldhana District

**Climate:-** The climate of Hiongoli district is generally dry throughout the year. Acute water scarcity is felt in the hotter month when the water level goes down.

**Description fo the Forests:-** The forest belongs to the sub group 5A/C-3 Southern Dry Mixed Deciduous Forests with type 5A/C-1-b-Dry Teak bearing Forests. The Forests are at various stages of degradation stages viz. 5A/DS2 Dry Savannah forests and 5A/DS-4 Dry grasslands could be marked which cover vast portions of the tract.

**Forest Area:-** According to Management & Legal Status, as per Annual Administration Report, the details of forest area of Hingoli Division as on dated 31/3/2014 are as follows.

**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	252.94	2.25	35.62	290.81
2.	Area in charge of F.D.C.M.	---	---	---	---
3.	Private Forest brought under possession of Forest Department	---	---	---	---
4	Area in charge of Revenue department	---	---	---	---
Total		252.94	2.25	35.62	290.81
% to total forest area		86.98	0.77	12.25	100

Hingoli forest division consist of three **Ranges** namely Hingoli, Aundha (East) and Aundha (West). The area under Scientific Management as recorded in Working Plan (2006-07 to 2015-16) by Shri Samir Sahai, I.F.S. Conservator of Forests, Working Plan Division, Aurangabad is as under.

**Table No.2**

Sr. No	Name of Ranges	Total area in (ha)
1.	(1) Hingoli,(2) Aundha (East) and (3) Aundha (West)	28846.90

Now Conservator of Forest, Working Plan Aurangabad, 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	Afforestation Working Circle	10128.347
2	New Working Circle	1404.136
3	Improvement Working Circle	9374.669

4	Silvipasture Working Circle	3411.561
5	Encroachment Eviction & Rehabilitation W.C.	3425.201
	Total	27743.914

### **Sampling plan of Tree Enumeration**

Actually the tree enumeration work was done by Divisional forest officer, Hingoli Division in 2013-14. The entire forest 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, Natural regeneration, Grass and Medicinal species were carried out in these plots. Similarly qualitative measurements were also carried out.

On scrutiny of data and preparation of results i.e. (1) Stock per hectare was calculated and the result 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 cum./ha.

Some noteworthy result on current enumeration is described in following Table No. 4(a)

**Table No. 4 (a)**  
**Statement showing estimated No. of trees per ha. for Previous  
and Current tree enumeration (2013-14)**

Sr. No	Name of Working Circle	Past enumeration	Sr. No.	Name of Working Circle	Current enumeration (2013-14) No. of trees per ha.
		No previous enumeration	1	Afforestation Working Circle	36.480
			2	New Working Circle	31.873
			3	Improvement Working Circle	81.177
			4	Silvipasture Working Circle	39.398
			5	Encroachment Eviction & Rehabilitation W.C.	40.886
<b>Weighted Average</b>			<b>Weighted Average</b>		<b>52.253</b>

It is observed that the total estimated number of trees per hectare in current enumeration ( 2013-14) is 52.253

**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
Afforestation Working Circle	53.443	20.033	26.524	100
New Working Circle	60.415	23.556	16.029	100
Improvement Working Circle	39.729	17.528	42.743	100
Silvipasture Working Circle	63.749	18.661	17.59	100
Encroachment Eviction & Rehabilitation W.C.	60.101	17.852	22.047	100
<b>Weighted Average</b>	<b>51.251</b>	<b>18.927</b>	<b>29.822</b>	<b>100</b>

Working circle wise estimated, number of sound trees per hectare are as follows.

**Table No.5**

**Working Circlewise 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	Afforestation Working Circle	36.48	4.232	3.965	21.373	6.910
	% of stock to total stock	100	11.60	10.87	58.59	18.94
2	New Working Circle	31.88	8.02	6.88	11.05	5.93
	% of stock to total stock	100	25.15	21.58	34.66	18.61
3	Improvement Working Circle	81.18	18.40	8.91	29.56	24.31
	% of stock to total stock	100	22.67	10.98	36.41	29.94
4	Silvipasture Working Circle	39.39	9.24	3.38	20.82	5.95
	% of stock to total stock	100	23.46	8.59	52.85	15.10
5	Encroachment & Eviction & Rehabilitation W.C.	40.89	9.09	2.88	23.91	5.00
	% of stock to total stock	100	22.23	7.05	58.49	12.23
Total weighted average		52.26	10.43	5.58	23.86	12.39
% of stock to total stock		100	19.16	10.67	45.67	23.70

**Table No.5A**

**Working Circlewise Volume in cum. 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	Afforestation Working Circle	6.893	0.262	0.489	3.650	2.492
	% of stock to total stock	100	3.80	7.09	52.96	36.15

2	New Working Circle	3.689	0.471	1.101	1.373	0.744
	% of stock to total stock	100	12.76	29.85	37.22	20.17
3	Improvement Working Circle	18.693	2.416	2.238	8.573	5.466
	% of stock to total stock	100	12.92	11.97	45.86	29.25
4	Silvipasture.Working Circle	4.986	0.500	0.663	3.142	0.681
	% of stock to total stock	100	10.028	13.297	63.016	13.658
5	E E & R Working Circle	4.957	0.495	0.430	3.524	0.508
	% of stock to total stock	100	9.99	8.67	71.09	10.25
Total weighted average		10.245	1.058	1.125	5.12	2.941
<b>% of stock to total stock</b>		<b>100</b>	<b>10.33</b>	<b>10.98</b>	<b>49.98</b>	<b>28.71</b>

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

**1) Afforestation 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	Lendia, Teak	11.60
2	B:-Species of Special Utility	Dhawada, Hiwar, Karai, Khair, Moin, Salai.	10.87
3	C:-Species of Minor Forest Produce	Awala, Behada, Biba, Bor, Charoli, Moha, Neem, Palas, Sitafal, Tendu.	58.59
4	D:-Other Species	Anjan, Babhul, Bahala, Bardoli, Chinchora,Dhamoda,Dudhi etc.	18.94

**2) New 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, Bibla, Lendia, Teak	25.15
2	B:-Species of Special Utility	Dhawada, Hiwar, Kalamb, Moin, Salai	21.58
3	C:-Species of Minor Forest Produce.	Apta, Awala, Behada, Chandan,Charoli, Moha, Neem, Palas, Tendu.	34.66
4	D:-Other Species	Bahala,m Bartondi, Chinchora, Dudhi, Lakhandi, Medshing, Nirmali, Padari etc.	18.61

### **3) 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	Lendia and Teak	22.67
2	B:-Species of Special Utility	Dhawada, Haldu, Hiwar, Moin,Salai.Kalamb, Kudai.	10.98
3	C:-Species of Minor Forest Produce	Amba, Awala, Behada, Bel, Biba, Bor, Charoli, Moha,Neem, Palas, Siras, Sitafal, Tendu.	36.41
4	D:-Other Species	Amaltas, Bahala, Bartondi, Bhutekas, Chinchora, Dudhi,	29.94

### **4) Silvipasture 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, bibla, Lendia, Teak.	9.24
2	B:-Species of Special Utility	Dhawada, Hiwar, Kalamb, Karai, Moin, Salai.	3.38
3	C:-Species of Minor Forest Produce	Awala, Behada, Charoli, Moha, Neem, Palas, Tendu.	20.82

4	D:-Other Species	Bahala, Bardoli, Dudhi Glyricidia etc.	5.95
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### 5) Encroachment Eviction & Rehabilitation 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	Lendia and Teak	22.23
2	B:-Species of Special Utility	Dhawada, Hiwar,Kudai, Moin,Khair.	7.05
3	C:-Species of Minor Forest Produce	Apta, Charoli, Moha, Neem, Palas, Tendu.	58.49
4	D:-Other Species	Amaltas, Babhul, Bahala, Bartondi, Dudhi, Glyricidia etc.	12.23

**Table No.6**

### Availability of Teak in Previous Enumeration (No. of sound trees per ha.)

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		

**Table No.6 (A)**

### Availability of Teak in Current (2013-14) enumeration. (No. of sound trees per ha.)

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	Afforestation Working Circle	36.480	3.408	9.34
2	New Working Circle	31.873	6.186	19.41
3	Improvement Working Circle	81.177	12.647	15.58
4	Silvipasture Working Circle	39.398	6.910	17.54
5	EE&R Working Circle	40.886	7.196	17.60
<b>Total (Weighted Average)</b>		<b>52.253</b>	<b>7.569</b>	<b>14.49</b>

**Estimated growing stock of Medicinal plant, Natural regeneration and grass 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	Afforestation W.C.	10128.347	300	0.75	87	116
2	New W.C.	1404.136	44	0.11	27	245
3	Improvement W . C.	9374.669	275	0.69	64	93
4	Silvipasture W.C.	3411.561	119	0.30	28	93
5	Encroachment Eviction & Rehabilitation W.C.	3425.201	110	0.28	42	150
	Total	27743.914	848	2.13	248	116

Working Circle wise name of species of **Medicinal Plants** found in sample plot are as follows.

Sr. No.	Working Circle	Name of species of Medicinal Plants
1	2	3
1	A.W.C.	Jakhamjudi, Tantani, Unhali. Jatashankar, Rantulas, Wasanwel, Anantmul, Bhuineem, Dongarmodi, Ganeri, Gulwel, Henkal.
2	New W.C.	Rantulas.
3	Improvement W . C.	Ala, Anamuli, Anantmul, Bel, Bhuineem, Bhuiawala, Biba, Dikamali, Gulwel, Kuda, Neem, Rantulas, Unhali, Wasanwel.
4	Silvipasture W.C.	Bhuineem, Anantmul, Bahala, Biba, Jakhamjudi, Moi, Palas, Tendu.
5	E E & RW.C.	Tantulas, Tantani, Khadkapala

**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 Regenerated Plants in sample area	No. of Regenerated Plants per Ha.
1	2	3	4	5	6	7
1	A.W.C.	10128.347	300	0.75	94	125
2	New W.C.	1404.136	44	0.11	43	391
3	Improvement W.C.	9374.669	275	0.69	941	1363
4	Silvipasture W.C.	3411.561	119	0.30	35	117
5	EE & RW.C.	3425.201	110	0.28	201	719
	Total	27743.914	848	2.13	1314	617

Working Circle wise name of species of **Natural regeneration** found in sample plot are as follows.

Sr. No.	Working Circle	Name of species of Natural Regeneration
1	2	3
1	A.W.C.	Bartondi, Chinchora, Dhawada, Dudhi, Hiwar, Henkal, Lendia, Neem, Palas, Shehda, Teak, Tendu.
2	New W.C.	Neem, Bahala, Bartondi, Dikamali, Lokhandi, Sitafal, Teak.
3	Improvement W.C.	Anantmul, Apta, Bahala, Bartondi, Bel, Bhuineem, Bor, Charoli, Chinchora, Dhawada, Dikamali, Dudhi, Ghatbor, Karad, Khair, Kusumba, Kuda, Lendia, Lokhandi, Moha, Neem, Palas, Rohan, Shadoda, Sitafal, Teak, Tendu.
4	Silvipasture W.C.	Bahala, Biba, Dudhi, Kuda, Lokhandi, Moi, Neem, Palas, Teak, Shedada, Tendu.
5	E.E.&R.W.C.	Amaltas, Bahala, Bartondi, Dudhi, Henkal, Lendia, Palas, Neem, Lokhandi, Teak, Tendu

**C) 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	A.W.C.	10128.347	300	0.030	10848	361600
2	New W.C.	1404.136	44	0.004	2420	605000
3	Improvement W.C.	9374.669	275	0.028	6327	225964
4	Silvipasture W.C.	3411.561	119	0.012	3233	269417
5	E E & R W.C.	3425.201	110	0.011	1901	172818
	Total	27743.914	848	0.086	24729	287547

Working Circle wise name of species of **Grass Species** found in sample plot are as follows.

Sr. No.	Working Circle	Name of Grass Species
1	2	3
1	A.W.C.	Betagawat, Bondara, Dongari, Gondali, Halgati, Kardu, Khadpal, Kolsan, Kusali, Lahankusali, Lajalu, Marvel, Mothikusali, Pawnya, Rantulas, Shada, Tantani,
2	New W.C.	Bit, Gondali, Ghaneri, Kunda, Kusali, Pawnya,
3	Improvement W.C.	Bhuineem, Gondali, Dikamali, Jakhamjudi, Kahi, Kardu, Kusali, Lahankusali, Mothikusali, Pawnya, Rantulas, Rosha, Shada, Tantani.
4	Silvipasture W.C.	Anantmul, Betagawat, Gondali, Haral, Kardu, Marwel, Lahankusali, Mothikusali, Pawnya, Rantulas, Tantani
5	E E & R W.C.	Kusali, Gondali, Mothikusali, Pawnya, Rantulas, Shada.

**Statistical Analysis: -**

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

**Table No.8**  
**Working circlewise standard error**

Sr. No.	Name of working circle	Population area in ha	Sample area in ha	Intensity of sampling %	% Standard Error
1	Afforestation W.C.	10128.347	108.00	1.07	11.97
2	New W. Circle	1404.136	15.84	1.13	13.70
3	Improvement W.C.	9374.669	99.00	1.06	16.59
4	Silvipasture W.C.	3411.561	42.84	1.26	13.32
5	Encroachment Eviction & Rehabilitation W.C.	3425.201	39.60	1.16	15.35
	Total	27743.914	305.28	---	---

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



