

## Result of Sample Tree Enumeration of West Kolhapur Forest Division

**Kolhapur** forest division is one of the forest divisions of Kolhapur circle. The forest extends over an area of 1389.71 sq. km. as per draft of PWPR. The Forest area of Kolhapur division lie between latitude 15<sup>o</sup>43' to 17<sup>o</sup>10' North and longitude 73<sup>o</sup>40' to 74<sup>o</sup>42' East.

**Climate:-** The Changes in temperature is gradual. The mean annual maximum temperature is 31.5<sup>o</sup>C and the mean annual temperature is 19.2<sup>o</sup>C Maximum temperature in April could reach upto 40.7<sup>o</sup>C and temperature in January could be as low as 10<sup>o</sup>C.

**Forest Area:-** In view of Management & Legal Status, as per Annual Administration Report, the details of forest area of Kolhapur Division as on dated 31/3/2018 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 Forest
1.	Area in charge of Forest Department	702.70	309.96	257.53	1270.19
2.	Area in charge of F.D.C.M.	2.59	10.99	1.98	15.56
3.	Private Forest brought under possession of Forest Department	64.64	0	0	64.64
Total		769.93	320.95	259.51	1350.39
% to total forest area		57.01	23.77	19.22	100

Kolhapur Forest Division consist of 6 Ranges. The Range-wise Forest area under Scientific Management as recorded in Working Plan (2007-08 to 2016-17) by Shri B.P.Singh, IFS and Dr. V.D. Chafekar, IFS Conservator of Forests Working Plan Kolhapur is as under.

**Table No.2**

Sr. No	Names of Ranges	Total Forest area in (ha)
1.	Patne	14549.86
2.	Ajara	17566.76
3.	Chandgad	13847.05
4.	Gaganbawada	11443.79
5	Gargoti	8645.86
6	Karveer	7082.08
7	Kadgaon	16632.71
8	Malkapur	12311.42
9	Panhala	12973.53
10	Pendkhale	12840.27
11	Radhanagari	7146.17
	<b>Total</b>	<b>135039.5</b>

Now Conservator of Forest, Working Plan, Kolhapur has proposed following working circle wise 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	Soil and Moisture Conservation W. C.	10279.55
2	Protection W.C.	68834.38
3	Improvement W.C.	39014.61
4	Old Plantation W.C.	13253.44
	<b>Total</b>	<b>131381.98</b>

**Sampling plan of Tree Enumeration**

Actually the tree enumeration work was done by the territorial staff of Dy. Conservator of Forest Kolhapur Division during Feb.2017 to Dec-2018. 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 is of 25"x25" (25 seconds x 25 seconds) i.e. 56.25 ha. In each plot of size 56.25 ha., 0.1 ha. plot was enumerated. The complete enumeration of trees, Natural regeneration, Grass and Medicinal plant 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 in population area.

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. in Previous (Oct-2004 to Dec-2005) and Current (Feb-2017 to Dec-2018) tree enumeration**

Sr. No	Name of Working Circle	Past enumeration (Oct-2004 to Dec-2004) ) No. of trees per ha.	Sr. No.	Name of Working Circle	Current enumeration (Feb.2017 to Dec-2018) No. of trees per ha.
1	Soil and Moisture Conservation W.C.	565.25	1	Soil and Moisture Conservation W. C.	214.672
2	Protection W. C.	851.73	2	Protection W.C.	300.190
3	Ferpali Sheti	262.50	3	Improvement W.C.	321.282
4	Nature and Wildlife W.C.	1106.25	4	Old Plantation Management W.C.	497.124
5	Selection Cum Improvement W.C.	627.48			
6	Kuran W.C.	551.50			
7	Teak Enrichment W.C.	831.74			
8	Kaju Plantation	637.50			
9	Unclassified Area	714.28			
<b>Weighted Average</b>		727.01	<b>Weighted Average</b>		<b>319.628</b>

It is observed that the total estimated number of trees per hectare in current enumeration ( Feb-2017 to Dec-2018) is decreased as compared to previous (Oct-2004 to Dec-2005) tree enumeration.

**Table 4 (b)****Estimated percentage distribution of trees in 15U30 ,31 U 45 and remaining girth class to overall girth class**

Sr.No.	Working Circle	Girth class-wise estimated percentage of number of trees			
		15 U 30	31U45	Remaining Girth Classes	Total estimated No. of trees
1	Soil and Moisture Conservation W. C.	41.18	21.41	37.41	100
2	Protection W.C.	39.84	25.80	34.36	100
3	Improvement W.C.	36.22	30.05	33.73	100
4	Old Plantation Management W.C.	31.90	23.56	44.54	100
<b>Weighted Average</b>		<b>38.00</b>	<b>26.51</b>	<b>35.49</b>	100

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	Soil and Moisture Conservation W.C	214.67	34.68	8.33	39.21	132.45
	% of stock to total stock	100	16.17	3.86	18.26	61.70
2	Protection W.C.	300.19	36.87	14.98	61.57	186.77
	% of stock to total stock	100	12.28	4.99	20.51	62.25
3	Improvement W.C.	321.28	46.21	9.47	58.30	207.30
	% of stock to total stock	100	14.38	2.95	18.15	64.52
4	Old Plantation Management W.C	497.12	53.93	6.42	84.64	352.13
	% of stock to total stock	100	10.85	1.29	17.03	70.83
Total weighted average		319.64	41.19	11.97	61.18	205.30
% of stock to total stock		100	12.89	3.74	19.14	64.23

**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	Soil and Moisture Conservation W. C.	48.67	5.02	1.00	12.99	29.66
	% of stock to total stock	100	10.31	2.07	26.69	69.94
2	Protection W.C.	60.02	8.27	2.60	15.00	34.15
	% of stock to total stock	100	13.78	4.34	24.99	56.89
3	Improvement W.C.	63.33	10.70	2.36	13.24	37.01
	% of stock to total stock	100	16.89	3.76	20.91	58.44
4	Old Plantation Management W.C	134.08	12.80	1.96	34.06	85.26
	% of stock to total stock	100	9.55	1.46	25.40	63.59
Total weighted average		67.59	9.19	2.36	16.24	39.80
<b>% of stock to total stock</b>		<b>100</b>	<b>13.60</b>	<b>3.48</b>	<b>24.03</b>	<b>58.89</b>

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

**1) 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, Shisam, Teak	16.17
2	B:-Species of Special Utility	Dhawada, Hiwar, Khair, Sawar, Moin, Kalamb	3.86
3	C:-Species of Minor Forest Produce	Amba, Apta, Awala. Biba, Bor, Char, Hirda, Jambhul, Kaju, Neem, Nilgiri, Palas, Shiras, Tendu	18.26
4	D:-Other Species	Acasia, Amberi, Amboti, Anjan, Asan Bahawa etc	61.70

### **2) 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, Shisam, Teak	12.28
2	B:-Species of Special Utility	Arjun, Dhawada, Haldu, Kalamb, Khair, Moin, Sawar, Shivan, Salai	4.99
3	C:-Species of Minor Forest Produce.	Amba, Apta, Awala, Behada, Bel, Biba, Char, Chinch, Hirda, Jambhul, Kaju, Moha, Neem, Nilgiri, Palas, Shiras, Sitaphal, Narkya	20.51
4	D:-Other Species	Aasan, Acasia, Alwan, Amberi, Ameti, Anjan, Asoli, Bahawa, Bhokar, Chandwad, Chikotin,etc	62.25

### **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	Ain, Bija, Lendia, Shisam, Teak	14.38
2	B:-Species of Special Utility	Arjun, Dhawada, Kalamb, Khair, Moin, Salai, Sawar Shivan	2.95
3	C:-Species of Minor Forest Produce	Amba, Apta, Awala, Behada, Bel, Biba, Char, Hirda, Jambhul, Kaju, Kawath, Moha, Narkya, Neem, Palas, Shiras.	18.15
4	D:-Other Species	Alwan, Asan, Acasia, Amberi, Amoni, Anjan, Asoli, Babhul, Badki, Bahawa, Bhokar, Chandwad, Dhaman, Dhoma, Fanashi, Gella, Glyricidia, Gondra, Hadkya, etc.	64.52

### **4) Old Plantation Management 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, Shisam, Teak	10.85
2	B:-Species of Special Utility	Moin, Sawar.	1.29

3	C:-Species of Minor Forest Produce	Amba, Awala, Biba, Hirda, Jambhul, Moha, Nilgiri, Palas, Narkya	17.03
4	D:-Other Species	Acasia, Alvin, Anjan, Asuli, Bahawa, Chandwad, Dhaman, Dhoma, Gelan, Gella, Hadaka,etc	70.83

**Table No.6**

**Availability of Teak in Previous (Oct-2004 to Dec-2005) 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	Soil and Moisture Conservation W.C.	565.25	4.24	0.75
2	Protection W. C.	851.73	0.82	0.1
3	Ferpali Sheti	262.50	0	0
4	Nature and Wildlife W.C.	1106.25	0	0
5	Selection Cum Improvement W.C.	627.48	0	0
6	Kuran W.C.	551.50	63.41	11.5
7	Teak Enrichment W.C.	831.74	112.50	13.53
8	Kaju Plantation	637.50	2.50	0.39
9	Unclassified Area	714.28	0	0
	<b>Weighted Average</b>	<b>727.18</b>	<b>18.54</b>	<b>2.55</b>

**Table No.6 (A)**

**Availability of Teak in Current (Feb-2017 to Dec-2018) 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	Soil & Moisture Conservation Working Circle	214.67	14.05	6.54
2	Protection W.C.	300.19	6.57	2.19
3	Improvement W.C.	321.28	4.52	1.41
4	Old Plantation Management W.C.	497.12	1.79	0.36
	<b>Total (Weighted Average)</b>	<b>319.63</b>	<b>6.07</b>	<b>1.90</b>

**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. 7

**Table No.7**  
**Working circlewise standard error**

Sr. No.	Name of working circle	Population area in ha	Sample area in ha	Intensity of sampling %	% Standard Error
1	Soil & Moisture Conservation W.C.	10279.55	12.6	0.12	8.80
2	Protection W.C.	68834.38	71.2	0.10	3.65
3	Improvement W.C.	39014.61	36.2	0.09	6.80
4	Old Plantation Management W.C.	13253.44	2.8	0.02	18.34
	Total	131381.98	122.8	0.09	

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