Result of Sample Tree Enumeration of West Nashik Forest Division

West Nashik forest division is one of the forest divisions of Nashik circle. The forest extends over an area of 1263.05 sq. km..

Climate:- No extreme of temperature are experienced . The temperature begins to increase rapidly from around the latter half of February. May is the hottest month with the mean daily maximum temperature of 37.4^0C at Nashik.

Forest Area:- In view of Management & Legal Status, as per Annual Administration Report, the details of forest area of West Nashik Division as on dated 31/3/2017 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	678.05	227.30	0.76	906.11
2.	Area in charge of F.D.C.M.	310.91	0	0	310.91
3.	Private Forest brought under possession of Forest Department	46.03	0	0	46.03
	Total	1034.99	227.30	0.76	1263.05
	% to total forest area	81.94	18.00	0.06	100

West Nashik 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 Nashik is as under.

Table No.2

Sr. No	Names of Ranges	Total Forest area in (ha) Including Area with FDCM
1.	Barhe	20575.736
2.	Peith	22080.741
3.	Harsul	30265.392
4.	Nashik	17054.541
5	Igatpuri	22500.59
6	Sinnar	14171.723
	Total	**126648.723**

Now Conservator of Forest, Working Plan Nashik 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	Afforestation W. C.	21595.443
2	Improvement W.C.	39251.364
3	Kuran W.C.	2773.777
4	Plantation W.C.	11764.906
5	Protection W.C.	11383.000
	Total	**86768.490**

Sampling plan of Tree Enumeration

Actually the tree enumeration work was done by Forest Resources Survey Scheme, Nashik, during Oct-2014 to May-2018. The entire forest division's area was considered for sampling enumeration plan. The trees are enumerated in girth classes started from 31-45 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 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 (Aril 2002 to March 2003) and Current (Oct-2014 to May-2018) tree enumeration

Sr. No	Name of Working Circle	Past enumeration (Aril 2002 to March 2003)) No. of trees per ha.	Sr. No.	Name of Working Circle	Current enumeration (Oct-2014 to May-2018) No. of trees per ha.
1	Reafforestation W. C.	23.73	1	Afforestation W. C.	28.66
2	Improvement W.C.	63.20	2	Improvement W.C.	59.54
3	Fodder protection W.C	5.46	3	Kuran W.C.	23.73
4	Pasture W. C.	7.71	4	Plantation W.C.	40.22
5	Protection W. C.	23.30	5	Protection W.C.	20.14
6	Fuelwood W. C.	89.95			
Weighted Average		**46.07**	**Weighted Average**		**42.92**

It is observed that the total estimated number of trees per hectare in current enumeration (Oct-2014 to May-2018) is decreased as compared to previous (April-2002 to March-2003) 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	Afforestation W.C	0	46.28	53.72	100
2	Improvement W.C.	0	25.83	74.17	100
3	Kuran W.C.	0	64.69	35.31	100
4	Plantation W.C.	0	44.06	55.94	100
5	Protection W.C.	0	31.62	68.38	100
Weighted Average		**0**	**35.39**	**64.61**	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	Afforestation.W.C	28.66	5.69	1.51	7.54	13.92
	% of stock to total stock	100	19.86	5.26	26.31	48.57
2	Improvement W.C.	59.54	15.86	4.06	10.09	29.53
	% of stock to total stock	100	26.64	6.82	16.94	49.60
3	Kuran W.C.	23.73	2.09	1.40	1.63	18.61
	% of stock to total stock	100	8.82	5.89	6.87	78.42
4	Plantation W.C	40.22	11.40	2.08	6.59	20.15
	% of stock to total stock	100	28.34	5.16	16.38	50.12
5	Protection W.C	20.14	2.26	1.56	5.94	10.38
	% of stock to total stock	100	11.24	7.73	29.51	51.52
Total weighted average		42.92	10.51	2.74	8.16	21.51
% of stock to total stock		100	24.46	6.39	19.03	50.12

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.W.C	152.25	1.36	0.97	4.18	145.74
	% of stock to total stock	100	0.89	0.64	2.74	95.73
2	Improvement W.C.	34.56	4.49	6.52	6.43	17.18
	% of stock to total stock	100	12.98	18.87	18.61	49.54
3	Kuran W.C.	5.88	0.29	0.73	0.81	4.05
	% of stock to total stock	100	4.95	12.46	13.73	68.86
4	Plantation W.C	14.51	1.61	2.42	3.43	7.06
	% of stock to total stock	100	11.07	16.65	23.66	48.62
5	Protection W.C	10.18	0.55	1.58	3.87	4.18
	% of stock to total stock	100	5.39	15.54	38.05	41.02
	Total weighted average	57.02	2.67	3.75	4.95	45.65
	% of stock to total stock	**100**	**4.68**	**6.58**	**8.68**	**18.06**

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

1) Afforestaion 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	Bibla, Bondara, Kakad, Sadada, Teak.	19.86
2	B:-Species of Special Utility	Dhawada, Hiwar, Kalamb, Khair, Kudai, Sawar	5.26
3	C:-Species of Minor Forest Produce	Apta, Awala, Amba, Behada, Bor, Chinch, Hirda, Jambhul, Moha, Neem, Nilgiri, Palas, Shiras.	26.31
4	D:-Other Species	Acasia, Alive, Asand, Babhul, Bhuskut, Gliricidia, Maharukh, Umbar, Waras etc.	48.57

2) Improverment 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	Bibla, Bondara, Kakad, Shisam, Teak, Tiwas.	26.64
2	B:-Species of Special Utility	Dhawada, Kalamb, Khair, Sawar.	6.82
3	C:-Species of Minor Forest Produce.	Amba, Apta, Awala, Behada, Bel, Chandan, Chinch, Hirda, Jambhul, Moha, Nilgiri, Palas, Ritha, Shiras, Tendu.	16.94
4	D:-Other Species	Acasia, Alive, Asand, Bahawa, Bhokar, Gliricidia, Hed,Humb,Pangara,Sadada,Subabhul,Umbar, Wad, etc.	49.60

3) 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	Teak.	8.82
2	B:-Species of Special Utility	Dhawada, Hiwar, Khair, Sawar.	5.89
3	C:-Species of Minor Forest Produce	Bor, Neem, Shiras, Tendu.	6.87
4	D:-Other Species	Anjan, Babhul, Gliricidai, Pangara, Subabhul, Waras etc.	78.42

4) PlantationWorking 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	Bibla, Bondara, Teak	28.34
2	B:-Species of Special Utility	Dhawada, Hiwar, Kalamb, Khair, Sawar.	5.16
3	C:-Species of Minor Forest Produce	Amba, Apta, Behada,Bor, Chinch, Hirda, Jambhul, Neem, Moha, Nilgiri, Palas, Shiras,Tendu	16.38
4	D:-Other Species	Acasia, Alive, Asand, Babhul, Gliricidai, Hed, Kakad, Modal, Payar, Sadada, Subabhul etc.	50.12

5) 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	Bibla, Bondara, Kakad, Teak, Tiwas	11.24
2	B:-Species of Special Utility	Dhawada, Hed, Hiwar, Kalamb, Kudai, Sawar,	7.73
3	C:-Species of Minor Forest Produce	Amba, Apta, Behada, Bor, Hirda, Jambhul, Moha, Neem, Palas, Shiras,Tendu.	29.51
4	D:-Other Species	Acasia, Alive, Asand, Modal, Pangara, Sadada, Umbar, Waras, Wad etc.	51.52

Table No.6
Availability of Teak in Previous (April 2002 to March-2003) Enumeration in (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	Reafforestation W. C.	23.73	0.21	0.87
2	Improvement W.C.	63.20	22.12	34.99
3	Fodder protection W.C	5.46	0.91	16.74
4	Pasture W. C.	7.71	0.02	0.31
5	Protection W. C.	23.30	5.76	24.71
6	Fuelwood W. C.	89.95	17.73	19.70
	Weighted Average	**46.07**	**8.69**	**18.86**

Table No.6 (A)
Availability of Teak in Current (Oct-2014 to May-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	Afforestation Working Circle	28.66	1.12	3.91
2	Improvement W.C.	59.54	13.41	22.52
3	Kuran W.C.	23.73	2.09	8.81
4	Plantation W.C.	40.22	10.83	26.92
5	Protection W.C.	20.14	1.51	7.50
	Total (Weighted Average)	**42.92**	**8.08**	**18.82**

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	Afforestation W.C.	21595.443	41.10	0.19	12.77
2	Improvement W.C.	39251.364	68.70	0.18	18.11
3	Kuran W.C.	2773.777	4.30	0.16	23.26
4	Plantation W.C.	11764.906	19.30	0.16	14.19
5	Protection W.C.	11383.000	2.20	0.19	22.33
	Total	86768.49	154.60	0.18	

Chief Forest Statistician,
Maharashtra State, Nagpur.