METRIC VOLUME TABLES FOR SOME TREE SPECIES FOUND IN THE NATURAL FORESTS OF BANGLADESH

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1. INTRODUCTION

A number of volume tables have been prepared in the past for several indigenous species growing in the forests of Bangladesh. In 1963 Forestal prepared some local-site tables for individual species and groups of species in connection with an inventory of the forest resources of the Chittagong Hill Tracts. Since then simple volume tables have been derived from commercial timber outturn data and some of these tables can be found in current Working Plan Documents for Sylhet and Chittagong Forest Divisions.

The most recent set of volume tables for indigenous species was published by the Bangladesh Forest Research Institute (Islam, 1984) but these were presented in Imperial Units and no separate regression equations were given. Bangladesh has now adopted the metric scheme of measurement and it has become desirable to present the tables again, this time in metric form and complete with equations for both imperial and metric units to facilitate the change from one system to the other.

These tables apply to trees growing in natural forests and should not be used for the same species when grown in plantations.

Table 1

SPECIES INCLUDED IN THESE VOLUME TABLES

A. Single Species in Separate Tables

Aphanamixis polystachya Parker	Pitraj
Artocarpus chaplasha Roxb.	Chapalish
Bombax ceiba Linn.	Simul
Dipterocarpus gracilis Bl.	Dhali Garjan
Dipterocarpus costatus Gaertn.f.	Baita Garjan
Dipterocarpus turbinatus Gaertn.f.	Teli Garjan
Duabanga grandiflora Roxb.	Banderhola
Mangifera sylvatica Roxb.	Uriam
Schima wallichii Chorsy	Kanak
Swintonia floribunda Griff.	Civit
Syzygium grande (Wt.) Wald.	Dhakijam
Terminalia bellerica Roxb.	Bahera
Tetrameles nudiflora R.Br.	Chundul

Table 1 (cont'd)

B. Mixed Species Group in One Table

Albizia chinensis Merr.	Chakua Koroi
Albizia procera Benth.	Sada Koroi
Alstonia scholaris R. Br.	Chatian
Anisoptera glabra (Roxb.) Pierre	Boilum
Artocarpus heterophyllus Lam.	Barta
Calophyllum polyanthum Wall.	Kamdeb
Toona ciliata Roem.	Toon
Chukrassia tabularis A. Juss.	Chikrassi
Hopea odorata Roxb.	Telsur
Mangifera indica Linn.	Am
Michelia champaca Linn.	Champaful
Sterculia alata Roxb.	Harikell
Terminalia chebula Retz.	Naritaki
Trewia nudiflora Linn.	Pitali

2. DATA COLLECTION

Data were collected from a large number of felled trees of each species (refer to stand tables for actual numbers), extracted by contractors from different coupes in Chittagong and Cox's Bazar Forest Divisions from 1974.

The aim was to select upto twenty sample trees for each diameter/height class cell, for each species, but this was not always possible. Complete measurement of each felled sample tree was made. Stump height was measured first on the uphill side. The position of breast height at 4'6" (1.37 m) was identified by adding the stump height to the butt end of the first log. Diameter at breast height was measured with calipers and total tree height recorded. Sample trees were considered in 3.0 m (10 ft) sections and included merchantable branches. Log length and diameter of both ends of each log were determined. The length of stem from the top of the last log to the tip of the tree was also recorded.

3. COMPILATION OF DATA

Total stem volumes were computed by sectional method, summing the volumes for each three metre long billet.

In addition to the primary variables of Volume (V), Diameter at breast height (D) and total Height (H), various functions and ratios of these variables (D^2, $1/D$, $1/D^2$, Log (V), Log (D), DH, D^2H, V/D^2H, $1/DH$, $1/D^2H$, H/D^2, H/D and Log (H) were derived to provide additional variables for testing in regression analyses.

4. COMPUTATION OF VOLUME FUNCTIONS

Fifteen regression models were tried for best fit with the different variables as follows:

1. $V = a + bD$
2. $V = a + bD + cD^2$
3. $V = a + bD^2$
4. $V = a + bD^2H$
5. $V = a + bD^2 + cH + dD^2H$
6. $V = a + bD^2 + cDH + dD^2H$
7. $\ln(V) = a + b \ln(D)$
8. $\ln(V) = a + b \ln(D) + c \ln(H)$
9. $V/D^2 = a + b/D^2 + c/D$
10. $V/D^2 = a + b/D$
11. $V/D^2H = a + b/^2H$
12. $V/D^2H = a + b/D^2 + cH/D^2 + dH$
13. $V/D^2H = a + b/D^2H + c/H + d/D^2$
14. $V/D^2 = a + b/D^2 + cH/D + dH$
15. $V/D^2H = a + b/D^2H + c/H + d/D$

Where V, D and H are as described above, a is the regression constant and b, c and d are regression coefficients. The logrithmic functions are to the base e (natural logarithms).

The regression models of best fit for each species were chosen by reference to various parameters describing the regressions, including furnival index and multiple correlation coefficient. Models of best fit are listed in Table 2.

Table 2

REGRESSION MODELS OF BEST FIT

Species or Group	One-Way Table	Two-Way Table
Aphanamixis polystachya	7	8
Artocarpus chaplasha	7	8
Bombax ceiba	7	8
Dipterocarpus gracilis	7	8
Dipterocarpus costatus	7	8
Dipterocarpus turbinatus	7	8
Daubanga grandiflora	7	13
Mangifera sylvatica	7	8
Schima wallichii	7	13
Swintonia floribunda	7	8
Syzygium grande	2	14
Terminalia bellerica	7	8
Tetrameles nudiflora	7	8
Mixed Species Group	7	8

5. STAND TABLES

Almost 4 000 trees were sampled. Available stand tables for the sampled trees of each species are given in Tables 3 to 13.

Numbers of trees sampled by species (where now known) were as follows:

Aphanamixis polystachya	148
Artocarpus chaplasha	175
Dipterocarpus gracilis	84
Dipterocarpus costatus	1 181
Dipterocarpus turbinatus	672
Duabanga grandiflora	77
Schima wallichii	71
Swintonia floribunda	404
Syzygium grande	369
Terminalia bellerica	120
Tetrameles nudiflora	162
Mixed species	174

Since all of the computer-generated volume tables have the same format, in most some or even many of the values shown will be well outside the range of the original data set. Extrapolation much outside the range of height and diameter indicated in the appropriate stand table should only be done with caution.

Table 3

APHANAMIXIS POLYSTACHYA - STAND TABLE - NUMBER OF TREES SAMPLED IN DIAMETER/HEIGHT CLASSES

Diameter	HEIGHT CLASSES												Total
	15.0	25.0	35.0	45.0	55.0	65.0	75.0	85.0	95.0	105.0	115.0	125.0	GT*130.0	
10.0	3	17	10	3	0	0	0	0	0	0	0	0	0	33
14.0	0	11	14	12	7	8	1	0	0	0	0	0	0	53
18.0	1	4	5	11	5	11	1	2	2	0	0	0	0	42
22.0	0	2	0	2	1	1	1	0	0	0	0	0	0	7
26.0	0	0	1	1	1	1	0	2	0	0	0	0	0	6
30.0	0	0	0	0	0	0	2	0	0	0	0	1	0	3
34.0	0	0	0	1	0	1	0	2	0	0	0	0	0	4
38.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GT40.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	4	34	30	30	14	22	5	6	2	0	0	1	0	148

Note: This Stand Table is in imperial units. Height in feet, diameter in inches since the original data were collected in those units.

Table 4

ARTOCARPUS CHAPLASHA - STAND TABLE -NUMBER OF TREES SAMPLED IN DIAMETER/HEIGHT CLASSES

Diameter	HEIGHT CLASSES 10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	GT*125.0	Total
10.0	0	3	4	4	0	0	0	0	0	0	0	0	0	11
14.0	2	0	3	9	12	5	3	0	0	0	0	0	0	34
18.0	0	1	1	3	8	5	6	1	0	0	0	0	0	25
22.0	1	0	2	3	5	7	6	4	0	1	0	0	0	29
26.0	0	0	0	1	4	1	8	4	1	2	0	1	0	22
30.0	0	0	0	0	5	5	3	4	0	1	2	1	1	22
34.0	0	1	0	1	5	1	0	1	4	2	2	0	0	17
38.0	0	0	0	1	2	1	1	0	0	0	0	0	0	5
42.0	0	0	0	1	0	0	2	0	0	1	1	0	0	5
46.0	0	0	0	0	1	1	0	0	0	2	0	0	0	4
50.0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
54.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GT56.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3	5	10	23	43	26	29	14	5	9	5	2	1	175

Note: This stand table is in imperial units. Height in feet, diameter in inches, since the original data were collected in those units.

Table 5

DIPTEROCARPUS GRACILIS - STAND TABLE - NUMBER OF TREES SAMPLED IN DIAMETER/HEIGHT CLASSES

Diameter	HEIGHT CLASSES													Total
	35.0	45.0	55.0	65.0	75.0	85.0	95.0	105.0	115.0	125.0	135.0	145.0	GT*150.0	
12.0	2	5	2	4	5	1	0	0	0	0	0	0	0	19
16.0	0	1	6	5	6	3	0	1	0	0	0	0	0	22
20.0	0	0	0	3	6	6	3	0	1	2	0	0	0	21
24.0	0	0	0	1	0	4	0	3	1	1	0	0	0	10
28.0	0	0	0	0	0	1	1	0	0	0	2	0	0	4
32.0	0	0	0	0	0	1	0	0	0	1	0	0	0	2
36.0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
40.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44.0	0	0	0	0	0	0	1	0	0	0	0	0	1	2
48.0	0	0	0	0	0	0	0	0	0	1	0	1	0	2
52.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GT54.0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Total	2	6	8	13	18	16	6	4	2	5	2	1	1	84

Note: This stand table is in imperial units. Height in feet, diameter in inches, since the original data were collected in those units.

Table 6

DIPTEROCARPUS COSTATUS - STAND TABLE - NUMBER OF TREES SAMPLED IN DIAMETER/HEIGHT CLASSES

Diameter	HEIGHT CLASSES 15.0	25.0	35.0	45.0	55.0 - 65.0	75.0	85.0	95.0	105.0	115.0	125.0	GT*130.0	Total
8.0	0	0	2	3	0	1	0	0	0	0	0	0	6
10.0	1	10	7	141	62	10	1	0	0	0	0	0	222
12.0	2	9	4	97	67	31	4	1	0	1	0	0	216
14.0	0	1	1	21	103	57	16	2	0	1	1	1	204
16.0	0	0	2	14	47	45	27	5	1	0	0	1	142
18.0	0	0	0	4	24	39	30	8	4	0	0	0	109
20.0	0	0	0	2	16	22	14	10	3	2	0	0	69
22.0	0	0	0	2	5	13	10	2	2	2	1	0	37
24.0	0	0	0	0	4	13	12	6	1	1	1	0	38
26.0	0	0	0	2	5	10	12	4	0	1	0	0	34
28.0	0	0	0	0	5	2	7	5	1	0	0	0	20
30.0	0	0	0	0	4	5	12	5	1	0	0	0	27
32.0	0	0	0	1	4	4	9	1	1	0	1	0	21
34.0	0	0	0	1	1	6	4	4	1	0	0	0	17
36.0	0	0	0	0	0	2	3	1	1	1	0	0	8
38.0	0	0	0	0	0	1	2	0	0	0	0	0	3
40.0	0	0	0	0	0	1	0	1	1	0	0	0	3
42.0	0	0	0	0	0	0	1	0	1	1	0	0	3
44.0	0	0	0	0	0	1	0	0	0	0	0	0	1
GT 46.0	0	0	0	0	0	0	0	1	0	0	0	0	1
Total	3	20	16	288	337	263	164	56	18	10	4	2	0	1181

Note: This stand table is in imperial units. Height in feet, diameter in inches, since the original data were collected in those units.

Table 7

DIPTEROCARPUS TURBINATUS - STAND TABLE - NUMBER OF TREES SAMPLED IN DIAMETER/HEIGHT CLASSES

Diameter	HEIGHT CLASSES													Total
	10.0	30.0	50.0	70.0	90.0	110.0	130.0	150.0	170.0	190.0	210.0	230.0	GT*240.0	
8.0	0	8	6	2	0	0	0	0	0	0	0	0	0	16
12.0	0	6	56	31	2	0	0	0	0	1	0	0	0	96
16.0	0	3	69	78	26	0	0	1	0	0	0	0	0	177
20.0	0	0	12	96	25	4	0	0	0	0	0	0	0	137
24.0	0	1	7	56	24	9	0	0	0	0	0	0	0	97
28.0	0	5	26	40	3	2	0	0	0	0	0	0	0	76
32.0	0	1	0	7	21	4	0	0	0	0	0	0	0	33
36.0	0	0	1	7	9	1	1	0	0	0	0	0	0	19
40.0	0	0	1	4	1	3	1	0	0	0	0	0	0	10
44.0	0	0	0	1	2	1	0	0	0	0	0	0	0	4
48.0	0	0	0	1	1	1	0	0	0	0	0	0	0	3
52.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60.0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
64.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
68.0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
72.0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
76.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
84.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GT86.0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	0	30	257	311	153	36	4	1	0	1	0	0	0	672

Table 7

DIPTEROCARPUS TURBINATUS - STAND TABLE - NUMBER OF TREES SAMPLED IN DIAMETER/HEIGHT CLASSES

Diameter	HEIGHT CLASSES													Total
	10.0	30.0	50.0	70.0	90.0	110.0	130.0	150.0	170.0	190.0	210.0	230.0	GT*240.0	
8.0	0	8	6	2	0	0	0	0	0	0	0	0	0	16
12.0	0	6	56	31	2	0	0	0	0	1	0	0	0	96
16.0	0	3	69	78	26	0	0	1	0	0	0	0	0	177
20.0	0	0	12	96	25	4	0	0	0	0	0	0	0	137
24.0	0	1	7	56	24	9	0	0	0	0	0	0	0	97
28.0	0	5	26	40	3	2	0	0	0	0	0	0	0	76
32.0	0	1	0	7	21	4	0	0	0	0	0	0	0	33
36.0	0	0	1	7	9	1	1	0	0	0	0	0	0	19
40.0	0	0	1	4	1	3	1	0	0	0	0	0	0	10
44.0	0	0	0	1	2	1	0	0	0	0	0	0	0	4
48.0	0	0	0	1	1	1	0	0	0	0	0	0	0	3
52.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60.0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
64.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
68.0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
72.0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
76.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
84.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GT86.0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Total	0	19	157	311	153	26	4	1	0	1	0	0	0	672

Note: This stand table is in imperial units. Height in feet, diameter in inches, since the original data

Table 8

DUABANGA GRANDIFLORA - STAND TABLE - NUMBER OF TREES SAMPLED IN DIAMETER/HEIGHT CLASSES

Diameter	HEIGHT CLASSES													Total
	25.0	35.0	45.0	55.0	65.0	75.0	85.0	95.0	105.0	115.0	125.0	135.0	GT*140	
18.0	2	1	2	1	1	1	1	0	0	0	0	0	0	9
22.0	1	2	1	2	2	2	0	0	0	0	0	0	0	10
26.0	0	4	2	2	0	1	0	0	1	0	1	0	0	11
30.0	0	0	5	1	0	1	2	2	0	1	0	0	0	12
34.0	0	1	2	3	5	1	0	1	0	2	0	0	0	15
38.0	0	0	1	0	2	0	1	0	0	0	0	0	0	4
42.0	0	0	0	1	2	1	0	0	0	1	0	0	0	5
46.0	0	0	0	0	0	1	0	1	3	0	0	0	0	5
50.0	0	0	1	0	0	1	0	0	0	0	0	0	0	2
54.0	0	0	0	0	1	0	0	0	0	0	1	0	0	2
58.0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
62.0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
GT64.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3	8	14	10	13	9	5	4	4	4	2	0	1	77

Note: This stand table is in imperial units. Height feet, diameter in inches, since the original data were collected in those units.

Table 9

SCHIMA WALLICHII - STAND TABLE - NUMBER OF TREES SAMPLED IN DIAMETER/HEIGHT CLASSES

Diameter	HEIGHT CLASSES 25.0	35.0	45.0	55.0	65.0	75.0	85.0	GT*90.0	Total
12.0	0	9	4	2	0	0	0	0	15
16.0	0	5	15	3	6	1	0	0	30
20.0	0	0	6	4	4	1	0	0	15
24.0	0	0	0	3	1	0	0	0	4
28.0	0	0	0	2	1	0	0	0	3
32.0	0	0	1	0	0	1	0	0	2
36.0	0	0	1	0	0	0	0	0	1
40.0	0	0	0	0	0	0	0	0	0
44.0	0	0	1	0	0	0	0	0	1
48.0	0	0	0	0	0	0	0	0	0
GT50.0	0	0	0	0	0	0	0	0	0
Total	0	14	28	14	12	3	0	0	71

Note: This stand table is in imperial units. Height in feet, diameter in inches, since the original data were collected in those units.

Table 10

SWINTONIA FLORIBUNDA - STAND TABLE - NUMBER OF TREES SAMPLED IN DIAMETER/HEIGHT CLASSES

Diameter	HEIGHT CLASSES 16.0	30.0	44.0	58.0	72.0	86.0	110.0	114.0	128.0	142.0	156.0	170.0	GT*177.0	Total
10.0	9	4	13	43	13	0	0	0	0	0	0	0	0	82
14.0	0	2	6	40	40	8	1	0	0	0	0	0	0	97
18.0	0	0	9	20	26	14	3	0	0	0	0	0	0	72
22.0	1	0	2	14	19	19	5	4	0	0	0	0	0	64
26.0	0	0	0	5	14	7	4	1	0	0	1	0	0	32
30.0	0	1	1	4	6	6	2	3	1	0	0	0	0	24
34.0	0	0	1	1	4	1	1	2	0	0	0	0	0	10
38.0	0	0	0	1	4	1	2	1	0	1	1	0	0	11
42.0	0	0	0	0	0	2	1	1	0	0	0	0	0	4
46.0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
50.0	0	0	1	1	0	1	0	0	0	0	0	0	0	3
54.0	0	0	0	1	1	0	0	1	0	0	0	0	0	3
58.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
66.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
GT72.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	10	7	33	132	127	59	19	13	1	1	2	0	0	404

Note: This stand table is in imperial units. Height in feet, diameter in inches, since the original data were collected in those units.

Table 11

TERMINALIA BELLERICA - STAND TABLE NUMBER OF TREES SAMPLED IN DIAMETER/HEIGHT CLASSES

Diameter	HEIGHT CLASSES 15.0	25.0	35.0	45.0	55.0	65.0	75.0	85.0	95.0	105.0	GT*110.0	Total
10.0	2	3	2	1	1	0	0	0	0	0	0	9
14.0	0	8	7	5	10	1	1	0	0	0	0	32
18.0	0	7	6	13	8	5	2	1	0	0	0	42
22.0	1	3	1	4	2	6	1	2	0	0	0	20
26.0	0	0	2	2	0	3	1	0	0	0	0	8
30.0	0	0	2	0	0	0	1	1	1	0	0	5
34.0	0	0	0	1	0	0	0	1	0	0	0	2
38.0	0	0	0	0	0	0	0	0	0	0	0	0
42.0	0	0	0	0	0	0	0	0	2	0	0	2
GT44.0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3	21	20	26	21	15	6	5	3	0	0	120

Note: This stand table is in imperial units, height in feet, diameter in inches, since the original data were collected in those units.

Table 12

TETRAMELES NUDIFLORA - STAND TABLE - NUMBER OF TREES SAMPLED IN DIAMETER/HEIGHT CLASSES

Diameter	HEIGHT CLASSES													Total
	24.0	36.0	48.0	60.0	72.0	84.0	96.0	108.0	120.0	132.0	144.0	156.0	GT*162.0	
8.0	0	0	11	15	6	0	0	0	0	0	0	0	0	32
16.0	0	0	6	24	32	11	0	0	0	0	0	0	0	73
24.0	0	2	1	5	11	6	3	0	0	0	0	0	0	28
32.0	0	0	0	1	1	3	3	3	0	0	1	0	0	12
40.0	0	0	0	3	1	2	0	1	2	1	0	0	0	10
48.0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
56.0	0	0	0	0	2	0	1	0	0	0	0	0	0	3
64.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
72.0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
80.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
88.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
96.0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
104.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GT108.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	2	18	49	53	22	10	4	2	1	1	0	0	162

Note: This stand table is in imperial units, height in feet, diameter in inches, since the original data were collected in those units.

Table 13

MIXED SPECIES - STAND TABLE - NUMBER OF TREES SAMPLED IN DIAMETER/HEIGHT CLASSES

Diameter	HEIGHT CLASSES														Total
	15.0	25.0	35.0	45.0	55.0	65.0	75.0	85.0	95.0	105.0	115.0	125.0	135.0	GT*140.0	
8.0	1	1	2	1	1	2	0	0	0	0	0	0	0	0	8
14.0	0	8	10	19	12	4	4	0	0	0	0	0	0	0	76
20.0	0	1	3	6	11	15	12	6	0	0	0	0	0	0	54
26.0	0	0	0	3	6	5	3	0	0	0	0	0	0	0	17
32.0	0	0	0	2	1	0	2	1	2	2	2	0	0	0	12
38.0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	4
44.0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3
50.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GT53.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	10	15	32	39	36	22	11	2	2	2	0	1	1	174

Note: This stand table is in imperial units, height in feet, diameter in inches since the original data were collected in those units.

6. REGRESSIONS FOR ONE-WAY VOLUME TABLES

One-way volume tables are based on the single variables of diameter at breast height (D) or girth at breast height (G). The assumption is that all trees of a given diameter or girth class tend to be of a similar height and form. This assumption is tenuous for some species but these tables can be convenient for a quick inventory or where the tops of trees are difficult to see for height measurement.

6.1 Metric One-Way Tables Based on Diameter

The one-way metric regressions are as follows where V = total volume overbark and excluding branch volume in cubic metres, D = diameter at breast height in centimetres and logarithms are to the base e:

Aphanamixis polystachya

$$\ln (V) = 2.4781 \ln (D) - 9.2157$$

Artocarpus chaplasha

$$\ln (V) = 2.30182 \ln (D) - 8.5181$$

Bombax ceiba

$$\ln (V) = 2.3088 \ln (D) - 8.4630$$

Dipterocarpus gracilis

$$\ln (V) = 2.4411 \ln (D) - 8.6333$$

Dipterocarpus costatus

$$\ln (V) = 2.2308 \ln (D) - 8.0201686$$

Dipterocarpus turbinatus

$$\ln (V) = 2.12932 \ln (D) - 7.643303$$

Duabanga grandiflora

$$\ln (V) = 2.4987 \ln (D) - 9.2929$$

Mangifera sylvatica

$$\ln (V) = 2.3370 \ln (D) - 8.5703$$

Schima wallichii

$$\ln (V) = 1.6912 \ln (D) - 6.3428$$

Swintonia floribunda

$$\ln (V) = 2.14002 \ln (D) - 7.631146787$$

Syzygium grande

$$V = 0.009951 D + 0.0005876 D^2 - 0.275876$$

Terminalia bellerica

$$\ln (V) = 2.1338 \ln (D) - 8.0446$$

Tetramales nudiflora

$$\ln (V) = 2.0291 \ln (D) - 7.077637$$

Mixed Species Group

$$\ln (V) = 2.08627 \ln (D) - 7.574983$$

6.2 Imperial One-Way Tables Based on Diameter

The one-way imperial regressions are as follows where V = total volume overbark, excluding branchwood volume, in cubic feet, D = diameter at breast height in inches and logarithms are to the base e.

Aphanamixis polystachya

$$\ln (V) = 2.4781 \ln (D) - 3.3414$$

Artocarpus chaplasha

$$\ln (V) = 2.30182 \ln (D) - 2.80855$$

Bombax ceiba

$$\ln (V) = 2.3088 \ln (D) - 2.7466$$

Dipterocarpus gracilis

$$\ln (V) = 2.4411 \ln (D) - 2.7936$$

Dipterocarpus costatus

$$\ln (V) = 2.2308 \ln (D) - 2.37651$$

Dipterocarpus turbinatus

$$\ln (V) = 2.12932 \ln (D) - 2.09424$$

Duabanga grandiflora

$$\ln (V) = 2.4987 \ln (D) - 3.3995$$

Mangifera sylvatica

$$\ln (V) = 2.3370 \ln (D) - 2.8276$$

Schima wallichii

$$\ln (V) = 1.6912 \ln (D) - 1.2021$$

Swintonia floribunda

$$\ln (V) = 2.14002 \ln (D) - 2.07211$$

Syzygium grande

$$V = 0.892498 D + 0.133871 D^2 - 9.74139$$

Terminalia bellerica

$$\ln (V) = 2.1338 \ln (D) - 2.4914$$

Tetrameles nudiflora

$$\ln (V) = 2.0291 \ln (D) - 1.6223$$

Mixed Species Group

$$\ln (V) = 2.08627 \ln (D) - 2.06605$$

6.3 Imperial One-Way Tables Based on Girth

The one-way imperial regressions are as follows, where V= total volume overbark, excluding branch volume, in cubic feet, G = girth at breast height in inches and logarithms are to the base e.

Aphanamixis polystachya

$$\ln (V) = 2.4781 \ln (G) - 6.1782$$

Artocarpus chaplasha

$$\ln (V) = 2.30182 \ln (G) - 5.44351$$

Bombax ceiba

$$\ln (V) = 2.3088 \ln (G) - 5.3896$$

Dipterocarpus gracilis

$$\ln (V) = 2.4411 \ln (G) - 5.5880$$

Dipterocarpus costatus

$$\ln (V) = 2.2308 \ln (G) - 4.930172$$

Dipterocarpus turbinatus

$$\ln (V) = 2.12932 \ln (G) - 4.531734$$

Duabanga grandiflora

$$\ln (V) = 2.4987 \ln (G) - 6.2598$$

Mangifera sylvatica

$$\ln (V) = 2.3370 \ln (G) - 5.5028$$

Schima wallichii

$$\ln (V) = 1.6912 \ln (G) - 3.1381$$

Swintonia floribunda

$$\ln (V) - 2.14002 \ln (G) - 4.521853$$

Syzygium grande

$$V = 0.28409 G + 0.013564 G^2 - 9.74139$$

Terminalia bellerica

$$\ln (V) = 2.1338 \ln (G) - 4.9340$$

Tetrameles nudiflora

$$\ln (V) = 2.0291 \ln (G) - 3.9451$$

Mixed Species Group

$$\ln (V) = 2.08627 \ln (G) - 4.45426$$

7. REGRESSIONS FOR TWO-WAY VOLUME TABLES

Two-way volume tables are based on either diameter (D) or girth (G) at breast height and total tree height (H). These tables usually give more reliable and precise volume estimations, though height measurement may be difficult and time consuming in dense forest.

7.1 Metric Two-Way Tables Based on Diameter and Height

The two-way metric regressions are as follows, where V = total volume overbark, excluding branches, in cubic metres, D = diameter at breast height in centimetres and logarithms are to the base e.

Aphanamixis polystachya

$$\ln (V) = 1.9328 \ln (D) + 0.6992 \ln (H) - 8.9863$$

Artocarpus chapalasha

$$\ln (V) = 2.13197 \ln (D) + 0.294608 \ln (H) - 8.66393$$

Bombax ceiba

$$\ln (V) = 1.9419 \ln (D) + 0.5276 \ln (H) - 9.1013$$

Dipterocarpus gracilis

$$\ln (V) = 1.8660 \ln (D) + 0.9648 \ln (H) - 9.4406$$

Dipterocarpus costatus

$$\ln (V) = 1.76514 \ln (D) + 1.00107 \ln (H) - 9.1692675$$

Dipterocarpus turbinatus

$$\ln (V) = 1.64852 \ln (D) + 1.13061 \ln (H) - 9.187185$$

Duabanga grandiflora

$$V = 0.0004129 D^2 + 0.001298 H + 0.0000247 D^2H - 0.5127$$

Mangifera sylvatica

$$\ln (V) = 2.0808 \ln (D) + 0.6926 \ln (H) - 8.9048$$

Schima wallichii

$$V = 0.05978 - 0.00003151 D^2 + 0.01648 H + 0.00002781 D^2H$$

Swintonia floribunda

$$\ln (V) = 1.81484 \ln (D) + 0.827986 \ln (H) - 8.862135955$$

Syzygium grande

$$V = 0.08566 + 0.0002378 D^2 + 0.011944 H + 0.000023649 D^2H$$

Terminalia bellerica

$$\ln (V) = 1.7826 \ln (D) + 0.6257 \ln (H) - 8.3245$$

Trameles nudiflora

$$\ln (V) = 1.85222 \ln (D) + 0.687905 \ln (H) - 8.492536$$

Mixed Species Group

$$\ln (V) = 1.59316 \ln (D) + 0.940025 \ln (H) - 8.3367$$

7.2 Imperial Two-Way Tables Based on Diameter and Height

The two-way imperial regressions are as follows, where V = total volume overbark, excluding branchwood, in cubic feet, D = diameter at breast height in inches and logarithms are to the base e.

Aphanamixis polystachya

$$\ln (V) = 1.9328 \ln (D) + 0.6992 \ln (H) - 4.4511$$

Artocarpus chap asha

$$\ln (V) = 2.13197 \ln (D) + 0.294608 \ln (H) - 3.46242$$

Bombax ceiba

$$\ln (V) = 1.9419 \ln (D) + 0.5276 \ln (H) - 3.7896$$

Dipterocarpus gracilis

$$\ln (V) = 1.8660 \ln (D) + 0.9648 \ln (H) - 5.2833$$

Dipterocarpus costatus

$$\ln (V) = 1.76514 \ln (D) + 1.00107 \ln (H) - 5.1491$$

Dipterocarpus turbinatus

$$\ln (V) = 1.64852 \ln (D) + 1.13061 \ln (H) - 5.43044$$

Duabanga grandiflora

$$V = 0.09407 D^2 + 0.01397 H + 0.001715 D^2H - 18.1030$$

Mangifera sylvatica

$$\ln (V) = 2.0808 \ln (D) + 0.6926 \ln (H) - 4.8201$$

Schima wallichii

$$V = 2.1109 - 0.007178 D^2 + 0.1774 H + 0.001931 D^2H$$

Swintonia floribunda

$$\ln (V) = 1.81484 \ln (D) + 0.827986 \ln (H) - 4.58995$$

Syzygium grande

$$V = 0.0541786 D^2 + 0.128545 (H) + 0.00164205 D^2H - 3.02472$$

Terminalia bellerica

$$\ln (V) = 1.7826 \ln (D) + 0.6257 \ln (H) - 3.8420$$

Tetrameles nudiflora

$$\ln (V) = 1.85222 \ln (D) + 0.687905 \ln (H) - 4.01938$$

Mixed Species Group

$$\ln (V) = 1.59316 \ln (D) + 0.940025 \ln (H) - 4.40427$$

7.3 Imperial Two-Way Tables Based on Girth and Height

The two-way imperial regressions are as follows, where V = total volume overbark, excluding branch volume, in cubic feet, G = girth at breast height in inches and logarithms are to the base e.

Aphanamixis polystachya

$$\ln (V) = 1.9328 \ln (G) + 0.6992 \ln (H) - 6.6636$$

Artocarpus chaplasha

$$\ln (V) = 2.13197 \ln (G) + 0.294608 \ln (H) - 5.9029$$

Bombax ceiba

$$\ln (V) = 1.9419 \ln (G) + 0.5276 \ln (H) - 6.0126$$

Dipterocarpus gracilis

$$\ln (V) = 1.8660 \ln (G) + 0.9648 \ln (H) - 7.4193$$

Dipterocarpus costatus

$$\ln (V) = 1.76514 \ln (G) + 1.00107 \ln (H) - 7.169707$$

Dipterocarpus turbinatus

$$\ln (V) = 1.64852 \ln (G) + 1.13061 \ln (H) - 7.317549$$

Duabanga grandiflora

$$V = 0.009531\ G^2 + 0.01397\ H + 0.0001738\ G^2H - 18.1030$$

Mangifera sylvatica

$$\ln (V) = 2.0808 \ln (G) + 0.6926 \ln (H) - 7.2021$$

Schima wallichii

$$V = 2.1109 - 0.0007273\ G^2 + 0.1774\ H + 0.0001957\ G^2H$$

Swintonia floribunda

$$\ln (V) = 1.81484 \ln (G) + 0.827986 \ln (H) - 6.66745$$

Syzygium grande

$$V = 0.005489\ G^2 + 0.128545\ H + 0.000166375\ G^2H - 3.02472$$

Terminalia bellerica

$$\ln (V) = 1.7826 \ln (G) + 0.6257 \ln (H) - 5.8826$$

Tetrameles nudiflora

$$\ln (V) = 1.85222 \ln (G) + 0.687905 \ln (H) - 6.13967$$

Mixed Species Group

$$\ln (V) = 1.59316 \ln (G) + 0.940025 \ln (H) - 6.2280065$$

8. CONVERSION FACTORS

Conversion factors (F) were computed to be applied to total volume overbark for deriving total volume underbark, volume to various top-end diameter limits and branchwood volume, where applicable. All factors are predicted from diameter (D). Underbark volume and volume to various merchantable limits is computed by multiplying total volume overbark by the factor. The branch-

wood volume is obtained the same way but is then added to total volume to obtain total volume including branches.

8.1 Metric Conversion Factors

Aphanamixis polystachya

Volume underbark

$F = 0.655 + 0.007937\ D - 0.00005847\ D^2$ to a diameter of 68 cm then constant at F = 0.924

Volume to 5 cm top-diameter limit

F = 1.000 constant

Volume to 10 cm top-diameter limit

$F = 1.0001 - 24.8498\ D^{-2.4467}$

Volume to 15 cm top-diameter limit

$F = 1/(1.0010 + 0.3036\ e^{-0.07516\ D})$

Volume to 20 cm top-diameter limit

$F = 0.9945 - 1.9156\ e^{-0.09406\ D})$

Branchwood volume

$F = 0.07395\ (1.0 - e^{-0.18846\ D})^{4054.6}$

(based on only 13 trees)

Artocarpus chaplasha

Volume underbark

$F = 0.9849397 - 3.86515\ D^{-0.9334469}$

Volume to 5 cm top-diameter limit

F = 1.000 constant

Volume to 10 cm top-diameter limit

F = 1.000 constant

Volume to 15 cm top-diameter limit

$F = 1.002116 - 0.1238702\ e^{-0.03725\ D}$

Volume to 20 cm top-diameter limit

$F = 1/(1.000084 + 0.6980312\ e^{-0.0544578741\ D})$

Branchwood volume

$F = 1/(9.179182 + 1940.113\ e^{-0.0965741\ D})$

Bombax ceiba

Volume underbark

$F = 0.9440 - 7.1054\ D^{-1.1609}$

Volume to 5 cm top-diameter limit

F = 1.000 constant

Volume to 10 cm top-diameter limit

$F = 1.000$ constant

Volume to 15 cm top-diameter limit

$F = 0.9997 - 203.943\ D^{-2.5987}$

Volume to 20 cm top-diameter limit

$F = 0.9984 - 89452.6\ D^{-3.865}$

Branchwood volume

Not computed, only 8 trees had branchwood volume

Dipterocarpus gracilis

Volume underbark

$F = 0.8493 + 0.001308\ D - 0.000007031\ D^2$ to a diameter of 92 cm then constant at 0.910

Volume to 5 cm top-diameter limit

$F = 1.000$ constant

Volume to 10 cm top-diameter limit

$F = 1.000 - 0.03310\ e^{-0.05676\ D}$

Volume to 15 cm top-diameter limit

$F = 0.9998 - 0.1636\ e^{-0.05594\ D}$

Volume to 20 cm top-diameter limit

$F = 0.9975 - 0.1477\ e^{-0.06433\ D}$

Branchwood volume

Not computed, regression difficult to fit

Factors for various top-diameter limits should be used with caution since even the 20 cm limit factor seems to be near 100 percent.

Dipterocarpus costatus

Volume underbark

$F = 0.9115433 - 0.2542682\ e^{-0.03882776\ D}$

Volume to 5 cm top-diameter limit

$F = 1.00$ constant

Volume to 10 cm top-diameter limit

$F = 1.00$ constant

Volume to 15 cm top-diameter limit

$F = 0.9997494 - 0.2360612\ e^{-0.0651332\ D}$

Volume to 20 cm top-diameter limit

$F = 0.9978021 - 1.001596\ e^{-0.0737476\ D}$

Branchwood volume

$F = 0.0005324126\ D - 0.0000034916 D^2 - 0.01252606$

Dipterocarpus turbinatus

Volume underbark

$F = 0.8993818 - 0.000497265\ D + 0.000006729\ D^2$

Volume to 5 cm top-diameter limit

$F = 1.00$ constant

Volume to 10 cm top-diameter limit

$F = 1/(0.9996527 + 0.1012232\ e^{-0.0644742\ D})$

Volume to 15 cm top-diameter limit

$F = 0.9987559 - 0.3612235\ e^{-0.0693777\ D})$

Volume to 20 cm top-diameter limit

$F = 1.000227 - 1609.242452\ D^{-2.747173}$

Branchwood volume

$F = 0.000190656\ D + 0.000004132\ D^2 - 0.005090909$

Duabanga grandiflora

Volume underbark

$F = 0.8116 + 0.001650\ D - 0.000004651\ D^2$ to a diameter of 178 cm then constant at $F = 0.958$

Volume to 5 cm top-diameter limit

$F = 1.00$ constant

Volume to 10 cm top-diameter limit

$F = 1.00$ constant

Volume to 15 cm top-diameter limit

$F = 1.00$ constant

Volume to 20 cm top-diameter limit

$F = 0.9986 + 0.9808\ e^{-0.07870\ D}$

Branchwood volume

$F = 1/(5.2419 + 416737.9\ e^{-0.2012\ D})$

Mangifera sylvatica

Volume underbark

$F = 0.9556 - 16.5862\ D^{-1.4465}$

Volume to 5 cm top-diameter limit

$F = 1.00$ constant

Volume to 10 cm top-diameter limit

$F = 1.0008 - 0.01859\ e^{-0.03721\ D}$

Volume to 15 cm top-diameter limit

$F = 1.0037 - 0.08292\ e^{-0.03518\ D}$

Volume to 20 cm top-diameter limit

$$F = 0.9960 - 1.9569\ e^{-0.09610\ D}$$

Branchwood volume

$$F = 0.2134 - 0.008965\ D + 0.00009556\ D^2$$

(since this is a quadratic, extrapolation much beyond the range of the data would be unwise)

Schima wallichii

Volume underbark

$$F = 1/(1.1935 + 0.3931\ e^{-0.04512\ D})$$

Volume to 5 cm top-diameter limit

$$F = 1.00 \text{ constant}$$

Volume to 10 cm top-diameter limit

$$F = 1.0005 - 0.02896\ e^{-0.04055\ D}$$

Volume to 15 cm top-diameter limit

$$F = 1.0015 - 0.1408\ e^{-0.04031\ D}$$

Volume to 20 cm top-diameter limit

$$F = 1.0050 - 0.4304\ e^{-0.03969\ D}$$

Branchwood volume

$$F = 0.09787 - 3.0658\ e^{-0.1131\ D}$$

Swintonia floribunda

Volume underbark

$F = 0.8244989 + 0.0022889\ D - 0.000010447\ D^2$ to a diameter of 109 cm then constant at $F = 0.958$

Volume to 5 cm top-diameter limit

$$F = 1.00 \text{ constant}$$

Volume to 10 cm top-diameter limit

$$F = 0.9997364 - 2634.87228\ D^{-0.363656}$$

Volume to 15 cm top-diameter limit

$$F = 1.000685 - 195.6021833\ D^{-2.509712}$$

Volume to 20 cm top-diameter limit

$$F = 1.004114 - 216.84365\ D^{-2.226021}$$

Branchwood volume

$$F = 0.2927091\ (1 - e^{-0.0287884\ D})^{12.07019}$$

Syzygium grande

Volume underbark

$$F = 1/(1.07405 + 0.2995727\ e^{-0.035858\ D})$$

Volume to 5 cm top-diameter limit

$F = 1.00$ constant

Volume to 10 cm top-diameter limit

$F = 1.00$ constant

Volume to 15 cm top-diameter limit

$F = 1/(1.000207 + 0.287965\ e^{-0.063979\ D})$

Volume to 20 cm top-diameter limit

$F = 1/(1.003997 + 1.566205\ e^{-0.082163\ D})$

Branchwood volume

$F = 0.004358\ D - 0.000032\ D^2 - 0.09923815$ (If F is negative set F=0)

Terminalia bellerica

Volume underbark

$F = D/(0.1146 + 0.4594\ D - 0.0003280\ D^2)$

(This function is almost linear and should not be extrapolated much beyond the range of data)

Volume to 5 cm top-diameter limit

$F = 1.00$ constant

Volume to 10 cm top-diameter limit

$F = 1.00$ constant

Volume to 15 cm top-diameter limit

$F = 1.0009 - 0.1212\ e^{-0.04406\ D}$

Volume to 20 cm top-diameter limit

$F = 0.9998 - 0.5266\ e^{-0.05224\ D}$

Branchwood volume

$F = 0.000002117\ D^{2.4536}$

Tetrameles nudiflora

Volume underbark

$F = 0.8316 + 0.0021653543\ D - 0.0000121094\ D^2$

up to a diameter of 89 cm then constant at $F = 0.928$

Volume to 5 cm top-diameter limit

$F = 1.00$ constant

Volume to 10 cm top-diameter limit

$F = 1.00$ constant

Volume to 15 cm top-diameter limit

$F = 1/(0.9993933 + 0.1137328\ e^{-0.04719488\ D})$

Volume to 20 cm top-diameter limit

$$F = 1/(0.9985865 + 0.3711621\ e^{-0.0478605\ D})$$

Branchwood volume

$$F = 0.0000124585\ D^{3.444204}$$

up to a diameter of 100 cm then use constant F = 0.166

Mixed Species Group

Volume underbark

$$F = 0.840082 + 0.00219243\ D - 0.000014044\ D^2$$ (upto a maximum diameter of 80 cm)

Volume to 5 cm top-diameter limit

F = 1.00 constant

Volume to 10 cm top-diameter limit

$$F = 0.9899 + 0.0001877\ D - 0.000000871\ D^2$$

up to a maximum diameter of 110 cm

Volume to 15 cm top-diameter limit

$$F = 0.94976 + 0.001001\ D - 0.000005023\ D^2$$

to a maximum diameter of 100 cm

Volume to 20 cm top-diameter limit

$$F = 0.8438 + 0.0031035\ D - 0.0000155311\ D^2$$

to a maximum diameter of 100 cm

Branchwood volume

$$F = D/(17.6668\ D - 0.1012375\ D^2 - 241.9453)$$

8.2 Imperial Conversion Factors

Aphanamixis polystachya

Volume underbark

$$F = 0.655 + 0.02016\ D - 0.0003772\ D^2$$

up to a diameter of 26 inches after which use F = 0.924 constant

Volume to 2 inch top-diameter limit

F = 1.00 constant

Volume to 4 inch top-diameter limit

$$F = 1.0001 - 2.5399\ D^{-2.4467}$$

Volume to 6 inch top-diameter limit

$$F = 1/(1.0010 + 0.3036\ e^{-0.1909\ D})$$

Volume to 8 inch top-diameter limit

$$F = 0.9945 - 1.9156\ e^{-0.2389\ D}$$

Branchwood volume

$$F = 0.07395\ (1.0 - e^{-0.4787\ D})^{4054.6}$$

(based on only 13 trees)

Artocarpus chaplasha

Volume underbark

$$F = 0.9849397 - 1.619109\ D^{-0.9334469}$$

Volume to 2 inch top-diameter limit

$F = 1.00$ constant

Volume to 4 inch top-diameter limit

$F = 1.00$ constant

Volume to 6 inch top-diameter limit

$$F = 1.002116 - 0.1238702\ e^{-0.09461513\ D}$$

Volume to 8 inch top-diameter limit

$$F = 1/(1.000084 + 0.6980312\ e^{-0.138323\ D})$$

Branch volume

$$F = 1/(9.179182 + 1546.113\ e^{-0.2452982\ D})$$

Bombax ceiba

Volume underbark

$$F = 0.9440 - 2.4078\ D^{-1.1609}$$

Volume to 2 inch top-diameter limit

$F = 1.00$ constant

Volume to 4 inch top-diameter limit

$F = 1.00$ constant

Volume to 6 inch top-diameter limit

$$F = 0.9997 - 18.0912\ D^{-2.5987}$$

Volume to 8 inch top-diameter limit

$$F = 0.9984 - 2437.31\ D^{-3.865}$$

Branchwood volume

Not computed, only 8 trees had branchwood volume

Dipterocarpus gracilis

Volume underbark

$$F = 0.8493 + 0.003322\ D - 0.00004536\ D^2$$

up to a diameter of 36 inches then use constant $F = 0.910$

Volume to 2 inch top-diameter limit

$F = 1.00$ constant

Volume to 4 inch top-diameter limit

$$F = 1.000 - 0.03310\ e^{-0.1429\ D}$$

Volume to 6 inch top-diameter limit

$$F = 0.9998 - 0.1636\ e^{-0.1421\ D}$$

Volume to 8 inch top-diameter limit

$$F = 0.9975 - 0.1477\ e^{-0.1634\ D}$$

Branchwood volume

Not computed. Use factors to various top diameter limits with caution since they all approach 100 percent of total volume

Dipterocarpus costatus

Volume underbark

$$F = 0.9115433 - 0.2542682\ e^{-0.09862251\ D}$$

Volume to 2 inch top-diameter limit

$$F = 1.00 \text{ constant}$$

Volume to 4 inch top-diameter limit

$$F = 1.00 \text{ constant}$$

Volume to 6 inch top-diameter limit

$$F = 0.9997494 - 0.2360612\ e^{-0.1654383\ D}$$

Volume to 8 inch top-diameter limit

$$F = 0.9978021 - 1.001596\ e^{-0.1873189\ D}$$

Branchwood volume

$$F = 0.00135328\ D - 0.00002252644\ D^2 - 0.01252606$$

Dipterocarpus turbinatus

Volume underbark

$$F = 0.8993818 - 0.001263054\ D + 0.00004341492\ D^2$$

Volume to 2 inch top-diameter limit

$$F = 1.00 \text{ constant}$$

Volume to 4 inch top-diameter limit

$$F = 1/(0.9996527 + 0.1012232\ e^{-0.163746\ D})$$

Volume to 6 inch top-diameter limit

$$F = 0.9987559 - 0.3612235\ e^{-0.1762194\ D}$$

Volume to 8 inch top-diameter limit

$$F = 1.000227 - 124.3006D^{-2.747173}$$

Branchwood volume

$$F = 0.0004842657\ D + 0.0000266608\ D^2 - 0.005090909$$

Duabanga grandiflora

Volume underbark

$$F = 0.8116 + 0.004192\ D - 0.00003008\ D^2$$

up to a diameter of 70 inches then use constant F = 0.958

Volume to 2 inch top-diameter limit

F = 1.00 constant

Volume to 4 inch top-diameter limit

F = 1.00 constant

Volume to 6 inch top-diameter limit

F = 1.00 constant

Volume to 8 inch top-diameter limit

$$F = 0.9986 + 0.9808\ e^{-0.1999\ D}$$

Branchwood volume

$$F = 1/(5.2419 + 416737.9\ e^{-0.5111\ D})$$

Mangifera sylvatica

Volume underbark

$$= 0.9556 - 4.3068\ D^{-1.4465}$$

Volume to 2 inch top-diameter limit

F = 1.00 constant

Volume to 4 inch top-diameter limit

$$F = 1.0008 - 0.01859\ e^{-0.09452\ D}$$

Volume to 6 inch top-diameter limit

$$F = 1.0037 - 0.08292\ e^{-0.08936\ D}$$

Volume to 8 inch top-diameter limit

$$F = 0.9960 - 1.9569\ e^{-0.2441\ D}$$

Branchwood volume

$$F = 0.2134 - 0.02277\ D + 0.0006165\ D^2$$

This is a quadratic so extrapolation much outside the range of data is unwise

Schima wallichii

Volume underbark

$$F = 1/(1.1935 + 0.3931\ e^{-0.1146D})$$

Volume to 2 inch top-diameter limit

F = 1.00 constant

Volume to 4 inch top-diameter limit

$$F = 1.0005 - 0.02896\ e^{-0.1030\ D}$$

Volume to 6 inch top-diameter limit

$$F = 1.0015 - 0.1408\, e^{-0.1024\, D}$$

Volume to 8 inch top-diameter limit

$$F = 1.0050 - 0.4304\, e^{-0.1008\, D}$$

Branchwood volume

$$F = 0.09787 - 3.0658\, e^{-0.2872\, D}$$

Swintonia floribunda

Volume underbark

$$F = 0.8244989 + 0.005813686\, D - 0.00006740135\, D^2$$

up to a diameter of 43 inches then use constant F = 0.958

Volume to 2 inch top-diameter limit

F = 1.00 constant

Volume to 4 inch top-diameter limit

$$F = 0.9997364 - 88.82922\, D^{-3.636564}$$

Volume to 6 inch top-diameter limit

$$F = 1.000685 - 18.85201\, D^{-2.509712}$$

Volume to 8 inch top-diameter limit

$$F = 1.004114 - 27.14288\, D^{-2.226021}$$

Branchwood volume

$$F = 0.2927091\, (1 - e^{-0.07312252\, D})^{12.07019}$$

Syzygium grande

Volume underbark

$$F = 1/(1.07405 + 0.2995727\, e^{-0.09108\, D})$$

Volume to 2 inch top-diameter limit

F = 1.00 constant

Volume to 4 inch top-diameter limit

F = 1.00 constant

Volume to 6 inch top-diameter limit

$$F = 1/(1.000207 + 0.287965\, e^{-0.1625071\, D})$$

Volume to 8 inch top-diameter limit

$$F = 1/(1.003997 + 1.566205\, e^{-0.2086952\, D})$$

Branchwood volume

$$F = 0.01106844\, D - 0.00020955\, D^2 - 0.09923815$$

Terminalia bellerica

Volume underbark

$$F = D/(0.1146 + 1.1669\ D - 0.002116\ D^2)$$

Volume to 2 inch top-diameter limit

$F = 1.00$ constant

Volume to 4 inch top-diameter limit

$F = 1.00$ constant

Volume to 6 inch top-diameter limit

$$F = 1.0009 - 0.1212\ e^{-0.119D}$$

Volume to 8 inch top-diameter limit

$$F = 0.9998 - 0.5266\ e^{-0.1327\ D}$$

Branchwood volume

$$F = 0.00002085\ D^{-2.4536}$$

Tetrameles nudiflora

Volume underbark

$$F = 0.8316 + 0.0055\ D - 0.000078125\ D^2$$

upto a diameter of 35 inches then use constant $F = 0.928$

Volume to 2 inch top-diameter limit

$F = 1.00$ constant

Volume to 4 inch top-diameter limit

$F = 1.00$ constant

Volume to 6 inch top-diameter limit

$$F = 1/(0.9993933 + 0.1137328\ e^{-0.119875\ D})$$

Volume to 8 inch top-diameter limit

$$F = 1/(0.9985865 + 0.3711621\ e^{-0.1215657\ D})$$

Branchwood volume

$$F = 0.0000005025934\ D^{3.444204}$$

up to a diameter of 40 inches then use constant $F = 0.166$

Mixed Species Group

Volume underbark

$$F = 0.840082 + 0.00556878\ D - 0.000090608\ D^2$$

Volume to 2 inch top diameter limit

$F = 1.00$ constant

Volume to 4 inch top-diameter limit

$$F = 0.9899 + 0.0004769\ D - 0.0000056217\ D^2$$

to a maximum diameter of 43 inches

Volume to 6 inch top-diameter limit

$F = 0.94976 + 0.002542\ D - 0.00003241\ D^2$

to a maximum diameter of 39 inches

Volume to 8 inch top-diameter limit

$F = 0.8438 + 0.007883\ D - 0.0001002\ D^2$

to a maximum diameter of 39 inches

Branchwood volume

$F = D/(44.87374\ D - 0.6531\ D^2 - 241.9453)$

9. TWO-WAY METRIC VOLUME TABLES BASED ON GIRTH AND HEIGHT

Because of the lack of girth tapes which read directly in diameter ("diameter tapes") in Bangladesh, usually it is girth at breast height (GBH) which is measured in the field.

For convenience, under such circumstances, two-way metric volume regressions based on girth (G) and total tree height (H) are given below and corresponding tables have been appended.

Aphanamixis polystachya

$\ln (V) = 1.9328 \ln (G) + 0.6992 \ln (H) - 11.198834$

Artocarpus chaplasha

$\ln (V) = 2.13197 \ln (G) + 0.294608 \ln (H) - 11.10446$

Bombax ceiba

$\ln (V) = 1.9419 \ln (G) + 0.5276 \ln (H) - 11.324258$

Dipterocarpus gracilus

$\ln (V) = 1.866 \ln (G) + 1.09648 \ln (H) - 11.576666$

Dipterocarpus costatus

$\ln (V) = 1.76514 \ln (G) + 1.00107 \ln (H) - 11.189884$

Dipterocarpus turbinatus

$\ln (V) = 1.64852 \ln (G) + 1.13061 \ln (H) - 11.0689$

Duabanga grandiflora

$V = 0.0000418355\ G^2 + 0.001298\ H + 0.00000250263\ G^2H - 0.5127$

Mangifera sylvatica

$\ln (V) = 2.0808 \ln (G) + 0.6926 \ln (H) - 11.28676$

Swintonia floribunda

$\ln (V) = 1.81484 \ln (G) + 0.827986 \ln (H) - 10.939639$

Schima wallichii

$\ln (V) = 0.05978 - 0.00000319161\ G^2 + 0.01648\ H + 0.00000281672\ G^2\ H$

Syzygium grande

$$\ln (V) = 0.08566 + 0.0000240941\ G^2 + 0.011944\ H + 0.00000239117\ G^2H$$

Terminalia bellerica

$$\ln (V) = 1.7826 \ln (G) + 0.6257 \ln (H) - 10.365104$$

Tetrameles nudiflora

$$\ln (V) = 1.85222 \ln (G) + 0.687905 \ln (H) - 10.61283$$

Mixed Species Group

$$\ln (V) = 1.59316 \ln (G) + 0.940025 \ln (H) - 12.436568$$

Logarithms are to the base e.

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