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VOLUME TABLES FOR SISSOO, KOROI, AKASHMONI, BABLA, MAHOGANY AND RAIN TREE PLANTED ON EMBANKMENTS AND ROAD SIDES IN THE COASTAL AREAS OF BANGLADESH

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Volume Tables for Sissoo, Koroi, Akashmoni, Babla, Mahogany and Rain Tree Planted on Embankments and Road Sides in the Coastal Areas of Bangladesh

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Introduction

Cyclones and tidal bores along the coastal areas of Bangladesh cause loss of lives and damage to properties almost every year. The damage is comparatively less in the areas where there are tree covers. The Forest Department has, therefore, undertaken a project titled "The Coastal Greenbelt Project" to raise trees along the whole coastal areas to save the lives and properties of the area. Under the project, different species like sissoo (*Dalbergia sissoo*), koroi (*Albizia* sp.), akashmoni (*Acacia auriculiformis*), babla (*A. nilotica*), mahogany (*Swietenia macrophyla*) and rain tree (*Samanea saman*) were planted on the embankments and roadsides of the coastal areas. However, there is no volume tables for the species growing in these areas, and growth rates are not known. But volume tables and estimation of growth rates are necessary for their economic evaluation and future management. Therefore, Bangladesh Forest Research Institute with the financial support of the Coastal Greenbelt Project undertook the present study to fulfill the demand. The present publication presents the volume tables for the above mentioned species planted on the embankments and roadsides in the coastal areas of Bangladesh.

Materials and methods

The plantations raised under the Coastal Greenbelt Project are still too young to forecast the future growth and yield and to prepare volume tables. But there are older plantations of these species on the embankments and roadsides in the area raised under the "Community Forestry Project" and "Thana Banayana and Nursery Unnayan Project". So, we collected necessary data from those plantations along with new plantations raised during this project period.

We selected representative trees for each species and girth at breast height (gbh) classes at random. First, we measured the gbh and total heights of the standing trees. Then we felled the trees leaving 6 to 10 cm stump, and we measured the girths of felled tree at one meter intervals. We removed a small sample of bark from each point of girth measurements and measured the bark thickness to estimate the underbark girth. It was not possible to fell all the trees due to unavoidable circumstances. Therefore, we also collected data from standing trees. For the selected standing trees we hold a bamboo marked at one meter intervals. Then we measured the girths at one meter intervals and bark thickness by climbing on the trees with ladders. We collected data from a total of 1065 trees for the preparation of volume tables of the six important species. We ranked the number of stems measured for growth estimation in descending order. We selected the six species which had maximum number of stems as the important species. The gbh-height class distribution of the sample trees are given in Table 1.

Compilation of data : We computed volumes of all the sections except top section by using the mean cross-sectional areas of the two ends of each section (Smallian formula). We assumed the top section cone and computed volume as one-third of the cylindrical volume of the portion. We considered the top end diameter measurement for each tree as the base diameter of the cone. We ignored the volume of the cone for estimation of underbark tree volume. We estimated the individual tree volume by summing up the volume of each section of a tree. We used regression techniques to relate these individual tree volumes (V) to gbh (G) and total height (H) using various functions and transformations as required in the models.

We used the following original and trasformed variables to select the best suited regression models :

Dependent variables : V, Log (V), V/G^2 and V/G^2H

Independent variables : G, G^2, H^2, G^2H, GH, Log(G), Log(H), $1/G^2$, $1/G$, $1/G^2H$, H/G^2, H/G.

The above mentioned dependent variables were regressed with the independent variables.

Computation of volume function : We did multiple regression analyses to select the best suited equations. We tried the following 15 models to select the equation of best fit with different variables as follows :

1. $V = a + bG$
2. $V = a + bG + cG^2$
3. $V = a + bG^2$
4. $V = a + bG^2H$
5. $V = a + bG^2 + cH + dG^2H$
6. $V = a + bG^2 + cGH + dG^2H$
7. $In (V) = a + b \ln(G)$
8. $In (V) = a + b \ln(G) + c \ln(H)$
9. $V/G^2 = a + b/G^2 + c/G$
10. $V/G^2 = a + b/G$
11. $V/G^2H = a + b/G^2H$
12. $V/G^2H = a + b/G^2 + cH/G^2 + GH$
13. $V/G^2h = a + b/G^2H + c/H + d/G^2$
14. $V/G^2 = a + b/G^2 + cH/G + dH$
15. $V/G^2H = a + b/G^2H + c/H + d/G$

where, V = Total volume overbark in cubic meters,
G = Girth at breast height in cm,
H = Total height in meters
a = Regression constant, b, c and dregression coefficients. The logarithmic functions are to t basee.

We have chosen the equations of the fit based on the highest multiple coefficie determination, significant F-ratio and lo residual mean square. We have selected m for estimation of the total volume overbarl conversion factors to estimate under volumes to a top end diameters of app mately 5, 10, 15 and 20 cm overbark.

Validation test procedure : The selected models for all the six species tested with a set of independent data trees for each species collected and compil the same procedure. The actual volum these trees were collectively compared wit corresponding volumes predicted by selected models. The independent test validation criteria were :

(1) The paired t-test :

$t = |\Sigma(A-E)/n|$ (Dawkins 1975)

With n-1 degrees of freedom at 0.05 level.

(2) Chi-square test :

$\chi^2 = \Sigma(A-E)^2/E$

With n-1 degrees of freedom at 0.05 level

(3) Percent Absolute Deviation (% AD)

$\% AD = |\Sigma(A-E)|/\Sigma A x100$

where, A = Actual volume.
E = Estimated volume.

Results and discussions

We selected volume equations for mation of total volume overbark. Conve factors were also selected to estimate under volume to top end diameter of approxim 5, 10, 15 and 20 cm overbark. The sel volume equations and conversion factor given in Table 2.

Results of validation : The values of the test statistics are summarized below.

Species	t	t	% AD	% AD	Chi-square	Chi-square
	Model-1	Model-2	Model-1	Model-2	Model-1	Model-2
Akashmoni	0.1205	0.0075	6.4982	0.4021	0.3099	0.2368
Babla	0.0564	0.0068	2.6340	0.3176	0.6935	0.4235
Koroi	0.0505	0.0271	0.8575	0.4600	2.5710	1.4578
Mahogany	0.1179	0.0550	3.6146	1.6871	1.7617	1.8704
Rain tree	0.5312	0.2912	8.3017	4.5514	2.9789	1.7518
Sissoo	1.1374	1.3255	4.4791	7.8109	3.4393	2.4690

The calculated paired t and chi-square values are less than the tabular values ($t_{0.05,29}$=2.045, $\chi^2_{0.05,29}$=42.6). The absolute deviation percent (% AD) is also less than 10%. Hence, statistically there is no significant difference among the calculated and estimated volumes. Therefore, the selected models can safely be used for estimation of the volumes of all the six species planted on embankments and along roadsides in the coastal areas of Bangladesh.

GBH-Basal Girth (BG) Relationships : Sometimes the trees are removed without recording the girth at breast height (GBH) and total height. Then, it is not possible to estimate the volumes of the removed trees. But it is necessary to have the estimates of volumes of the removed trees to have an account of the harvest from the plantations. The stump girths can be measured while the stumps are still there after removal of the trees. Therefore, GBH and stump girth (basal girth at about 15 cm above ground level) were established to estimate the gbh of the removed trees first followed by the estimation of the volume of the removed trees. The GBH and stump girth (BG) of the six species are given below :

Koroi	GBH = - 0.8028 + 0.79396*BG	R^2 = 0.955
Mahogany	GBH = - 3.213S7 + 0.80453*BG	R^2 = 0.972
Raintree	GBH = - 1.39177 + 0.8114*BG	R^2 = 0.980
Sissoo	GBH = - 0.70 + 0.78141*BG	R^2 = 0.976
Akashmoni	GBH = - 3.78893 + 0.836316*BG	R^2 = 0.976
Babla	GBH = - 2.04655 + 0.88228*BG	R^2 = 0.984

We estimated volume for ready use and are presented in Tables 3-15. The volume equations and the Tables are applicable for sissoo (*Dalbergia sissioo*), koroi (*Albizia* sp.), akashmoni (*Acacia auriculiformis*), babla (*A. nilotica*) mahogany (*Swietenia macrophyla*) and rain tree (*Samanea saman*) planted on the embankments and roadsides of the coastal districts of Bagerhat, Pirojpur, Barguna, Patuakhali, Barisal, Bhola, Laxmipur, Noakhali, Feni, Chittagong and Cox's Bazar.

Confidence limit : These volume tables should not be used to estimate volumes of individual trees in a stand. These tables may be used for the mean tree of a stand which may be multiplied by the number of stems to get the total volume of the stand. Estimation of volumes for the trees outside the height and gbh ranges shown in the stand table should only be done with caution.

How to use volume tables and conversion factors

Take the measurements of girth(s) at breast height and total height(s) of the desired tree(s) first to have an estimate of the volume. Then, choose the corresponding total volume overbark from the volume tables or estimate the total overbark volume by using the volume equation of the selected species and convert this total overbark volume to underbark volume for desired top end diameter limit. For example, let the girth and height of the selected mahogany tree are 66 cm and 14 m respectively. Then, the total volume for this mahogany tree is:

$$\log(V) = -12.4361459 + 1.8661846 \log(G) + 1.2282822 \log(H)$$
$$= -12.4361459 + 1.8661846 \log(66) + 1.2282822 \log(14)$$
$$= -1.37597$$
$$V = \text{Exp.} (\log(V) = 0.2526$$

Multiply this total volume overbark with the corresponding conversion factor to estimate the underbark volume to different top end diameter limits. For examples, underbark volume (Vub) will be estimated as given below :

$$Vub = V \times Fub = 0.2526 \times 0.9265$$
$$= 0.234 \text{ cum.}$$

Similarly, underbark volume up to top end diameters of 5 cm (girth = 15.7 cm) and 10 cm (girth = 31.4 cm) may be estimated as given below :

$$V5 = V \times F5 = 0.2528 \times 0.9061$$
$$= 0.2289 \text{ cu. m.}$$

$$V10 = V \times F10 = 0.2526 \times 0.6094$$
$$= 0.1539 \text{ cu. m.}$$

If the measured gbh and total height coincides with the tabular gbh and total height then the tabular values may only be used directly. Otherwise, the volumes and conversion factors should be estimated first by using the respective equations followed by estimation of desired volume as given above. The one-way volume tables (GBH-volume tables and equations) may similarly be used.

References

Cox, F. 1994. Volume functions for plantation species and elements for growth. Document No. 2. FAO, Rome. 60 pp.

Dawkins, H. C. 1975. *Statforms*. Department of Forestry, University of Oxford. 5 pp.

Table 1. Grith at breast height and total height class distribution of sample trees measured for estimation of volume for **SISSOO, MAHOGANY, KOROI, AKASHMONI, BABLA AND RAIN TREE** planted on the roadsides and embankments in the coastal areas of Bangladesh.

Species	GBH (cm)	Height class in meters									
		5	7	9	11	13	15	17	19	21	Total
Akashmoni	25	15	2								17
	35	7	11								18
	45		10	7	6	2					25
	55		4	4	8						16
	65			4	5	2					11
	75				4	1	1				6
	85			1	1	6	1				9
	95				2	4	1		1		8
	105					2	1				3
	115					5	1	1			7
	125					1	3				4
	Total	22	27	16	26	23	8	1	1		124
Koroi	25	1									1
	35	5	7	1							13
	45	1	7	4							12
	55		6	2	1						9
	65		4	6	9	1					20
	75		1		6	4	1	2			14
	85				10	4	2				16
	95			1	3	2	5	2			13
	105					5	4	2	1		12
	115					8	11	1	3		23
	125				1	4	6	2		1	14
	135					6	4				10
	145					2	6				8
	155						4	1	1	1	7
	165							3	1	2	6
	Total	7	25	14	30	36	43	13	6	4	178
Mahogany	25	18	17								35
	35	6	18	8							32
	45	1	4	13							18
	55	1	6	9	5	3					24
	65			5	5	1					11
	75			4	8	2	2				16
	85			3	7	14	5				29
	95			3	6	3					12
	105			1	2	4	10				17
	115					1	7	4			12
	125					1	8	2			11
	135				1	5	3				9
	145				1	6	4	1			12
	155					1	3				4
	165					2	1				3
	Total	26	45	46	35	43	43	7			245

Table 1. Continued.

Species	GBH (cm)	Height class in meters									
		5	7	9	11	13	15	17	19	21	Total
Sissoo	25	2	3	1	1						7
	35	5	9	5	2						21
	45		5	11	6	3	1				26
	55				9	8	7				24
	65		1	6	8	7	8	1			31
	75			1	5	7	11	2			26
	85			1	1		12	4			18
	95					2	5	4	2		13
	105					2	4	2	2		10
	115					2	3		1	2	8
	125					3	2	4	3		12
	135						1	1	1		3
	145						1	1	1		3
	Total	7	18	25	32	34	55	19	10	2	202
Babla	25	1									1
	35	3	8	8	1						20
	45			17	3						20
	55	1	2	5	10						18
	65		3	3	7	1					14
	75				4	7	2				13
	85			1	5	4	1				11
	95			1	6	2					9
	105			3	2	1	1				7
	115				6	7		2			15
	Total	5	13	38	44	22	4	2			128
Rain tree	25	10	1	1							11
	35	7	1	2							10
	45	2	7	5	1						15
	55	3	7	2	2	3					17
	65		2	3	3	3	1				12
	75			4	5	2	1				12
	85		1		5	4	1				11
	95			2	6	3					11
	105			3	3	4	2				12
	115			1	3	6					10
	125				1	6	3	1			11
	135				3	3	5	1			12
	145				1	7	1				9
	155				3	1	6	1			11
	165						1	1			2
	175					2	1				3
	185					2	3				5
	195					4					4
	205				1	5	4				10
	Total	22	18	23	37	55	29	4			188

Table 2. Volume and converion factor models for estimation of volume up to different to send diameters for **SISSOO, MAHOGANY, KOROI, AKASHMONI, BABLA AND RAIN TREE** planted on the roadsides and embankments in the coastal areas of Bangladesh.

Species	Volume/conversion equations	R^2	No. of observations
Akashmoni	log(V) = -11.839665 + 2.404568*log (G)	0.973	124
	log(V) = -11.506528+1.973377*log(G)+0.623823*log(H)	0.979	124
	Fub=G/(10.14316785+0.887876*G+0.0007408*G^2)	0.991	124
	F5=G/(14.1548988+0.93206806*G+0.00061086*G^2)	0.983	124
	F10= -0.2080896+0.02051161*G-0.00009592*G^2 0.8869 is constant from gbh 114 cm	0.814	108
	F15=-0.75195615+0.02602414*G-0.00010886*G^2 0.8034 is constant from gbh 120 cm	0.857	83
	F20=-1.3170613+0.0271059*G-0.0000902*G^2	0.856	51
Mahogany	log(V)= -12.52620808+2.5653795*log(G)	0.942	245
	log(V)= -12.4361459+1.8661846*log(G)+1.2282822*log(H)	0.960	245
	Fub= G/(12.2255598+0.834757*G+0.0008996*G^2) 0.9574 is contant from gbh 117 cm	0.996	245
	F5= G/(11.1197969+0.8596949*G+0.001144*G^2) constant after 100 cm gbh (0.9214)	0.980	245
	F10= -0.2221803+0.0170416*G-0.0000673*G^2	0.804	222
	F15= -0.4795166+0.0161686*G-0.0000527*G^2	0.775	177
	F20= -0.5048475+0.0126964*G-0.0000316*G^2	0.672	138
Koroi	log(V)= -12.8715358+2.6994968*log(G)	0.929	178
	log(V)= -12.4+1.7131*log(G)+1.58245*log(H)	0.967	178
	Fub= G/(8.2005596+0.9405175*G+0.0003273*G^2)	0.999	178
	F5= G/(14.7539854+0.9554005*G+0.0005282*G^2)	0.991	178
	F10= 1.0865688-28.5099263/G	0.844	173
	F15= 1.1510961-49.8337744/G	0.810	152
	F20= -0.9534501+0.0198877*G-0.0000573*G^2	0.831	142
Sissoo	log(V)= -12.427775+2.6056676*log(G)	0.902	202
	log(V) = -12.5189939+1.9800535*log(G)+1.0775148*log(H)	0.934	202
	Fub= G/(8.2660565+0.952099*G+0.0002453*G^2)	0.995	202
	F5= G/(10.3502791+1.1634831*G-0.0007935*G^2)	0.979	202
	F10= -0.41985+0.028034*G-0.000157*G^2 0.8315 is constant after gbh 90 cm	0.805	
	F15= -1.2178+0.03933*G-0.000195*G^2 0.7651 is constant after gbh 100 cm	0.854	
	F20= -1.5982+0.03884*G-0.0001644*G^2 0.6956 is constant after gbh 117 cm	0.830	193
Babla	log(V)= -11.2782859+2.34743*log(G)	0.910	128
	log(V)= -11.875835+1.8823999*log(G)+1.0819988*log(H)	0.910	128
	Fub= G/(6.7308322+0.9248798*G+0.0005741*G^2)	0.997	128
	F5= G/(8.7785999+1.0200141*G+0.0003543*G^2)	0.987	128
	F10= -0.49322+0.0262412*G-0.0001275*G^2	0.771	120
	F15= -1.0759925+0.0311006*G-0.0001346*G^2	0.766	93
	F20= -1.3170613+0.0271059*G-9.000002*G^2	0.714	59
Rain tree	log(V)= -12.287524+2.5086408*log(G)	0.952	190
	log(V)= -12.3213818+1.8912934*log(G)+1.183443*log(H)	0.974	190
	Fub= G/(11.4831022+0.9321882*G+0.0002577*G^2)	0.996	190
	F5=G/(16.1036268+1.0084875*G+0.0001823*G^2)	0.987	190
	F10= G/(68.6872892+0.362527*G+0.0021786*G^2)	0.910	173
	F15= -0.4321178+0.0145722*G-0.000011*G^2	0.842	163
	F20= -0.6798156+0.0153724*G-0.000001*G^2	0.775	137

Table 3. Total volume overbark (one way) in cubic meters for **SISSOO, MAHOGANY, KOROI, AKASHMONI, BABLA AND RAIN TREE** planted on the roadsides and embankments in the coastal areas of Bangladesh.

GBH (cm)	Volumes in cubic meters for the species											
	Sissoo		Mahogany		Koroi		Akashmoni		Babla		Rain Tree	
	BG(cm)	Volume	BG(cm)	Volume	BG(cm)	Volume	BG(cm)	Volume	BG(cm)	Volume	BG(cm)	Volume
15	20.1	0.0046	22.6	0.0038	19.9	0.0038	22.5	0.0049	19.3	0.0073	20.2	0.0041
18	23.9	0.0075	26.4	0.0060	23.7	0.0063	26.1	0.0075	22.7	0.0112	23.9	0.0065
21	27.8	0.0112	30.1	0.0090	27.5	0.0095	29.6	0.0109	26.1	0.0161	27.6	0.0096
24	31.6	0.0158	33.8	0.0126	31.2	0.0137	33.2	0.0150	29.5	0.0220	31.3	0.0134
27	35.4	0.0215	37.6	0.0171	35.0	0.0188	36.8	0.0199	32.9	0.0290	35.0	0.0180
30	39.3	0.0283	41.3	0.0224	38.8	0.0250	40.4	0.0257	36.3	0.0371	38.7	0.0234
33	43.1	0.0363	45.0	0.0285	42.6	0.0323	44.0	0.0323	39.7	0.0464	42.4	0.0297
36	47.0	0.0455	48.7	0.0357	46.4	0.0409	47.6	0.0398	43.1	0.0569	46.1	0.0370
39	50.8	0.0560	52.5	0.0438	50.1	0.0507	51.2	0.0483	46.5	0.0687	49.8	0.0452
42	54.6	0.0680	56.2	0.0530	53.9	0.0619	54.8	0.0577	49.9	0.0817	53.5	0.0544
45	58.5	0.0814	59.9	0.0632	57.7	0.0746	58.3	0.0681	53.3	0.0961	57.2	0.0647
48	62.3	0.0963	63.7	0.0746	61.5	0.0888	61.9	0.0796	56.7	0.1118	60.9	0.0761
51	66.2	0.1127	67.4	0.0872	65.2	0.1046	65.5	0.0921	60.1	0.1289	64.6	0.0886
54	70.0	0.1308	71.1	0.1010	69.0	0.1221	69.1	0.1056	63.5	0.1474	68.3	0.1022
57	73.8	0.1506	74.8	0.1160	72.8	0.1412	72.7	0.1203	66.9	0.1674	72.0	0.1171
60	77.7	0.1722	78.6	0.1332	76.6	0.1622	76.3	0.1361	70.3	0.1888	75.7	0.1331
63	81.5	0.1955	82.3	0.1499	80.4	0.1850	79.9	0.1530	73.7	0.2117	79.4	0.1505
66	85.4	0.2207	86.0	0.1689	84.1	0.2098	83.4	0.1711	77.1	0.2361	83.1	0.1691
69	89.2	0.2478	89.8	0.1894	87.9	0.2366	87.0	0.1904	80.5	0.2621	86.8	0.1891
72	93.0	0.2769	93.5	0.2112	91.7	0.2654	90.6	0.2110	83.9	0.2896	90.5	0.2104
75	96.9	0.3079	97.2	0.2345	95.5	0.2963	94.2	0.2327	87.3	0.3188	94.1	0.2331
78	100.7	0.3411	100.9	0.2593	99.3	0.3294	97.8	0.2557	90.7	0.3495	97.8	0.2571
81	104.6	0.3763	104.7	0.2857	103.0	0.3647	101.4	0.2800	94.1	0.3819	101.5	0.2827
84	108.4	0.4137	108.4	0.3136	106.8	0.4023	105.0	0.3056	97.5	0.4159	105.2	0.3097
87	112.2	0.4533	112.1	0.3432	110.6	0.4423	108.6	0.3325	100.9	0.4516	108.9	0.3382
90	116.1	0.4952	115.9	0.3744	114.4	0.4847	112.1	0.3608	104.3	0.4890	112.6	0.3682
93	119.9	0.5394	119.6	0.4072	118.1	0.5295	115.7	0.3903	10.7.7	0.5282	116.3	0.3998
96	123.8	0.5859	123.3	0.4418	121.9	0.5769	119.3	0.4213	111.1	0.5690	120.0	0.4329
99	127.6	0.6348	127.0	0.4781	125.7	0.6269	122.9	0.4537	114.5	0.6117	123.7	0.4677
102	131.4	0.6862	130.8	0.5161	129.5	0.6795	126.5	0.4874	117.9	0.6561	127.4	0.5040
105	135.3	0.7400	134.5	0.5560	133.3	0.7348	130.1	0.5226	121.3	0.7023	131.1	0.5420
108	139.1	0.7964	138.2	0.5976	137.0	0.7928	133.7	0.5592	124.7	0.7503	134.8	0.5817
111	142.9	0.8553	142.0	0.6412	140.8	0.8537	137.3	0.5973	128.1	0.8001	138.5	0.6231
114	146.8	0.9168	145.7	0.6866	144.6	0.9174	140.8	0.6369	131.5	0.8518	142.2	0.6662
117	150.6	0.9810	149.4	0.7339	148.4	0.9841	144.4	0.6779	134.9	0.9054	145.9	0.7111
120	154.5	1.0480	153.1	0.7831	152.2	1.0537	148.0	0.7205	138.3	0.9608	149.6	0.7577
123	158.3	1.1176	156.9	0.8343	155.9	1.1263	151.6	0.7646	141.7	1.0181	153.3	0.8062
126	162.1	1.1900	160.6	0.8875	159.7	1.2020	155.2	0.8102	145.1	1.0774	157.0	0.8564
129	166.0	1.2653	164.3	0.9428	163.5	1.2808	158.8	0.8573	148.5	1.1386	160.7	0.9085
132	169.8	1.3434	168.1	1.0000	167.3	1.3628	162.4	0.9061	151.9	1.2017	164.4	0.9624
135	173.7	1.4244	171.8	1.0594	171.0	1.4481					168.1	1.0182
138	177.5	1.5083	175.5	1.1208	174.8	1.5366					171.8	1.0759
141	181.3	1.5953	179.3	1.1844	178.6	1.6284					175.5	1.1356
144	185.2	1.6852	183.0	1.2501	182.4	1.7237					179.2	1.1972
147	189.0	1.7783	186.7	1.3180	186.2	1.8223					182.9	1.2607
150	192.9	1.8744	190.4	1.3882	189.9	1.9245					186.6	1.3263

Table 4. Total volumes overbark in cubic meters for **AKASHMONI** planted on the roadsides and embankments in the coastal areas of Bangladesh.

GBH (cm)	BG (cm)	Volume in cubic meters for the height in meters													
		5	6	7	8	9	10	11	12	13	14	15	16	17	18
15	22.5	0.0058	0.0064	0.0071	0.0077	0.0083	0.0089								
18	26.1	0.0082	0.0092	0.0102	0.0110	0.0119	0.0127								
21	29.6	0.0112	0.0125	0.0138	0.0150	0.0161	0.0172								
24	33.2	0.0145	0.0163	0.0179	0.0195	0.0210	0.0224								
27	36.8	0.0183	0.0206	0.0226	0.0246	0.0265	0.0283								
30	40.4	0.0226	0.0253	0.0279	0.0303	0.0326	0.0348	0.0369	0.0390	0.0410	0.0429				
33	44.0	0.0273	0.0305	0.0336	0.0365	0.0393	0.0420	0.0446	0.0471	0.0495	0.0518				
36	47.6	0.0324	0.0363	0.0399	0.0434	0.0467	0.0499	0.0529	0.0559	0.0587	0.0615				
39	51.2	0.0379	0.0425	0.0467	0.0508	0.0547	0.0584	0.0620	0.0654	0.0688	0.0720				
42	54.8	0.0439	0.0491	0.0541	0.0588	0.0633	0.0676	0.0717	0.0757	0.0796	0.0834				
45	58.3	0.0503	0.0563	0.0620	0.0674	0.0725	0.0774	0.0822	0.0868	0.0912	0.0955				
48	61.9	0.0571	0.0640	0.0704	0.0765	0.0824	0.0880	0.0934	0.0986	0.1036	0.1085				
51	65.5	0.0643	0.0721	0.0794	0.0863	0.0928	0.0991	0.1052	0.1111	0.1168	0.1223				
54	69.1	0.0720	0.0807	0.0888	0.0966	0.1039	0.1110	0.1178	0.1244	0.1307	0.1369	0.1429	0.1488	0.1545	0.1601
57	72.7	0.0801	0.0898	0.0988	0.1074	0.1156	0.1235	0.1310	0.1384	0.1454	0.1523	0.1590	0.1656	0.1719	0.1782
60	76.3	0.0887	0.0994	0.1094	0.1189	0.1279	0.1366	0.1450	0.1531	0.1609	0.1685	0.1760	0.1832	0.1902	0.1972
63	79.9	0.0976	0.1094	0.1204	0.1309	0.1409	0.1504	0.1597	0.1686	0.1772	0.1856	0.1937	0.2017	0.2095	0.2171
66	83.4	0.1070	0.1199	0.1320	0.1435	0.1544	0.1649	0.1750	0.1848	0.1942	0.2034	0.2124	0.2211	0.2296	0.2380
69	87.0	0.1168	0.1309	0.1441	0.1566	0.1686	0.1800	0.1911	0.2017	0.2120	0.2221	0.2318	0.2414	0.2507	0.2598
72	90.6	0.1271	0.1424	0.1567	0.1704	0.1833	0.1958	0.2078	0.2194	0.2306	0.2415	0.2522	0.2625	0.2726	0.2825
75	94.2	0.1377	0.1543	0.1699	0.1847	0.1987	0.2122	0.2252	0.2378	0.2500	0.2618	0.2733	0.2845	0.2955	0.3062
78	97.8	0.1488	0.1667	0.1836	0.1995	0.2147	0.2293	0.2434	0.2569	0.2701	0.2829	0.2953	0.3074	0.3193	0.3309
81	101.4	0.1603	0.1796	0.1978	0.2149	0.2313	0.2470	0.2622	0.2768	0.2910	0.3047	0.3181	0.3312	0.3440	0.3565
84	105.0			0.2125	0.2309	0.2485	0.2654	0.2817	0.2974	0.3126	0.3274	0.3418	0.3558	0.3696	0.3830
87	108.6			0.2277	0.2475	0.2664	0.2844	0.3019	0.3187	0.3350	0.3509	0.3663	0.3814	0.3961	0.4104
90	112.1			0.2435	0.2646	0.2848	0.3041	0.3228	0.3408	0.3582	0.3752	0.3917	0.4077	0.4235	0.4388
93	115.7			0.2597	0.2823	0.3038	0.3245	0.3443	0.3635	0.3822	0.4002	0.4178	0.4350	0.4518	0.4682
96	119.3			0.2765	0.3005	0.3235	0.3454	0.3666	0.3870	0.4069	0.4261	0.4449	0.4631	0.4810	0.4984
99	122.9			0.2938	0.3194	0.3437	0.3671	0.3896	0.4113	0.4323	0.4528	0.4727	0.4921	0.5111	0.5296
102	126.5				0.3387	0.3646	0.3893	0.4132	0.4362	0.4586	0.4803	0.5014	0.5220	0.5421	0.5618
105	130.1				0.3587	0.3860	0.4123	0.4375	0.4619	0.4856	0.5985	0.5309	0.5527	0.5740	0.5949
108	133.7				0.3792	0.4081	0.4358	0.4625	0.4883	0.5133	0.5376	0.5613	0.5843	0.6068	0.6289
111	137.3				0.4003	0.4308	0.4600	0.4882	0.5155	0.5418	0.5675	0.5924	0.6168	0.6406	0.6638
114	140.8				0.4219	0.4541	0.4849	0.5146	0.5433	0.5711	0.5981	0.6245	0.6501	0.6752	0.6997
117	144.4				0.4441	0.4779	0.5104	0.5417	0.5719	0.6012	0.6296	0.6573	0.6843	0.7107	0.7365
120	148.0					0.5024	0.5365	0.5694	0.6012	0.6320	0.6619	0.6910	0.7194	0.7471	0.7742
123	151.6					0.5275	0.5633	0.5979	0.6312	0.6635	0.6949	0.7255	0.7553	0.7844	0.8129
126	155.2					0.5532	0.5908	0.6270	0.6619	0.6958	0.7288	0.7608	0.7921	0.8226	0.8525
129	158.8					0.5795	0.6189	0.6568	0.6934	0.7289	0.7634	0.7970	0.8297	0.8617	0.8930
132	162.4					0.6064	0.6476	0.6873	0.7256	0.7627	0.7988	0.8340	0.8682	0.9017	0.9344

Table 5. Conversion factors to estimate the underbark volumes up to different top end diameters fo **AKASHMONI** planted on the roadsides and embankments in the coastal areas of Bangladesh.

GBH (cm)	BG (cm)	Fub	F5	F10	F15	F20
15	22.5	0.6348	0.5305			
18	26.1	0.6827	0.5782			
21	29.6	0.7213	0.6177			
24	33.2	0.7528	0.6508			
27	36.8	0.7791	0.6790	0.2758		
30	40.4	0.8012	0.7031	0.3209		
33	44.0	0.8199	0.7240	0.3643		
36	47.6	0.8359	0.7423	0.4060		
39	51.2	0.8497	0.7582	0.4460		
42	54.8	0.8617	0.7724	0.4842		
45	58.3	0.8721	0.7849	0.5207	0.1987	
48	61.9	0.8813	0.7960	0.5555	0.2464	
51	65.5	0.8893	0.8060	0.5885	0.2921	
54	69.1	0.8963	0.8149	0.6198	0.3359	
57	72.7	0.9025	0.8229	0.6494	0.3777	
60	76.3	0.9080	0.8301	0.6773	0.4176	
63	79.9	0.9128	0.8367	0.7034	0.4555	
66	83.4	0.9170	0.8426	0.7278	0.4914	0.0790
69	87.0	0.9208	0.8479	0.7505	0.5254	0.1238
72	90.6	0.9241	0.8528	0.7715	0.5575	0.1670
75	94.2	0.9271	0.8572	0.7907	0.5875	0.2085
78	97.8	0.9296	0.8612	0.8082	0.6156	0.2484
81	101.4	0.9319	0.8648	0.8240	0.6418	0.2867
84	105.0	0.9338	0.8681	0.8381	0.6660	0.3234
87	108.6	0.9355	0.8711	0.8504	0.6882	0.3584
90	112.1	0.9370	0.8739	0.8610	0.7085	0.3918
93	115.7	0.9382	0.8764	0.8699	0.7268	0.4236
96	119.3	0.9393	0.8786	0.8770	0.7431	0.4538
99	122.9	0.9401	0.8807	0.8824	0.7575	0.4824
102	126.5	0.9408	0.8825	0.8861	0.7699	0.5093
105	130.1	0.9414	0.8842	0.8881	0.7804	0.5346
108	133.7	0.9418	0.8857	0.8884	0.7889	0.5583
111	137.3	0.9421	0.8870	0.8869	0.7955	0.5803
114	140.8	0.9422	0.8882	0.8869	0.8001	0.6008
117	144.4	0.9423	0.8893	0.8869	0.8027	0.6196
120	148.0	0.9422	0.8902	0.8869	0.8034	0.6368
123	151.6	0.9421	0.8910	0.8869	0.8034	0.6523
126	155.2	0.9419	0.8918	0.8869	0.8034	0.6663
129	158.8	0.9416	0.8924	0.8869	0.8034	0.6786
132	162.4	0.9412	0.8929	0.8869	0.8034	0.6893

Table 4. Total volumes overbark in cubic meters for **AKASHMONI** planted on the roadsides and embankments in the coastal areas of Bangladesh.

GBH (cm)	BG (cm)	Volume in cubic meters for the height in meters													
		5	6	7	8	9	10	11	12	13	14	15	16	17	18
15	22.5	0.0058	0.0064	0.0071	0.0077	0.0083	0.0089								
18	26.1	0.0082	0.0092	0.0102	0.0110	0.0119	0.0127								
21	29.6	0.0112	0.0125	0.0138	0.0150	0.0161	0.0172								
24	33.2	0.0145	0.0163	0.0179	0.0195	0.0210	0.0224								
27	36.8	0.0183	0.0206	0.0226	0.0246	0.0265	0.0283								
30	40.4	0.0226	0.0253	0.0279	0.0303	0.0326	0.0348	0.0369	0.0390	0.0410	0.0429				
33	44.0	0.0273	0.0305	0.0336	0.0365	0.0393	0.0420	0.0446	0.0471	0.0495	0.0518				
36	47.6	0.0324	0.0363	0.0399	0.0434	0.0467	0.0499	0.0529	0.0559	0.0587	0.0615				
39	51.2	0.0379	0.0425	0.0467	0.0508	0.0547	0.0584	0.0620	0.0654	0.0688	0.0720				
42	54.8	0.0439	0.0491	0.0541	0.0588	0.0633	0.0676	0.0717	0.0757	0.0796	0.0834				
45	58.3	0.0503	0.0563	0.0620	0.0674	0.0725	0.0774	0.0822	0.0868	0.0912	0.0955				
48	61.9	0.0571	0.0640	0.0704	0.0765	0.0824	0.0880	0.0934	0.0986	0.1036	0.1085				
51	65.5	0.0643	0.0721	0.0794	0.0863	0.0928	0.0991	0.1052	0.1111	0.1168	0.1223				
54	69.1	0.0720	0.0807	0.0888	0.0966	0.1039	0.1110	0.1178	0.1244	0.1307	0.1369	0.1429	0.1488	0.1545	0.1601
57	72.7	0.0801	0.0898	0.0988	0.1074	0.1156	0.1235	0.1310	0.1384	0.1454	0.1523	0.1590	0.1656	0.1719	0.1782
60	76.3	0.0887	0.0994	0.1094	0.1189	0.1279	0.1366	0.1450	0.1531	0.1609	0.1685	0.1760	0.1832	0.1902	0.1972
63	79.9	0.0976	0.1094	0.1204	0.1309	0.1409	0.1504	0.1597	0.1686	0.1772	0.1856	0.1937	0.2017	0.2095	0.2171
66	83.4	0.1070	0.1199	0.1320	0.1435	0.1544	0.1649	0.1750	0.1848	0.1942	0.2034	0.2124	0.2211	0.2296	0.2380
69	87.0	0.1168	0.1309	0.1441	0.1566	0.1686	0.1800	0.1911	0.2017	0.2120	0.2221	0.2318	0.2414	0.2507	0.2598
72	90.6	0.1271	0.1424	0.1567	0.1704	0.1833	0.1958	0.2078	0.2194	0.2306	0.2415	0.2522	0.2625	0.2726	0.2825
75	94.2	0.1377	0.1543	0.1699	0.1847	0.1987	0.2122	0.2252	0.2378	0.2500	0.2618	0.2733	0.2845	0.2955	0.3062
78	97.8	0.1488	0.1667	0.1836	0.1995	0.2147	0.2293	0.2434	0.2569	0.2701	0.2829	0.2953	0.3074	0.3193	0.3309
81	101.4	0.1603	0.1796	0.1978	0.2149	0.2313	0.2470	0.2622	0.2768	0.2910	0.3047	0.3181	0.3312	0.3440	0.3565
84	105.0			0.2125	0.2309	0.2485	0.2654	0.2817	0.2974	0.3126	0.3274	0.3418	0.3558	0.3696	0.3830
87	108.6			0.2277	0.2475	0.2664	0.2844	0.3019	0.3187	0.3350	0.3509	0.3663	0.3814	0.3961	0.4104
90	112.1			0.2435	0.2646	0.2848	0.3041	0.3228	0.3408	0.3582	0.3752	0.3917	0.4077	0.4235	0.4388
93	115.7			0.2597	0.2823	0.3038	0.3245	0.3443	0.3635	0.3822	0.4002	0.4178	0.4350	0.4518	0.4682
96	119.3			0.2765	0.3005	0.3235	0.3454	0.3666	0.3870	0.4069	0.4261	0.4449	0.4631	0.4810	0.4984
99	122.9			0.2938	0.3194	0.3437	0.3671	0.3896	0.4113	0.4323	0.4528	0.4727	0.4921	0.5111	0.5296
102	126.5				0.3387	0.3646	0.3893	0.4132	0.4362	0.4586	0.4803	0.5014	0.5220	0.5421	0.5618
105	130.1				0.3587	0.3860	0.4123	0.4375	0.4619	0.4856	0.5985	0.5309	0.5527	0.5740	0.5949
108	133.7				0.3792	0.4081	0.4358	0.4625	0.4883	0.5133	0.5376	0.5613	0.5843	0.6068	0.6289
111	137.3				0.4003	0.4308	0.4600	0.4882	0.5155	0.5418	0.5675	0.5924	0.6168	0.6406	0.6638
114	140.8				0.4219	0.4541	0.4849	0.5146	0.5433	0.5711	0.5981	0.6245	0.6501	0.6752	0.6997
117	144.4				0.4441	0.4779	0.5104	0.5417	0.5719	0.6012	0.6296	0.6573	0.6843	0.7107	0.7365
120	148.0					0.5024	0.5365	0.5694	0.6012	0.6320	0.6619	0.6910	0.7194	0.7471	0.7742
123	151.6					0.5275	0.5633	0.5979	0.6312	0.6635	0.6949	0.7255	0.7553	0.7844	0.8129
126	155.2					0.5532	0.5908	0.6270	0.6619	0.6958	0.7288	0.7608	0.7921	0.8226	0.8525
129	158.8					0.5795	0.6189	0.6568	0.6934	0.7289	0.7634	0.7970	0.8297	0.8617	0.8930
132	162.4					0.6064	0.6476	0.6873	0.7256	0.7627	0.7988	0.8340	0.8682	0.9017	0.9344

Table 6. Total volume overbark in cubic meters for **MAHOGANY** planted on the roadsides and embankments in the coastal areas of Bangladesh.

GBH (cm)	BG (cm)	Volume in cubic meters for the height in meters									
		5	6	7	8	9	10	11	12	13	14
15	22.6	0.0045	0.0056	0.0068	0.0080	0.0092	0.0105				
18	26.4	0.0063	0.0079	0.0095	0.0112	0.0130	0.0148				
21	30.1	0.0084	0.0105	0.0127	0.0150	0.0173	0.0197	0.0222	0.0247		
24	33.8	0.0108	0.0135	0.0163	0.0192	0.0222	0.0253	0.0284	0.0316		
27	37.6	0.0135	0.0168	0.0203	0.0240	0.0277	0.0315	0.0354	0.0394		
30	41.3	0.0164	0.0205	0.0248	0.0292	0.0337	0.0384	0.0431	0.0480	0.0529	0.0580
33	45.0	0.0196	0.0245	0.0296	0.0348	0.0403	0.0458	0.0515	0.0573	0.0633	0.0693
36	48.7	0.0230	0.0288	0.0348	0.0410	0.0474	0.0539	0.0606	0.0674	0.0744	0.0815
39	52.5	0.0267	0.0334	0.0404	0.0476	0.0550	0.0626	0.0704	0.0783	0.0864	0.0946
42	56.2	0.0307	0.0384	0.0464	0.0546	0.0632	0.0719	0.0808	0.0899	0.0992	0.1087
45	59.9	0.0349	0.0437	0.0528	0.0622	0.0718	0.0818	0.0919	0.1023	0.1128	0.1236
48	63.7	0.0394	0.0492	0.0595	0.0710	0.0810	0.0922	0.1037	0.1154	0.1273	0.1394
51	67.4	0.0441	0.0551	0.0666	0.0785	0.0907	0.1033	0.1161	0.1292	0.1425	0.1561
54	71.1	0.0490	0.0613	0.0741	0.0873	0.1009	0.1149	0.1292	0.1437	0.1586	0.1737
57	74.8	0.0542	0.0679	0.0820	0.0966	0.1117	0.1271	0.1429	0.1590	0.1754	0.1921
60	78.6	0.0697	0.0747	0.0902	0.1063	0.1229	0.1399	0.1572	0.1750	0.1930	0.2114
63	82.3				0.1165	0.1346	0.1532	0.1722	0.1916	0.2114	0.2316
66	86.0				0.1270	0.1468	0.1671	0.1878	0.2090	0.2306	0.2526
69	89.8				0.1380	0.1595	0.1815	0.2041	0.2271	0.2506	0.2744
72	93.5				0.1494	0.1727	0.1965	0.2209	0.2459	0.2713	0.2971
75	97.2				0.1613	0.1864	0.2121	0.2384	0.2653	0.2972	0.3206
78	100.9				0.1735	0.2005	0.2282	0.2565	0.2855	0.3150	0.3450
81	104.7				0.1862	0.2151	0.2449	0.2753	0.3063	0.3380	0.3702
84	108.4				0.1992	0.2302	0.2621	0.2946	0.3278	0.3617	0.3962
87	112.1				0.2127	0.2458	0.2798	0.3145	0.3500	0.3862	0.4230
90	115.9				0.2266	0.2619	0.2981	0.3351	0.3729	0.4114	0.4506
93	119.6				0.2409	0.2784	0.3169	0.3562	0.3964	0.4374	0.4790
96	123.3				0.2556	0.2954	0.3362	0.3780	0.4206	0.4640	0.5083
99	127.0				0.2707	0.3129	0.3561	0.4003	0.4455	0.4915	0.5383
102	130.8				0.2862	0.3308	0.3765	0.4232	0.4710	0.5196	0.5692
105	134.5				0.3021	0.3492	0.3974	0.4468	0.4972	0.5485	0.6008
108	138.2				0.3184	0.3680	0.4189	0.4709	0.5240	0.5781	0.6332
111	122.0				0.3352	0.3873	0.4408	0.4956	0.5515	0.6085	0.6664
114	145.7				0.3523	0.4071	0.4633	0.5209	0.5796	0.6395	0.7004
117	149.4				0.3697	0.4273	0.4863	0.5467	0.6084	0.6713	0.7352
120	153.1				0.3876	0.4480	0.5099	0.5732	0.6378	0.7037	0.7708

Table 6. Continued.

GBH (cm)	BG (cm)	Volume in cubic meters for the height in meters							
		11	12	13	14	15	16	17	18
78	100.9	0.2565	0.2855	0.3150	0.3450	0.3755	0.4065	0.4379	0.4698
81	104.7	0.2753	0.3063	0.3380	0.3702	0.4029	0.4361	0.4699	0.5040
84	108.4	0.2946	0.3278	0.3617	0.3962	0.4312	0.4668	0.5029	0.5394
87	112.1	0.3145	0.3500	0.3862	0.4230	0.4604	0.4984	0.5369	0.5759
90	115.9	0.3351	0.3729	0.4114	0.4506	0.4904	0.5309	0.5719	0.6135
93	119.6	0.3562	0.3964	0.4374	0.4790	0.5214	0.5644	0.6080	0.6523
96	123.3	0.3780	0.4206	0.4640	0.5083	0.5532	0.5989	0.6452	0.6921
99	127.0	0.4003	0.4455	0.4915	0.5383	0.5859	0.6343	0.6833	0.7330
102	130.8	0.4232	0.4710	0.5196	0.5692	0.6195	0.6706	0.7224	0.7750
105	134.5	0.4468	0.4972	0.5485	0.6008	0.6539	0.7079	0.7626	0.8181
108	138.2	0.4709	0.5240	0.5781	0.6332	0.6892	0.7461	0.8038	0.8622
111	142.0	0.4956	0.5515	0.6085	0.6664	0.7254	0.7852	0.8459	0.9074
114	145.7	0.5209	0.5796	0.6395	0.7004	0.7624	0.8253	0.8891	0.9537
117	149.4	0.5467	0.6084	0.6713	0.7352	0.8003	0.8663	0.9332	1.0011
120	153.1	0.5732	0.6378	0.7037	0.7708	0.8390	0.9082	0.9784	1.0496
123	156.9	0.6002	0.6679	0.7369	0.8072	0.8785	0.9510	1.0245	1.0991
126	160.6	0.6278	0.6986	0.7708	0.8443	0.9190	0.9948	1.0717	1.1496
129	164.3	0.6560	0.7300	0.8054	0.8822	0.9602	1.0394	1.1198	1.2012
132	168.1	0.6848	0.7620	0.8407	0.9209	1.0023	1.0850	1.1689	1.2539
135	171.8	0.7141	0.7947	0.8767	0.9603	1.0452	1.1315	1.2189	1.3076
138	175.5	0.7440	0.8279	0.9135	1.0005	1.0890	1.1788	1.2700	1.3623
141	179.3	0.7745	0.8618	0.9509	1.0415	1.1336	1.2271	1.3220	1.4181
144	183.0	0.8055	0.8964	0.9890	1.0832	1.1790	1.2763	1.3749	1.4749
147	186.7	0.8371	0.9315	0.10278	1.1257	1.2253	1.3263	1.4289	1.5328
150	190.4	0.8693	0.9673	1.0672	1.1690	1.2723	1.3773	1.4838	1.5917
153	194.2	0.9020	1.0037	1.1074	1.2130	1.3202	1.4291	1.5396	1.6516
156	197.9	0.9353	1.0408	1.1483	1.2577	1.3690	1.4819	1.5964	1.7126
159	201.6	0.9691	1.0784	1.1898	1.3032	1.4185	1.5355	1.6542	1.7745
162	205.4	1.0035	1.1167	1.2321	1.3495	1.4688	1.5900	1.7129	1.8375
165	209.1	1.0385	1.1556	1.2750	1.3965	1.5200	1.6454	1.7726	1.9015
168	212.8	1.0740	1.1951	1.3186	1.4443	1.5720	1.7017	1.8332	1.9666
171	216.5	1.1101	1.2353	1.3629	1.4928	1.6248	1.7588	1.8948	2.0326
174	220.3	1.1467	1.2760	1.4078	1.5420	1.6784	1.8168	1.9573	2.0997
177	224.0	1.1839	1.3174	1.4535	1.5920	1.7328	1.8757	2.0207	2.1677
180	227.7	1.2216	1.3594	1.4998	1.6427	1.7880	1.9355	2.0851	2.2368

Table 7. Conversion factors to estimate the underbark volumes up to different top end diameters for **MAHOGANY** planted on the roadsides and embankments in the coastal areas of Bangladesh.

GBH (cm)	BG (cm)	Fub	F5	F10	F15	F20
15	22.6	0.6012	0.6180			
18	26.4	0.6535	0.6675			
21	30.1	0.6965	0.7076			
24	33.8	0.7322	0.7405			
27	37.6	0.7623	0.7678			
30	41.3	0.7879	0.7907	0.2285		
33	45.0	0.8098	0.8101	0.2669		
36	48.7	0.8287	0.8266	0.3041		
39	52.5	0.8451	0.8407	0.3401		
42	56.2	0.8594	0.8529	0.3748	0.1066	
45	59.9	0.8719	0.8633	0.4084	0.1414	0.0025
48	63.7	0.8829	0.8724	0.4408	0.1752	0.0318
51	67.4	0.8926	0.8802	0.4719	0.2080	0.0605
54	71.1	0.9011	0.8870	0.5018	0.2399	0.0886
57	74.8	0.9087	0.8929	0.5305	0.2709	0.1162
60	78.6	0.9153	0.8979	0.5580	0.3009	0.1432
63	82.3	0.9212	0.9023	0.5843	0.3299	0.1696
66	86.0	0.9265	0.9061	0.6094	0.3580	0.1955
69	89.8	0.9311	0.9093	0.6333	0.3852	0.2208
72	93.5	0.9352	0.9120	0.6559	0.4114	0.2455
75	97.2	0.9388	0.9143	0.6774	0.4367	0.2696
78	100.9	0.9419	0.9162	0.6976	0.4610	0.2932
81	104.7	0.9447	0.9177	0.7166	0.4844	0.3162
84	108.4	0.9471	0.9190	0.7344	0.5068	0.3387
87	112.1	0.9492	0.9199	0.7510	0.5283	0.3606
90	115.9	0.9510	0.9206	0.7664	0.5488	0.3819
93	119.6	0.9525	0.9211	0.7806	0.5684	0.4026
96	123.3	0.9538	0.9214	0.7936	0.5870	0.4228
99	127.0	0.9548	0.9214	0.8053	0.6047	0.4424
102	130.8	0.9557	0.9214	0.8159	0.6214	0.4614
105	134.5	0.9563	0.9214	0.8252	0.6372	0.4799
108	138.2	0.9568	0.9214	0.8333	0.6520	0.4978
111	142.0	0.9572	0.9214	0.8402	0.6659	0.5151
114	145.7	0.9573	0.9214	0.8459	0.6788	0.5319
117	149.4	0.9574	0.9214	0.8504	0.6908	0.5481
120	153.1	0.9574	0.9214	0.8537	0.7018	0.5637
123	156.9	0.9574	0.9214	0.8558	0.7119	0.5787
126	160.6	0.9574	0.9214	0.8566	0.7211	0.5932

Table 8. Total volumes overbark in cubic meters for **KOROI** planted on the roadsides and embankments in the coastal areas of Bangladesh.

GBH (cm)	BG (cm)	Volume in cubic meters for the height in meters										
		5	6	7	8	9	10	11	12	13	14	15
15	19.9	0.0054	0.0073	0.0093	0.0114	0.0138	0.0163	0.0189				
18	23.7	0.0074	0.0099	0.0127	0.0156	0.0188	0.0223	0.0259				
21	27.5	0.0097	0.0129	0.0165	0.0204	0.0245	0.0290	0.0337				
24	31.2	0.0122	0.0162	0.0207	0.0256	0.0308	0.0364	0.0424				
27	35.0	0.0149	0.0199	0.0254	0.0313	0.0377	0.0446	0.0519				
30	38.8	0.0178	0.0238	0.0304	0.0375	0.0452	0.0534	0.0621				
33	42.6	0.0210	0.0280	0.0358	0.0442	0.0532	0.0629	0.0731	0.0839	0.0953		
36	46.4	0.0244	0.0325	0.0415	0.0513	0.0618	0.0730	0.0849	0.0974	0.1106		
39	50.1	0.0280	0.0373	0.0476	0.0588	0.0709	0.0837	0.0974	0.1117	0.1268		
42	53.9	0.0317	0.0424	0.0541	0.0668	0.0805	0.0951	0.1105	0.1268	0.1440		
45	57.7	0.0357	0.0477	0.0608	0.0752	0.0906	0.1070	0.1244	0.1428	0.1620		
48	61.5	0.0399	0.0532	0.0680	0.0839	0.1011	0.1195	0.1389	0.1595	0.1810		
51	65.2	0.0443	0.0591	0.0754	0.0931	0.1122	0.1326	0.1541	0.1769	0.2008		
54	69.0	0.0488	0.0651	0.0831	0.1027	0.1288	0.1462	0.1700	0.1951	0.2214		
57	72.8	0.0536	0.0715	0.0912	0.1127	0.1358	0.1604	0.1865	0.2140	0.2429	0.2732	0.3047
60	76.6	0.0585	0.0780	0.0996	0.1230	0.1482	0.1751	0.2036	0.2337	0.2653	0.2983	0.3327
63	80.4	0.0636	0.0848	0.1083	0.1337	0.1612	0.1904	0.2214	0.2541	0.2884	0.3243	0.3617
66	84.1	0.0688	0.0919	0.1173	0.1448	0.1745	0.2062	0.2398	0.2751	0.3123	0.3512	0.3917
69	87.9	0.0743	0.0991	0.1265	0.1563	0.1883	0.2225	0.2587	0.2969	0.3370	0.3789	0.4227
72	91.7	0.0799	0.1066	0.1361	0.1681	0.2026	0.2393	0.2783	0.3194	0.3625	0.4076	0.4546
75	95.5	0.0857	0.1144	0.1460	0.1803	0.2172	0.2567	0.2984	0.3425	0.3888	0.4371	0.4876
78	99.3	0.0917	0.1223	0.1561	0.1928	0.2323	0.2745	0.3192	0.3663	0.4158	0.4675	0.5214
81	103.0	0.0978	0.1305	0.1665	0.2057	0.2479	0.2928	0.3405	0.3908	0.4435	0.4987	0.5563
84	106.8	0.1041	0.1389	0.1772	0.2189	0.2638	0.3117	0.3624	0.4159	0.4721	0.5308	0.5920
87	110.6	0.1105	0.1475	0.1882	0.2325	0.2801	0.3310	0.3848	0.4417	0.5013	0.5637	0.6287
90	114.4	0.1171	0.1563	0.1995	0.2464	0.2969	0.3508	0.4079	0.4681	0.5313	0.5974	0.6663
93	118.1	0.1239	0.1653	0.2110	0.2606	0.3140	0.3710	0.4314	0.4951	0.5620	0.6319	0.7048
96	121.9	0.1308	0.1746	0.2228	0.2752	0.3316	0.3918	0.4555	0.5228	0.5934	0.6672	0.7442
99	125.7	0.1379	0.1840	0.2349	0.2901	0.3496	0.4130	0.4802	0.5511	0.6255	0.7033	0.7845
102	129.5				0.3053	0.3679	0.4346	0.5054	0.5800	0.6583	0.7402	0.8256
105	133.3				0.3209	0.3866	0.4568	0.5311	0.6095	0.6918	0.7779	0.8677
108	137.0				0.3367	0.4057	0.4794	0.5574	0.6397	0.7260	0.8164	0.9106
111	140.8				0.3529	0.4252	0.5024	0.5842	0.6704	0.7609	0.8556	0.9543
114	144.6				0.3694	0.4451	0.5259	0.6115	0.7018	0.7965	0.8956	0.9989
117	148.4				0.3862	0.4654	0.5498	0.6393	0.7337	0.8328	0.9364	1.0444
120	152.2				0.4034	0.4860	0.5742	0.6676	0.7662	0.8697	0.9779	1.0907