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A critical review and database of biomass and volume allometric equation for trees and shrubs of Bangladesh

H Mahmood[1, 4], M R H Siddique[1] and M Akhter[2, 3]

[1]Forestry and Wood Technology Discipline, Khulna University, Khulna - 9208, Bangladesh
[2]Assistant Conservator of Forests, Forest Department, Ministry of Environment and Forest, Dhaka, Bangladesh
[3]Food and Agricultural Organization of the United Nations, Bangladesh

E-mail: mahmoodhossain@hotmail.com

Abstract. Estimations of biomass, volume and carbon stock are important in the decision making process for the sustainable management of a forest. These estimations can be conducted by using available allometric equations of biomass and volume. Present study aims to: i. develop a compilation with verified allometric equations of biomass, volume, and carbon for trees and shrubs of Bangladesh, ii. find out the gaps and scope for further development of allometric equations for different trees and shrubs of Bangladesh. Key stakeholders (government departments, research organizations, academic institutions, and potential individual researchers) were identified considering their involvement in use and development of allometric equations. A list of documents containing allometric equations was prepared from secondary sources. The documents were collected, examined, and sorted to avoid repetition, yielding 50 documents. These equations were tested through a quality control scheme involving operational verification, conceptual verification, applicability, and statistical credibility. A total of 517 allometric equations for 80 species of trees, shrubs, palm, and bamboo were recorded. In addition, 222 allometric equations for 39 species were validated through the quality control scheme. Among the verified equations, 20%, 12% and 62% of equations were for green-biomass, oven-dried biomass, and volume respectively and 4 tree species contributed 37% of the total verified equations. Five gaps have been pinpointed for the existing allometric equations of Bangladesh: a. little work on allometric equation of common tree and shrub species, b. most of the works were concentrated on certain species, c. very little proportion of allometric equations for biomass estimation, d. no allometric equation for below-ground biomass and carbon estimation, and d. lower proportion of valid allometric equations. It is recommended that site and species specific allometric equations should be developed and consistency in field sampling, sample processing, data recording and selection of allometric equations should be maintained to ensure accuracy in estimation of biomass, volume, and carbon stock in different forest types of Bangladesh.

1. Introduction

Bangladesh is one of the most densely populated countries in the world with only 0.06% of the world's forest [1] and 0.017 ha of per capita forest land [2]. The huge population (166.3 million) exerts immense pressure on her forest resources for the demand of timber, fuel wood, and other forest products. Measurement of forest biomass and volume are important for estimating forest productivity. Appropriate estimation of forest stocking, productivity, nutrient cycling, nutrient budget, amount of carbon stock, and prediction of future status are important considerations for the sustainable management of forest resources [3, 4]. Tree biomass and volume can be measured from both destructive (clear-cut) and non-destructive (allometric equation) methods [3, 5]. Allometric method is frequently used for estimating the biomass and volume of forest plant species, which is the most powerful tool of measurement [6, 7, 8, 9]. The use of appropriate equations for estimating biomass and volume will contribute in improving the accuracy of forest resource assessment, and also guide the forest policies and management interventions [10, 11]. Considering this importance, different research and academic institutions and individual researchers have developed biomass and volume allometric equations for estimating biomass and volume stock of a particular forest of Bangladesh.

Choice of allometric equations is one of the key sources of uncertainty in forest biomass estimation. About one-fourth of the published equations contain blunders, oversights, or forecast unrealistic values [12]. Therefore, verification and validation of allometric equation is imperative, before its application in estimation of biomass and volume [13]. Validating and verifying an allometric equation is vast in extent, and diverse in regards to methods, assumptions and conclusions. Recently, [13] proposed a systematic transparent quality control method to quantify the degree of confidence for the allometric equations without involving equation development. Quantitative reviews of available allometric equations have been implemented at a regional scale, but few countries have developed a national database for biomass and volume allometric equations [12]. In South Asia, the first regional database was developed in 2014 [14], while [15] have developed the first database for Bangladesh in 2013. However, these databases were not comprehensive and quality controlled. Repetition of some allometric equations was also observed. The use and development of allometric equations should be specific to the conditions of the country, which is crucial for three reasons. The first is that the assessment of tree and forest resources of a country should be accurate. The second is that country specific models are more efficient, and the third reason is the amount of uncertainty of the models used. However, the overall objective is to improve the quality of estimates for a multitude of purposes including timber volume, wood energy biomass, carbon stocks, etc. in trees and forest resources of Bangladesh. To achieve this overall objective, we have to have the status of the existing tree allometric equations, forest resource estimation methods, and a verified database of tree allometric equations. Therefore, a quality controlled comprehensive database of allometric equations is needed to assess the gaps and scope for the development of new allometric equations with important tree species of different forest types of Bangladesh. The specific objectives of the present study were to: i. develop a compilation with valid allometric equations of biomass, volume and carbon for trees and shrubs of Bangladesh, ii. find out the gaps and scope for further development of allometric equations with different trees and shrubs.

2. Material and Methods

2.1. Collection of Information

Key stakeholders (government departments, research organizations, academic institutions, and potential individual researchers) were identified considering their involvement and experiences in the use and development of allometric equations. A draft list of documents containing allometric equations was prepared through consultation with key stakeholders and online search (Google Scholar) results. This list was updated by taking time and identifying unlisted documents. The listed documents were collected from bibliographic databases such as: Science Direct, Springer Link, CABI, AGRIS, AGRICOLA, JSTOR, ResearchGate. Sometimes personal and official communications were established with identified key stakeholders to obtain their research articles, reports, theses, bulletins, monographs, inventory reports and proceedings papers. Hard and soft copies of the collected documents were maintained for references.

2.2. Compilation of Information

The collected documents were sorted considering relevance and repetition. The information of the allometric equations in the sorted documents was grouped and recorded into 8 different categories. The categories were plant ecology (Population), geographical location, ecoregions (FAO, Udvardy, Bailey, WWF, Holridge and IUCN Bioecological zones-Bangladesh), equation parameters (coefficients, constants, variables and ranges), plant components (leaves, Branches, Stump, Stems, Bark, Root, etc.), taxonomical description (Family, Genus, Species), fit statistical information (R2, adjusted R2, RMSE, sample number, bias correction, Akaike information criterion, furnival index) and Bibliography.

2.3. Quality control of the allometric equations

All the allometric equations were tested through a quality control scheme following four types of verification (operational verification, conceptual verification, applicability, statistical credibility) according to [13]. The detail process of verification has been given below:

- Operational verification: Too large or too small predicted biomass or volume values
- Conceptual verification: Predicted biomass or volume are lower than "0" or have negative values
- Applicability: Under which condition the model can be applied (Population ecology, environmental condition of the site where the equation was developed, tree component measured, Taxonomic reference, Range of applicability)
- Statistical credibility: Sample size should be at least 30 trees and the coefficient of determination should be higher than 0.85

3. Results

3.1. Documents of allometric equations

A total of 53 documents were identified that contained the allometric equations for plants of Bangladesh. The collected documents were sorted, considering relevance and repetition, and 50 documents were found (i.e. 96% of the total document of allometric equations). Most of the documents were Journals (52%) followed by reports (24%), bulletins and theses (figure 1). The list of documents containing allometric equations of Bangladesh has been presented as Appendix 1.

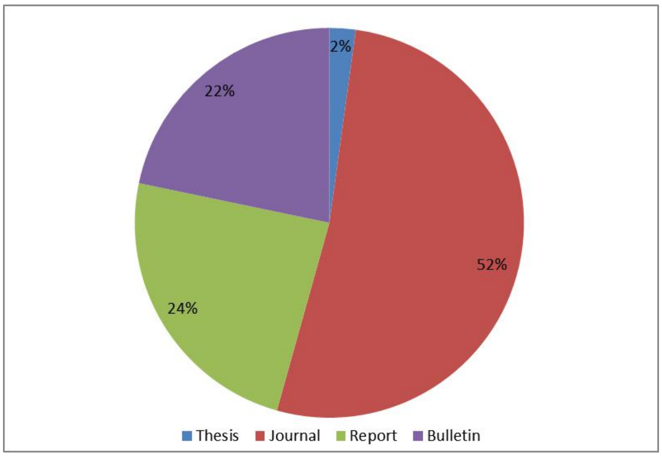

Figure 1. Document type of available literature in percentage.

Most of the documents were prepared during the last decade of the twentieth century (1991-2000). However, the number of studies on the development of allometic equations has increased rapidly during 2011 to 2016, which contributed 26% of the total allometric documents of Bangladesh (figure 2).

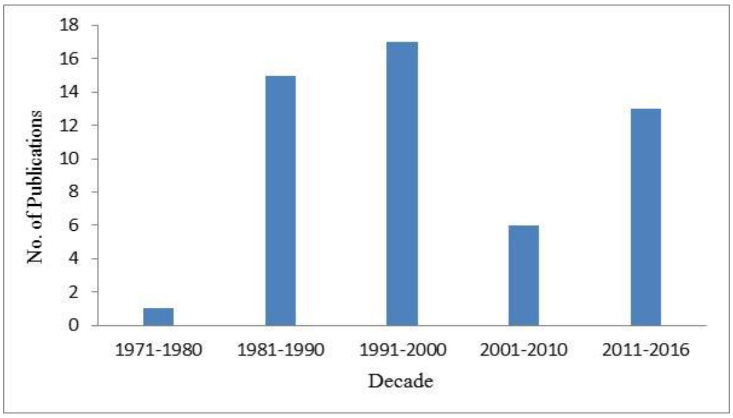

Figure 2. Year-wise publication of the documents.

3.1. Total number of allometric equations

This study recorded a total of 517 allometric equations on volume, biomass, carbon and nutrients for 80 species of tree, shrub, palm and bamboo. Higher preference, about 92% of the total allometric equations, was recorded for trees and 6% for shrubs. Among these equations, 70% equations were for volume estimation and only 6% equations were for oven-dry biomass estimation. Unfortunately, there is not a single equation for below-ground biomass estimation (table 1).

Table 1. Total number of allometric equations according to plant and equation types in Bangladesh.

Category	**Volume**	**Green biomass**	**Oven-dried biomass**	**Air-dried biomass**	**Carbon**	**Nutrients**	**Length of split leaf**	**Total**
Tree	360	78	11	0	25	3	0	477
Shrub	1	1	20	0	3	6	0	31
Palm	0	2	0	0	0	0	1	3
Bamboo	0	3	0	3	0	0	0	6
Total	361	84	31	3	28	9	1	517

3.2. Verified allometric equations

Considering operational and conceptual verification, applicability and statistical credibility, the total number of allometric equations was reduced to 222, which was 43% of the total allometric equations. Most of the equations (45%) failed to meet the requirements of statistical credibility and conceptual verification (24%) (table 2). About 97% of the valid allometric equations were for individual species, while only 3% equations for mixed species. Irrespectively, about 77% of allometric equations were for plantation followed by natural forest (15%) and home garden (7%).

Table 2. Number of allometric equations in each category of verification.

Category	**Operational verification**	**Conceptual verification**	**Applicability**	**Statistical credibility**	**Final validation**
Valid	473	394	517	285	222
Not valid	44	123	0	232	295
Total equation	517	517	517	517	517

Trees contained 196 verified equations which were 41% of the total allometric equations under the tree category. Shrubs contained 26 verified equations which were 84% of the total allometric equations of the shrub category (table 1 and 3). Surprisingly, not a single verified allometric equation was found for palm and bamboo. Under valid allometric equations, about 62% and 12% of the equations were observed for volume and oven-dry biomass respectively (figure 3).

Table 3. Number of verified allometric equations according to plant and equation types in Bangladesh.

Category	Volume	Green biomass	Oven-dried biomass	Carbon	Nutrients	Total
Tree	138	44	10	1	3	196
Shrub	0	0	17	3	6	26
Palm	0	0	0	0	0	0
Bamboo	0	0	0	0	0	0
Grand total	138	44	27	4	9	222

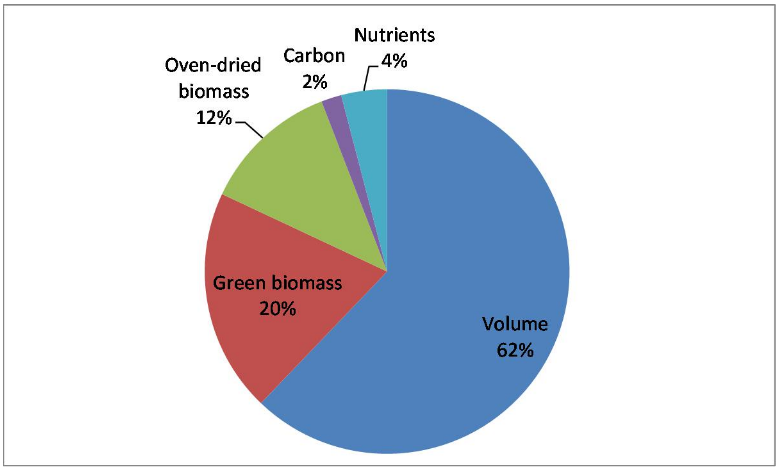

Figure 3. Percentage of valid allometric equations in different categories.

Thirty-nine species of 18 families and 31 genera have a total of 222 verified allometric equations. But, *Sonneratia apetala, Acacia mangium* and *Acacia auriculiformis* have each of 12 volume equations. *Senna siamea* has 23 allometric equations for green biomass, but other species have few equations under each category. These four species contributed 37% of the total verified allometric equations (Table 4). Species wide valid allometric equations in Bangladesh have been prepared and presented in Appendix 2.

Table 4. List of species with verified allometric equations in Bangladesh.

Genus	Species	Local name	Volume	Green biomass	Oven-dried biomass	Carbon	Nutrients	Remark
Acacia	*mangium*	Mangium	12	12				
Acacia	*auriculiformis*	Akashmoni	12	5	1			
Acacia	*nilotica*	Babla	2					
Aegialitis	*rotundifolia*	Nuniya			2			
Aegiceras	*corniculatum*	Khulshi			4	1	3	
Albizia	*procera*	Koroi	2					
Albizia	*spp*	Koroi	6					Mixed species
Albizia	*saman*	Rain tree	6					
Albizia	*richardiana*	Rajkoroi	2					
Aphanamixis	*polystachya*	Pitraj	2					
Artocarpus	*chaplasha*	Chapalish	2		2			
Artocarpus	*heterophyllus*	Kathal	2					
Avicennia	*officinalis*	Baen	2					
Azadirachta	*indica*	Neem	2					
Breonia	*chinensis*	Kadam	1					
Ceriops	*decandra*	Goran			5			
Dalbergia	*sissoo*	Sissoo	5					
Dipterocarpus	*turbinatus*	Telya garjan	3					
Eucalyptus	*camaldulensis*	Eucalyptus	7					
Eucalyptus	*tereticornis*	Eucalyptus	1					
Eucalyptus	*brassiana*	Eucalyptus	1					
Excoecaria	*agallocha*	Gewa			5	1	3	
Falcataria	*moluccana*	Moluccna	2					
Gmelina	*arborea*	Gamar	2					
Hevea	*brasiliensis*	Rubber	10					
Kandelia	*candel*	Goria			5	1	3	
Lagerstroemia	*speciosa*	Jarul	1		1			
Lannea	*coromandelica*	Badi	1					
Mangifera	*indica*	Am	2					
Melia	*azadarach*	Bokain	2					
Mixed			1	4	1	1		
Pinus	*caribaea*	Pine	8					
Senna	*siamea*	Minjiri	8	23				
Shorea	*robusta*	Sal	7					
Sonneratia	*apetala*	Keora	12					
Swietenia	*macrophylla*	Mahogany	6					
Syzygium	*cumini*	Kalojam	1					
Tectona	*grandis*	Teak	2		1			
Terminalia	*arjuna*	Arjun	2					

Xylia	*xylocarpa*	Pyinkado	1

A total of 58 verified allometric equations were observed for all over Bangladesh for different species. These allometric equations were developed from sample trees that were collected from different locations of Bangladesh. Therefore, these equations overlap different ecoregions of Bangladesh. Conversely, the other 164 verified allometric equations were found under all categories of ecoregions in Bangladesh as described by FAO, Udvardy, WWF and Bailey (table 5).

Table 5. Numbers of allometric equations and species in different ecoregions of Bangladesh.

Ecoregion	Zones	Equation number	Species number
FAO	Tropical moist Deciduous Forest	38	12
	Tropical rain forest	26	12
Udvardy	Tropical humid forests	76	14
	Tropical dry forests / Woodlands	12	9
WWF	Tropical humid forest	12	6
	Tropical and subtropical moist broadleaf forests	10	1
	Tropical and subtropical dry broadleaf forests	77	20
	Mangrove	33	5
Bailey	Rainforest Division	101	21
	Rainforest Regime Mountain	12	9
Holdridge	Subtropical moist	13	4
	Subtropical wet	13	10
	Tropical moist	10	2
Bangladesh IUCN	Brahmaputra-Jamuna flood plain	4	2
	Chittagong Hills and the CHTs	6	2
	Ganges flood plain	2	1
	Offshore island	14	2
	Sundarbans	33	5
	Surma-Kushiara flood plain	1	1
	Sylhet hills	11	8

* Overlapped ecoregions have not considered in this table.

4. Discussion

Allometric equations for trees and shrubs are fundamental to assess standing volume, biomass or carbon stock, bioenergy, nutrient cycling, payment for environmental services etc. [7, 10, 11]. Inappropriate use and development of allometric equations may give an inaccurate estimate of forest resources that may lead to inappropriate decisions on forest management issues and initiatives [16]. In Bangladesh, 5% species of trees and shrubs have allometric equations for estimating biomass and volume. However, this percentage was reduced to 2.5% considering only the verified equations. Four tree species contributed about 37% of the total valid allometric equations, and 12% verified equations were for oven-dried biomass of 10 species. This scenario pinpointed five gaps in the existing allometric equations of Bangladesh. This situation indicates: a. little work on allometric equations of common tree and shrub species, b. most of the works were concentrated on certain species, c. very little proportion of allometric equations for biomass estimation, d. no allometric equation for below-ground biomass and carbon estimation, and d. lower proportion of valid allometric equations.

Bangladesh Forest Research Institute (BFRI) was usually responsible for the development of allometric equations for estimating volume and biomass since 1971. Forest Department also developed some volume allometric equations in cooperation with BFRI under specific forest inventory from 1971 to 2000. The contribution of individual researchers in developing allometric equations was quite low during that period. Recently (2001-2016), the contribution from the individual researchers has increased. Previously, almost all efforts were given to derived volume equations for different tree species in the natural forest and plantation, to estimate the commercial volume stock of timber in particular forest and species as well. This could be the reason a very small number of biomass allometric equations were found in Bangladesh during 1971 to 2000. Few fuel wood species (*Acacia mangium, Acacia auriculiformis, Senna siamea* and *Sonneratia apetala*) have gotten more emphasis to derive allometric equations.

Development of biomass and volume allometric equations requires extensive planning, field works, sample analysis in the laboratory, and data analysis. These activities are mostly destructive, difficult, and expensive to repeat. Therefore, these activities require consistency in field work and equation selection process. Most of the allometric equations, 45% and 24% of the total allometric equations, failed to meet the requirements of statistical credibility and conceptual verification respectively under quality control scheme. This large proportion of invalid equations (57%) may be from lack of awareness on the quality control scheme of the derived allometric equations. So, it is suggested to include interval of calibration, residual standard deviation, coefficient of regression value, number of sample trees and location of sample tree or data collection in the document to meet the requirements of quality control scheme.

During the last National Forest Assessment in Bangladesh (2005-07), globally available equations and factors were used to calculate the above-ground biomass of forest. The Sundarban Carbon inventory in 2009-10 used the globally available equations for the mangrove species to calculate the carbon stock in the Sundarban Reserved Forest [17]. However, he accuracy can be questionable as they were using some general allometric equations [16, 18]. Therefore, development of allometric equations for local species, considering various factors for different forest types, is essential to ensure accuracy in volume, biomass and carbon estimation [12]. Major species of bamboo natural/ homestead, coastal afforestation, fresh water swamp forest, inland chars, mango plantation, associate species of Sal forest, major species of the Sundarbans and tree species outside the forest (table 6) should be given more emphasis during the development of biomass and volume allometric equations in Bangladesh.

Table 6. List of recommended species for further development of allometric equations in Bangladesh.

Acacia catechu	*Bombax ceiba*	*Dendrocalamus longispathus*
Adina cordifolia	*Borassus flabellifer*	*Dillenia indica*
Albizia lebbeck	*Bruguiera gymnorrhiza*	*Dillinia pentagyna*
Albizia odoratissimus	*Bruguiera sexangula*	*Diospyros peregrina*
Anacardium occidentale	*Butea monosperma*	*Disopyros philippensis*
Areca catechu	*Calophyllum inophyllum*	*Duabanga grandiflora*
Avicennia alba	*Cassia fistula*	*Dysoxylum binectariferum*
Avicennia marina	*Cerbera manghas*	*Erythrina orientalis*
Avicennia officinalis	*Chickrassia tabularis*	*Excoecaria indica*
Bambusa arundinacea	*Clerodendrum inerne*	*Feronia limonia*
Bambusa balcooa	*Cocos nucifera*	*Ficus bengalensis*
Bambusa longispiculata	*Cynometra ramiflora*	*Ficus hispida*
Bambusa polymorpha	*Dalbergia sisoo*	*Ficus religiosa*
Bambusa tulda	*Dalbergia spinosa*	*Heritiera fomes*
Bambusa vulgaris	*Dellinia pentagyna*	*Hibiscus tiliaceus*
Barringtonia acutangula	*Delonix regia*	*Khaya anthotheca*
Leucaena leucocephala	*Pongamia pinnata*	*Pithecellobium dulce*
Litchi chinensis	*Psidium guajava*	*Tamarix indica*
Lumnitzera racemosa	*Rhizophora apiculata*	*Terminalia belerica*
Melocanna baccifera	*Rhizophora mucronata*	*Terminalia catappa*

Michelia champca	*Schima wallichii*	*Toona ciliata*
Mimosops elengi	*Sonneratia apetala*	*Trema orientalis*
Moringa oleifera	*Sonneratia caseolaris*	*Xylocarpus granatum*
Nypa fruticans	*Spondias dulce*	*Xylocarpus mekongensis*
Phoenix paludosa	*Syzygium grandis*	*Zizyphus mauritiana*
Phoenix sylvestris	*Tamarindus indica*	

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Appendix A

Sl no	Source
1	Alamgir, M., Al-Amin, M. 2008. Allometric models to estimate biomass organic carbon stock in forest vegetation. Journal of Forestry Research 19 (2): 101-106
2	Chaffey, D.R., Miller, F.R., Sandom, J.H. 1985. A forest inventory of the Sundarbans, Bangladesh. Project report 140, Overseas Development Administration, Land Resources Development Centre, England
3	Cox, F.Z. 1984. Volume functions for plantation species and elements for growth models for Teak. Field Document no 2, Assistance to the Forestry Sector of Bangladesh, Food and Agricultural Organization of the United Nations, FAO/UNDP Project BGD/79/017
4	Das, N. 2014. Modeling Develops to Estimate Leaf Area and Leaf Biomass of Lagerstroemia speciosa in West Vanugach Reserve Forest of Bangladesh. ISRN Forestry, doi. org/10.1155/2014/ 486478
5	Das, S., Davidson, J., Latif, M.A., Rahman, F., Das, S. 1985. Tree volume tables for Moluccana (Paraserianthes falcataria syn. Albizia falcataria syn. A. moluccana) in Bangladesh. Bulletin no 4, Inventory Division, Bangladesh Forest Research Institute, Chittagong.
6	Das, S., Rahman, M.F., Reza, N.A., Latif, M.A. 1992. Tree volume tables for Sal (Shorea robusta Gaertn. f.) in the plantations of Bangladesh. Bulletin 7, Forest Inventory Series, Bangladesh Forest Research Institute, Chittagong, 1-11 pp.
7	Davidson, J., Das, S., Khan, S.A., Latif, M.A., Zashimuddin, M. 1985. Tree volume tables for small Eucalypt round wood in Bangladesh. Bulletin no 4, Silviculturer Research Division, Bangladesh Forest research Institute, Chittagong
8	Deb, J.C., Halim, M.A., Ahmed, E. 2012. An allometric equation for estimating stem biomass of Acacia auriculiformis in the north-eastern region of Bangladesh. Southern Forests 74(2): 103–113

9	Drigo, R., Latif, M.A., Chowdhury, J.A., Shaheduzzaman, M. 1987. The maturing mangrove plantations of the coastal afforestation project. Food and Agricultural Organization of the United Nations, FAO/UNDP Project BDG/85/085, Assistant to the Forestry Sector.

Sl no	Source
10	Drigo, R., Shaheduzzaman, M., Chowdhury, J.A. 1988. Inventory of forest resources of Southern Sylhet Forest Division. Assistance to Forestry Sector - Phase II, Field Document no 3, Food and Agriculture Organisation of the United Nations, FAO/UNDP Project BGD/85/085
11	Hossain, S.M.Y., Martin, A.R. 2013. Merchantable timber production in Dalbergia sissoo plantations across Bangladesh: regional patterns, management practices and edaphic factors. Journal of Tropical Forest Science 25(3): 299-309
12	Islam, S.M.Z., Ahmed, K.U., Khan, M.I. 2014. Mathematical models for estimating stem volume and volume tables of Rubber tree. Bulletin 10, Forest Inventory Series, Bangladesh Forest Reearch Institute, Chittagong.
13	Islam, S.M.Z., Khan, M.I. Ahmed, K.U. 2012. Volume equations and tables for Rajkoroi (Albizia richardiana King and Prain) planted in the southern part of Bangladesh. Bangladesh Journal of Forest Science 32 (1): 28-39
14	Islam, S.S., 1988. Commercial volume table for teak (Tectona grandis) in Bangladesh by regression technique. Bano Biggyan Patrika 17 (1&2): 55-67
15	Islam, S.S., Kabir, J., Masum, A.K.M. 2012. Volume Table of Raintree (Samanea saman) in Bangladesh by Regression Technique. Open Journal of Statistics 2: 115-119
16	Islam, S.S., Reza, N.A., Hasnin, M., Khan, M.A.S., Islam, M.R., Siddiqi, N.A. 1992. Volume table of young Keora (Sonneratia apetala) trees for the western coastal belt of Bangladesh. Bulletin 1, Plantation Trial Unit Series, Bangladesh Forest Research Institute, Chittagong, 1-23 pp.
17	Khan, M.N.I., Faruque, O. 2010. Allometric relationships for predicting the stem volume in a Dalbergia sissoo Roxb. plantation in Bangladesh. iForest 3: 153-158
18	Kingston, B. 1979. A collation of tree and bamboo volume tables of Bangladesh. Field Document no 15, Food and Agricultural Organization of the United Nations, UNDP/FAO Project BGD/72/005, Forest Research Institute, Chittagong
19	Latif M.A., Habib, M.A. 1994. Biomass tables for Acacia mangium grown in the plantations in Bangladesh. Journal of Tropical Forest Science 7(2): 296- 302
20	Latif, M.A., 1988. Biomass tables for young Eucalyptus grown in Bangladesh. Bano Biggyan Patrika 17 (1 & 2): 46-54

Sl no	Source
21	Latif, M.A., Das, S., Rahman, M.F., Chowdhury, J.A. 1994. Tree volume tables for Baen (Avicennia officinalis L.) in the coastal plantations of Bangladesh. In: Latif, M.A. (ed.), Tree volume table for keora (Sonneratia apetala) and Baen (Avicennia officinalis) in the coastal plantation of Banglaesh. Bulletin 8, Forest Inventory Division, Bangladesh Forest Research Institute, Chittagong, 21-23 pp.
22	Latif, M.A., Habib, M.A. 1993. Biomass table for Acacia auriculiformis grown in the plantation in Bangladesh. Indian Journal of Forestry 16 (4): 323-327
23	Latif, M.A., Habib, M.A. 1994. Biomass tables for minjiri (Cassia Siamea Lam.) grown in the plantations in Bangladesh. Bangladesh Journal of Forest Science 23 (1): 59-64
24	Latif, M.A., Habib, M.A., Das, S., 1993. Tree volume tables for Acacia mangium in the plantations of Bangladesh. Bangladesh Journal of Forest Science 22 (1 & 2): 23-29
25	Latif, M.A., Islam, M.N. 1984a. Tree volume volume tables for Syzygium grande (Wt.) Wald (Dhakijam). In: Choudhury, J.H., and Davidson, J. (eds.), Tree volume tables for four species grown in plantation in Bangladesh. Bulletin 2, Inventory Division, Bangladesh Forest Research institute. Chittagong, Bangladesh, pp. 25-57.
26	Latif, M.A., Islam, M.N. 1984b. Tree volume tables for Artocarpus chaplasha Roxb. (Chapalish). In: Choudhury, J.H., and Davidson, J. (eds.), Tree volume tables for four species grown in plantation in Bangladesh. Bulletin 2, Inventory Division, Bangladesh Forest Research institute. Chittagong, Bangladesh, pp. 58-92.
27	Latif, M.A., Islam, M.N. 1984c. Tree volume tables for Dipterocarpus turbintus Gaertn. F. (Tali Garjan). In: Choudhury, J.H., and Davidson, J. (eds.), Tree volume tables for four species grown in plantation in Bangladesh. Bulletin 2, Inventory Division, Bangladesh Forest Research institute. Chittagong, Bangladesh, pp. 122-128.
28	Latif, M.A., Islam, M.N. Choudhury, J.H. 1984. Tree volume tables for Gmelina arborea Roxb. (Gamar). In: Choudhury, J.H., and Davidson, J. (eds.), Tree volume tables for four species grown in plantation in Bangladesh. Bulletin 2, Inventory Division, Bangladesh Forest Research institute. Chittagong, Bangladesh, pp. 93-121.
29	Latif, M.A., Islam, M.N., Islam, S.S. 1985. Tree volume tables for Teak (Tectona grandis) in Bangladesh. Bulletin no 5, Inventory Division, Bangladesh Forest Research Institute, Chittagong.

Sl no	Source
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Appendix B

Genus	Species	Local name	Family	Unite of Y	Vegetation Component	Equation	Sample size	R2	MSE	Ref. No
Senna	*siamea*	Minjiri	Leguminosae	kg	Total above-ground green biomass	Log (Green biomass) = -1.5851 + 2.4855 * Log (DBH)	120	0.9728	0.0232	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Total above-ground green biomass	Log (Green biomass) = -4.4303 + 2.4855 * Log (GBH)	120	0.9728	0.0232	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Total above-ground green biomass	Log (Green biomass) = -2.0847 + 2.1723 * Log (DBH) + 0.5141 * Log (Height)	120	0.9777	0.0189	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Total above-ground green biomass	Log (Green biomass) = -4.5714 + 2.1723 * Log (GBH) + 0.5141 * Log (Height)	120	0.9777	0.0189	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Stem green biomass	Log (Green biomass) = -2.1442 + 2.5917 * Log (DBH)	120	0.9665	0.0313	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Stem green biomass	Log (Green biomass) = -5.1110 + 2.5917 * Log (GBH)	120	0.9665	0.0313	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Stem green biomass	Log (Green biomass) = -2.7095 + 2.2372 * Log (DBH) + 0.5817 * Log (Height)	120	0.9722	0.0257	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Stem green biomass	Log (Green biomass) = -5.2705 + 2.2372 * Log (GBH) + 0.5817 * Log (Height)	120	0.9722	0.0257	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Branch green Biomass	Log (Green biomass) = -2.2732 + 1.9752 * Log (DBH)	120	0.5707	0.3528	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Branch green Biomass	Log (Green biomass) = -4.5343 + 1.9752 * Log (GBH)	120	0.5707	0.3528	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Branch green Biomass	Log (Green biomass) = -3.2955 + 1.3142 * Log (DBH) + 1.0521 * Log (Height)	120	0.5855	0.3355	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Branch green Biomass	Log (Green biomass) = -4.7999 + 1.3142 * Log (GBH) + 1.0521 * Log (Height)	120	0.5855	0.3355	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Leaves and twigs green biomass	Log (Green biomass) = -2.1219 + 1.9299 * Log (DBH)	120	0.7614	0.1568	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Leaves and twigs green biomass	Log (Green biomass) = -4.3311 + 1.9299 * Log (GBH)	120	0.7614	0.1568	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Leaves and twigs green biomass	Log (Green biomass) = -0.6183 + 2.8726 * Log (DBH) - 1.5471 * Log (Height)	120	0.8209	0.098	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Leaves and twigs green biomass	Log (Green biomass) = -3.9067+ 2.8726 * Log (GBH) - 1.5471 * Log (Height)	120	0.8209	0.098	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Stem and branch green biomass	Log (Green biomass) = -2.0512 + 2.6006 * Log (DBH)	120	0.9641	0.0339	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Stem and branch green biomass	Log (Green biomass) = -5.0282 + 2.6006 * Log (GBH)	120	0.9641	0.0339	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Stem and branch green biomass	Log (Green biomass) = -2.9256 + 2.0525 * Log (DBH) + 0.8996 * Log (Height)	120	0.9785	0.0201	23

Senna	*siamea*	Minjiri	Leguminosae	kg	Stem and branch green biomass	Log (Green biomass) = -5.2752 + 2.0525 * Log (GBH) + 0.8996 * Log (Height)	120	0.9785	0.0201	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Branch, leaves and twigs green biomass	Log (Green biomass) = -2.5173 + 2.281 * Log (DBH)	120	0.8098	0.1641	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Branch, leaves and twigs green biomass	Log (Green biomass) = -2.9974 + 1.98 * Log (DBH) + 0.494 * Log (Height)	120	0.8115	0.1613	23
Senna	*siamea*	Minjiri	Leguminosae	kg	Branch, leaves and twigs green biomass	Log (Green biomass) = -5.264 + 1.98 * Log (GBH) + 0.494 * Log (Height)	120	0.8115	0.1613	23

Genus	Species	Local name	Family	Unit e of Y	Vegetation Component	Equation	Sample size	R2	MSE	FI	Ref. No
Sonneratia	*apetala*	Keora	Lythraceae	m3	Total volume over bark	Volume = 0.0117 + 0.0000280056 * DBH^(2) * Height	713	0.912			42
Sonneratia	*apetala*	Keora	Lythraceae	m3	Total volume over bark	Volume = 0.0117 + 0.00000283756 * GBH^(2) * Height	713	0.912			42
Sonneratia	*apetala*	Keora	Lythraceae	m3	Volume under bark	Volume = 0.0041 + 0.0000246325 * DBH^(2) * Height	713	0.937			42
Sonneratia	*apetala*	Keora	Lythraceae	m3	Volume under bark	Volume = 0.0041 + 0.00000249579 * GBH^(2) * Height	713	0.937			42
Avicennia	*officinalis*	Baen	Aviceniaceae	m3	Total volume over bark	Volume = 0.0089 + 0.0000264 * DBH^(2) * Height	308	0.859	0.00026		21
Avicennia	*officinalis*	Baen	Aviceniaceae	m3	Total volume over bark	Volume = 0.0089 + 0.00000267 * GBH^(2) * Height	308	0.859	0.00026		21
Albizia	*procera*	Koroi	Mimosaceae	m3	Total volume over bark	Log (Volume) = -12.0901 + 2.502194 * Log (GBH)	221	0.983			41
Albizia	*procera*	Koroi	Mimosaceae	m3	Total volume over bark	Log (Volume) = -11.6632 + 1.941989 * Log (GBH) + 0.754839 * Log (Height)	221	0.991			41
Terminalia	*arjuna*	Arjun	Combretacear	m3	Total volume over bark	Log (Volume) = -11.1885 + 2.222144 * Log (GBH)	177	0.986			41
Terminalia	*arjuna*	Arjun	Combretacear	m3	Total volume over bark	Log (Volume) = -11.3794 + 1.896423 * Log (GBH) + 0.653558 * Log (Height)	177	0.997			41
Shorea	*robusta*	Sal	Dipterocarpaceae	m3	Total volume over bark	Log (Volume) = -9.1727759 + 2.5178944 * DBH	499	0.9666	0.03856	0.0575	38
Shorea	*robusta*	Sal	Dipterocarpaceae	m3	Total volume over bark	Log (Volume) = -12.0554 + 2.5178944 * Log (GBH)	499	0.9666	0.03856	0.0575	38
Shorea	*robusta*	Sal	Dipterocarpaceae	m3	Total volume over bark	Log (Volume) = -9.615639 + 2.033071 * Log (DBH) + 0.7361229 * Log (Height)	499	0.9551	0.00776	0.0881	38
Shorea	*robusta*	Sal	Dipterocarpaceae	m3	Total volume over bark	Log (Volume) = -11.938881 + 2.033071 * Log (GBH) + 0.7361229 * Log (Height)	499	0.9551	0.00776	0.0881	38

Shorea	*robusta*	Sal	Dipterocarpaceae	m3	Total volume under bark	Volume = 0.0032556 + 0.0000269 * DBH^(2) * Height	499	0.9622	0.00652	0.0808	38
Shorea	*robusta*	Sal	Dipterocarpaceae	m3	Total volume under bark	Volume = 0.003255 + 0.0000027255 * GBH^(2) * Height	499	0.9622	0.00652	0.0808	38
Sonneratia	*apetala*	Keora	Lythraceae	m3	Total volume over bark	Volume = 0.0052 - 0.0022 * X + 0.0005 * DBH^(2)	461	0.86	0.00008	0.009	16
Sonneratia	*apetala*	Keora	Lythraceae	m3	Total volume over bark	Log (Volume) = -9.1937 + 1.7683 * Log (DBH) + 0.7358 * Log (Height)	461	0.95	0.0547	0.003	16
Sonneratia	*apetala*	Keora	Lythraceae	m3	Total volume over bark	Volume = 0.0042 - 0.0017 * DBH + 0.0005 * DBH^(2)	464	0.85	0.0001	0.0109	16
Sonneratia	*apetala*	Keora	Lythraceae	m3	Total volume over bark	Log (Volume) = -9.2587 + 1.6463 * Log (DBH) + 0.9138 * Log (Height)	464	0.94	0.0744	0.0051	16
Acacia	*mangium*	Mangium	Fabaceae	m3	Total volume over bark	Log (Volume) = -8.209 + 2.2178 * Log (DBH)	132	0.98	0.0152	0.0062	24
Acacia	*mangium*	Mangium	Fabaceae	m3	Total volume over bark	Log (Volume) = -10.7488 + 2.2178 * Log (GBH)	132	0.98	0.0152	0.0062	24

Genus	Species	Local name	Family	Unite of Y	Vegetation Component	Equation	Sample size	R2	MSE	FI	Ref. No
Acacia	*mangium*	Mangium	Fabaceae	m3	Total volume over bark	Log (Volume) = -9.1426 + 1.7612 * Log (DBH) + 0.83335 * Log (Height)	132	0.989	0.0091	0.0048	24
Acacia	*mangium*	Mangium	Fabaceae	m3	Total volume over bark	Log (Volume) = -11.1587 + 1.7612 * Log (GBH) + 0.83335 * Log (Height)	132	0.989	0.0091	0.0048	24
Acacia	*mangium*	Mangium	Fabaceae	m3	Total volume under bark	Log (Volume) = -9.00226 + 2.3246 * Log (DBH)	132	0.969	0.0299	0.0056	24
Acacia	*mangium*	Mangium	Fabaceae	m3	Total volume under bark	Log (Volume) = -11.6633 + 2.3246 * Log (GBH)	132	0.969	0.0299	0.0056	24
Acacia	*mangium*	Mangium	Fabaceae	m3	Total volume under bark	Log (Volume) = -10.2221 + 1.74054 * Log (DBH) + 1.07596 * Log (Height)	132	0.977	0.0219	0.0048	24
Mixed				kg	Total above-ground green biomass	Log (Green biomass) = -1.3933 + 2.39602 * Log (DBH)	294	0.948			20
Mixed				kg	Total above-ground green biomass	Log (Green biomass) = -4.136 + 2.39602 * Log (GBH)	294	0.948			20
Mixed				kg	Total above-ground green biomass	Log (Green biomass) = -2.228 + 1.81492 * Log (DBH) + 0.85007 * Log (Height)	294	0.9575			20
Mixed				kg	Total above-ground green biomass	Log (Green biomass) = -4.306 + 1.81492 * Log (GBH) + 0.85007 * Log (Height)	294	0.9575			20
Tectona	*grandis*	Teak	Lamiaceae	cft	Total volume over bark	Volume = 0.084 * DBH^(2.263)	635	0.88	0.23	40.79	17
Tectona	*grandis*	Teak	Lamiaceae	cft	Total volume over bark	Volume = 0.000465 * DBH^(1.58) * Height^(1.603)	645	0.92	0.16	33.36	17
Acacia	*auriculiformis*	Akashmoni	Leguminosae	kg	Total above-ground green biomass	Log (Green biomass) = -1.3577 + 2.4177 * Log (DBH)	139	0.9674			22
Acacia	*auriculiformis*	Akashmoni	Leguminosae	kg	Total above-ground green biomass	Log (Green biomass) = -2.2782 + 1.9736 * Log (DBH) + 0.8113 * Log (Height)	139	0.986	0.0084		22
Acacia	*auriculiformis*	Akashmoni	Leguminosae	kg	Stem green biomass	Log (Green biomass) = -2.3176 + 2.6075 * Log (DBH)	139	0.9698	0.0218		22
Acacia	*auriculiformis*	Akashmoni	Leguminosae	kg	Stem green biomass	Log (Green biomass) = -3.1661 + 2.1982 * Log (DBH) + 0.7477 * Log (Height)	139	0.983	0.0119		22
Acacia	*auriculiformis*	Akashmoni	Leguminosae	m3	Total volume over bark	Log (Volume) = -8.208 + 2.2389 * Log (DBH)	139	0.959		0.0061	36
Acacia	*auriculiformis*	Akashmoni	Leguminosae	m3	Total volume over bark	Log (Volume) = -10.7709 + 2.2389 * Log (GBH)	139	0.959		0.0061	36
Acacia	*auriculiformis*	Akashmoni	Leguminosae	m3	Total volume over bark	Log (Volume) = -9.125 + 1.918 * Log (DBH) + 0.67988 * Log (Height)	139	0.988		0.0648	36
Acacia	*auriculiformis*	Akashmoni	Leguminosae	m3	Total volume over bark	Log (Volume) = -11.3205 + 1.918 * Log (GBH) + 0.67988 * Log (Height)	139	0.988		0.0648	36
Acacia	*auriculiformis*	Akashmoni	Leguminosae	m3	Total volume under bark	Log (Volume) = -9.187 + 2.468 * Log (DBH)	139	0.9688		0.0059	36

Acacia	*auriculiformis*	Akashmoni	Leguminosae	m3	Total volume under bark	Log (Volume) = -12.0121 + 2.468 * Log (GBH)	139	0.9688	0.0059	36
Acacia	*auriculiformis*	Akashmoni	Leguminosae	m3	Total volume under bark	Log (Volume) = -10.2398 + 2.100244 * Log (DBH) + 0.780214 * Log (Height)	139	0.9773	0.0048	36

Genus	Species	Local name	Family	Unite of Y	Vegetation Component	Equation	Sample size	R2	MSE	FI	Ref. No
Acacia	auriculiformis	Akashmoni	Leguminosae	m3	Total volume under bark	Log (Volume) = -12.6440 + 2.100244 * Log (GBH) + 0.780214 * Log (Height)	139	0.9773		0.0048	36
Senna	siamea	Minjiri	Leguminosae	m3	Total volume over bark	Log (Volume) = -8.602 + 2.4038 * Log (DBH)	120	0.9796		0.0098	36
Senna	siamea	Minjiri	Leguminosae	m3	Total volume over bark	Log (Volume) = -11.3536 + 2.4038 * Log (GBH)	120	0.9796		0.0098	36
Senna	siamea	Minjiri	Leguminosae	m3	Total volume over bark	Log (Volume) = -9.514 + 1.871 * Log (DBH) + 0.897 * Log (Height)	120	0.9898		0.0054	36
Senna	siamea	Minjiri	Leguminosae	m3	Total volume over bark	Log (Volume) = -11.6557 + 1.871 * Log (GBH) + 0.897 * Log (Height)	120	0.9898		0.0054	36
Senna	siamea	Minjiri	Leguminosae	m3	Total volume under bark	Log (Volume) = -9.334 + 2.55686 * Log (DBH)	120	0.976		0.0081	36
Senna	siamea	Minjiri	Leguminosae	m3	Total volume under bark	Log (Volume) = -12.2632 + 2.55686 * Log (GBH)	120	0.976		0.0081	36
Senna	siamea	Minjiri	Leguminosae	m3	Total volume under bark	Log (Volume) = -10.1766698 + 2.0641847 * Log (DBH) + 0.8290937 * Log (Height)	120	0.986		0.0049	36
Senna	siamea	Minjiri	Leguminosae	m3	Total volume under bark	Log (Volume) = -12.5396 + 2.064187 * Log (GBH) + 0.8290937 * Log (Height)	120	0.986		0.0049	36
Pinus	caribaea	Pine	Pinaceae	m3	Total volume over bark	Log (Volume) = -8.7854 + 2.410755 * Log (DBH)	122	0.986		0.002	36
Pinus	caribaea	Pine	Pinaceae	m3	Total volume over bark	Log (Volume) = -11.545 + 2.410755 * Log (GBH)	122	0.986		0.002	36
Pinus	caribaea	Pine	Pinaceae	m3	Total volume over bark	Log (Volume) = -9.39412 + 1.867386 * Log (DBH) + 0.839034 * Log (Height)	122	0.9945		0.0052	36
Pinus	caribaea	Pine	Pinaceae	m3	Total volume over bark	Log (Volume) = -11.5317 + 1.867386 * Log (GBH) + 0.839034 * Log (Height)	122	0.9945		0.0052	36
Pinus	caribaea	Pine	Pinaceae	m3	Total volume under bark	Log (Volume) = -9.11552 + 2.483187 * Log (DBH)	122	0.9858		0.0084	36
Pinus	caribaea	Pine	Pinaceae	m3	Total volume under bark	Log (Volume) = -11.9580 + 2.483187 * Log (GBH)	122	0.9858		0.0084	36
Pinus	caribaea	Pine	Pinaceae	m3	Total volume under bark	Log (Volume) = -9.7505 + 1.935397 * Log (DBH) + 0.851715 * Log (Height)	122	0.9933		0.0058	36
Pinus	caribaea	Pine	Pinaceae	m3	Total volume under bark	Log (Volume)= -11.9660 + 1.935397 * Log (GBH) + 0.851715 * Log (Height)	122	0.9933		0.0058	36
Acacia	auriculiformis	Akashmoni	Leguminosae	m3	Total volume over bark	Log (Volume) = -11.839665 + 2.404568 * Log (GBH)	124	0.973			31
Acacia	auriculiformis	Akashmoni	Leguminosae	m3	Total volume over bark	Log (Volume) = -11.506528 + 1.973377 * Log (GBH) + 0.623823 * Log (Height)	124	0.979			31
Swietenia	macrophylla	Mahogany	Meliaceae	m3	Total volume over bark	Log (Volume) = -12.52620808 + 2.5653795 * Log (GBH)	245	0.942			31

Swietenia	macrophylla	Mahogany	Meliaceae	m3	Total volume over bark	Log (Volume) = -12.4361459 + 1.8661846 * Log (GBH) + 1.2282822 * Log (Height)	245	0.96	31
Albizia	spp	Koroi	Mimosaceae	m3	Total volume over bark	Log (Volume) = -12.8715358 + 2.6994968 * Log (GBH)	178	0.929	31

Genus	Species	Local name	Family	Unite of Y	Vegetation Component	Equation	Sample size	R2	MSE	FI	Ref. No
Albizia	spp	Koroi	Mimosaceae	m3	Total volume over bark	Log (Volume) = -12.4 + 1.7131 * Log (GBH) + 1.58245 * Log (Height	178	0.967			31
Dalbergi a	*sissoo*	Sissoo	Fabaceae	m3	Total volume over bark	Log (Volume) = -12.427775 + 2.6056676 * Log (GBH)	202	0.902			31
Dalbergi a	*sissoo*	Sissoo	Fabaceae	m3	Total volume over bark	Log (Volume) = -12.5189939 + 1.9800535 * Log (GBH) + 1.0775148 * Log (Height)	202	0.934			31
Acacia	*nilotica*	Babla	Mimosaceae	m3	Total volume over bark	Log (Volume) = -11.2782859 + 2.34743 * Log (GBH)	128	0.91			31
Acacia	*nilotica*	Babla	Mimosaceae	m3	Total volume over bark	Log (Volume) = -11.875835 + 1.8823999 * Log (GBH) + 1.0819988 * Log (Height)	128	0.91			31
Albizia	*saman*	Rain tree	Mimosaceae	m3	Total volume over bark	Log (Volume) = -12.287524 + 2.5086408 * Log (GBH)	190	0.952			31
Albizia	*saman*	Rain tree	Mimosaceae	m3	Total volume over bark	Log (Volume) = -12.3213818 + 1.8912934 * Log (GBH) + 1.183443 * Log (Height)	190	0.974			31
Ceriops	*decandra*	Goran	Rhizophoracea e	g	Leaf	Oven-dried biomass = 2.99 * (Collar girth)^(1.95)	48	0.89	0.02		39
Ceriops	*decandra*	Goran	Rhizophoracea e	g	Branch	Oven-dried biomass = 0.23 * (Collar girth)^(3.09)	48	0.94	0.03		39
Ceriops	*decandra*	Goran	Rhizophoracea e	g	Bark	Oven-dried biomass = 0.77 * (Collar girth)^(2.23)	48	0.97	0.01		39
Ceriops	*decandra*	Goran	Rhizophoracea e	g	Stem with bark	Oven-dried biomass = 3.22 * (Collar girth)^(2.27)	48	0.97	0.01		39
Ceriops	*decandra*	Goran	Rhizophoracea e	g	Total above-ground	Oven-dried biomass = 4.70 * (Collar girth)^(2.41)	48	0.97	0.01		39

Genus	Species	Local name	Family	Unite of Y	Vegetation Component	Equation	Sample size	R2	MSE	RMSE	AIC	Bias correction	Ref. No
Aegialitis	*rotundifolia*	Nuniya	Plumbaginaceae	g	Leaf	Oven-dried biomass = 13.96 * (Collar girth) - 12.38 * (Height)^(2)- 0.01 * (Height at girth measurement point)^(2) + 0.08 * (Collar girth) * (Height) * (Height at girth measurement point)	50	0.88	1392.78	37.32			48
Aegialitis	*rotundifolia*	Nuniya	Plumbaginaceae	g	Branch	Oven-dried biomass = 3.09 * (Collar girth)^(2) - 22.887 * (Height)^(2) + 0.13 * (Collar girth) * (Height) * (Height at girth measurement point)	50	0.92	8626.98	92.882			48
Excoecaria	*agallocha*	Gewa	Euphorbiaceae	kg	Leaf	Log 10 (Oven-dried biomass) = 0.9256 * Log 10 (DBH^(2)) - 2.133	30	0.8499	0.051	0.226	-86.652	1.146	40
Excoecaria	*agallocha*	Gewa	Euphorbiaceae	kg	Branch	Log 10 (Oven-dried biomass) = 1.1656 * Log 10 (DBH^(2)) - 1.7047	30	0.9669	0.016	0.126	-122.159	1.043	40
Excoecaria	*agallocha*	Gewa	Euphorbiaceae	kg	Bark	Log 10 (Oven-dried biomass) = 1.0824 * Log 10 (DBH^(2)) - 1.7568	30	0.9933	0.003	0.052	-175.484	1.007	40
Excoecaria	*agallocha*	Gewa	Euphorbiaceae	kg	Stem without bark	Log 10 (Oven-dried biomass) = 1.0927 * Log 10 (DBH^(2)) - 1.0275	30	0.9937	0.003	0.051	-176.616	1.007	40
Excoecaria	*agallocha*	Gewa	Euphorbiaceae	kg	Total above-ground	Log 10 (Oven-dried biomass) = 1.0996 * Log 10 (DBH^(2)) - 0.8572	30	0.9953	0.002	0.044	-185.005	1.005	40
Excoecaria	*agallocha*	Gewa	Euphorbiaceae	kg	Total above-ground	Log 10 (Nitrogen) = 1.0972 * Log 10 (DBH^(2)) - 3.0845	30	0.9922	0.0032	0.05677		1.008583	40
Excoecaria	*agallocha*	Gewa	Euphorbiaceae	kg	Total above-ground	Log 10 (Phosphorus) = 1.0947 * Log 10 (DBH^(2)) - 5.6790	30	0.9905	0.0039	0.0623		1.010333	40
Excoecaria	*agallocha*	Gewa	Euphorbiaceae	kg	Total above-ground	Log 10 (Potassium) = 1.0990 * Log 10 (DBH^(2)) - 3.0370	30	0.9929	0.0029	0.054		1.007774	40

Genus	Species	Local name	Family	Unit e of Y	Vegetation Component	Equation	Sample size	R2	MSE	RMSE	AIC	FI	Bias correction	Ref. No
Excoecaria	*agallocha*	Gewa	Euphorbiaceae	kg	Total above-ground	Log 10 (Carbon) = 1.1 * Log 10 (DBH^(2)) - 1.1937	30	0.9953	0.0019	0.044			1.005136	40
Kandelia	*candel*	Goria	Rhizophoraceae	kg	Leaf	Oven-dried biomass = 0.014 * (DBH)^(2) + 0.03	25	0.89	0.004	0.06	-133.53	0.063		37
Kandelia	*candel*	Goria	Rhizophoraceae	kg	Branch	Sqrt (Oven-dried biomass) = 0.29 * (DBH) - 0.21	25	0.87	0.03	0.16	-86.947	0.23		37
Kandelia	*candel*	Goria	Rhizophoraceae	kg	Bark	Sqrt (Oven-dried biomass) = 0.66 * sqrt (DBH) - 0.57	25	0.86	0.01	0.1	-110.07	0.111		37
Kandelia	*candel*	Goria	Rhizophoraceae	kg	Stem without bark	Sqrt (Oven-dried biomass) = 1.19 * Sqrt (DBH) - 1.02	25	0.86	0.03	0.18	-80.521	0.345		37
Kandelia	*candel*	Goria	Rhizophoraceae	kg	Total above-ground	Oven-dried biomas = 0.21 * (DBH)^(2) + 0.12	25	0.94	0.38	0.62	-18.875	0.616		37
Kandelia	*candel*	Goria	Rhizophoraceae	kg	Total above-ground	Nitrogen = 0.39 * (DBH)^(2) + 0.49	25	0.95						37
Kandelia	*candel*	Goria	Rhizophoraceae	kg	Total above-ground	Phosphorus = 0.77 * (DBH)^(2) + 0.14	25	0.95						37
Kandelia	*candel*	Goria	Rhizophoraceae	kg	Total above-ground	Potassium = 0.87 * (DBH)^(2) + 0.07	25	0.95						37
Kandelia	*candel*	Goria	Rhizophoraceae	kg	Total above-ground	Carbon = 0.09 * (DBH)^(2) + 0.05	25	0.96						37
Acacia	*auriculiformis*	Akashmoni	Leguminosae	kg	Stem biomass	Oven-dried biomass = 0.092486 * ((DBH) * (Height))^(1.4765)	600	0.9674			-600.02		1.01066	8
Albizia	*saman*	Rain tree	Mimosaceae	m3	Stem volume	Log (Volume) = -8.3013 + 2.1746 * Log (DBH)	205	0.86	0.07			0.21		15
Albizia	*saman*	Rain tree	Mimosaceae	m3	Stem volume	Log (Volume) = -9.1864 + 1.8502 * Log (DBH) + 0.8234 * Log (Height)	205	0.9	0.05			0.18		15

Mixed Shrub	g	Above-ground biomass	Oven-dried biomass = 0.696735 + 0.536662 * (Biomass)	0.87201	1
Mixed Shrub	g	Above-ground biomass	Carbon = -0.379625 + 0.500132 * (Biomass)	0.89708	1

Genus	Species	Local name	Family	Unit e of Y	Vegetation Component	Equation	Sample size	R2	MSE	AIC	FI	Bias correction	Ref. No
Acacia	*mangium*	Mangium	Fabaceae	kg	Total above-ground green biomass	Log (Green biomass) = -1.4659 + 2.3256 * Log (DBH)	132	0.9795	0.0193				19
Acacia	*mangium*	Mangium	Fabaceae	kg	Total above-ground green biomass	Log (Green biomass) = -4.1281 + 2.3256 * Log (GBH)	132	0.9795	0.0193				19
Acacia	*mangium*	Mangium	Fabaceae	kg	Total above-ground green biomass	Log (Green biomass) = -1.7073 + 2.1922 * Log (DBH) + 0.2331 * Log (Height)	132	0.9772	0.0185				19
Acacia	*mangium*	Mangium	Fabaceae	kg	Total above-ground green biomass	Log (Green biomass) = -4.2168 + 2.1922 * Log (GBH) + 0.2331 * Log (Height)	132	0.9772	0.0185				19
Acacia	*mangium*	Mangium	Fabaceae	kg	Stem green biomass	Log (Green biomass) = -2.2782 + 2.5213 * Log (DBH)	132	0.9553	0.0431				19
Acacia	*mangium*	Mangium	Fabaceae	kg	Stem green biomass	Log (Green biomass) = -5.1644 + 2.5213 * Log (GBH)	132	0.9553	0.0431				19
Acacia	*mangium*	Mangium	Fabaceae	kg	Stem green biomass	Log (Green biomass) = -2.7344 + 2.2692 * Log (DBH) + 0.4406 * Log (Height)	132	0.9584	0.0397				19
Acacia	*mangium*	Mangium	Fabaceae	kg	Stem green biomass	Log (Green biomass) = -5.3320 + 2.2692 * Log (GBH) + 0.4406 * Log (Height)	132	0.9584	0.0397				19
Acacia	*mangium*	Mangium	Fabaceae	kg	Stem and branch green biomass	Log (Green biomass) = -1.8493 + 2.3906 * Log (DBH)	132	0.9751	0.0211				19
Acacia	*mangium*	Mangium	Fabaceae	kg	Stem and branch green biomass	Log (Green biomass) = -4.5859 + 2.3906 * Log (GBH)	132	0.9751	0.0211				19
Acacia	*mangium*	Mangium	Fabaceae	kg	Stem and branch green biomass	Log (Green biomass) = -2.4276 + 2.0709 * Log (DBH) + 0.5586 * Log (Height)	132	0.9818	0.0153				19
Acacia	*mangium*	Mangium	Fabaceae	kg	Stem and branch green biomass	Log (Green biomass) = -4.7982 + 2.0709 * Log (GBH) + 0.5586 * Log (Height)	132	0.9818	0.0153				19

Artocarpus	*chaplasha*	Chapalish	Moraceeae	kg	Leaf	Log (Oven-dried biomass) = -4.44814 + 2.0483 * Log (DBH)	200		-58.298		1.019	47
Lagerstroemia	*speciosa*	Jarul	Lythraceae	kg	Leaf	Log (Oven-dried biomass) = -1.34008 + 0.83123 * Log (DBH) + 0.47969 * Log (Height)	312	0.9638	-309.79	0.47	1.0066	4
Artocarpus	*chaplasha*	Chapalish	Moraceeae	kg	Stem biomass	Log (Oven-dried biomass) = -0.53361 + 0.988759 * Log ((DBH)^(2) * (Height) * (Wood density))	101	0.99	-427.62			46

Genus	**Species**	**Local name**	**Family**	**Unite of Y**	**Vegetation Component**	**Equation**	**Sample size**	**R2**	**RMSE**	**AIC**	**FI**	**Ref. No**
Tectona	*grandis*	Teak	Lamiaceae	kg	Stem biomass	Log (Oven-dried biomass) = 0.07908 + 0.89315 * Log ((DBH)^(2) * (Height) * (Wood density))	101	0.94		-76.89		46
Albizia	*richardiana*	Rajkoroi	Leguminosae	m3	Total volume over bark	Log (Volume) = -10.996396 + 2.247808 * Log (GBH)	511	0.98				13
Albizia	*richardiana*	Rajkoroi	Leguminosae	m3	Total volume over bark	Log (Volume) = -10.831293 + 1.699319 * Log (GBH) + 0.813706 * Log (Height)	511	0.98				13
Mixed				m3	Total volume over bark	Log (Volume) = -9.4209 + 1.7480 * Log (DBH) + 0.9310 * Log (Height)	954	0.984				7
Eucalyptus	*brassiana*	Eucalyptus	Myrtaceae	m3	Total volume over bark	Log (Volume) = -9.5783 + 1.6783 * Log (DBH) + 1.0483 * Log (Height)	164	0.985				7
Eucalyptus	*tereticornis*	Eucalyptus	Myrtaceae	m3	Total volume over bark	Log (Volume) = -9.4264 + 1.6850 * Log (DBH) + 0.9840 * Log (Height)	279	0.981				7
Eucalyptus	*camaldulensis*	Eucalyptus	Myrtaceae	m3	Total volume over bark	Log (Volume) = -9.3520 + 1.8055 * Log (DBH) + 0.8590 * Log (height)	511	0.986				7
Artocarpus	*chaplasha*	Chapalish	Moraceeae	m3	Total volume over bark	Log (Volume) = -8.179774 + 2.24074 * Log (DBH)	427	0.976	0.03		3.27	26
Artocarpus	*chaplasha*	Chapalish	Moraceeae	m3	Total volume over bark	Log (Volume) = -8.9449526 + 1.82851 * Log (DBH) + 0.735381 * Log (Height)	427	0.984	0.02		2.67	26
Gmelina	*arborea*	Gamar	Lamiaceae	m3	Total volume over bark	Log (Volume) = -7.9022697 + 2.1472 * Log (DBH)	486	0.933	0.08		3.68	28
Gmelina	*arborea*	Gamar	Lamiaceae	m3	Total volume over bark	Log (Volume) = -8.4687076 + 1.63502 * Log (DBH) + 0.784847 * Log (Height)	486	0.966	0.04		2.65	28
Dipterocarpus	*turbinatus*	Telya garjan	Dipterocarpaceae	m3	Total volume over bark	Log (Volume) = -8.5116354 + 2.35556 * Log (DBH)	436	0.979	0.034		1.82	27
Dipterocarpus	*turbinatus*	Telya garjan	Dipterocarpaceae	m3	Total volume over bark	Volume = 0.000390878 + 0.00064549776 * (DBH)^(2) + 0.0001478277 * (DBH) * (Height) + 0.00002407 * (DBH)^(2) * (Height)	436	0.69			1.47	27
Falcataria	*moluccana*	Moluccna	Leguminosae	m3	Stem Volume over bark	Log (Volume) = -8.9942 + 1.4963 * Log (DBH) + 1.1461 * Log (Height)	343	0.932			0.0141	5
Falcataria	*moluccana*	Moluccna	Leguminosae	m3	Stem Volume over bark	Log (Volume) = -10.707106 + 1.4963 * Log (GBH) + 1.1461 * Log (Height)	343	0.932				5
Hevea	*brasiliensis*	Rubber	Euphorbiaceae	m3	Total volume over bark	Log (Volume) = -10.5628 + 2.1502 * Log (GBH)	583	0.95				12
Hevea	*brasiliensis*	Rubber	Euphorbiaceae	m3	Total volume over bark	Log (Volume) = -11.2768 + 1.8795 * Log (GBH) + 0.6928 * Log (Height)	583	0.97				12
Hevea	*brasiliensis*	Rubber	Euphorbiaceae	m3	Total volume under bark	Log (Volume) = -10.6451 + 2.1607 * Log (GBH)	583	0.95				12

Hevea	*brasiliensis*	Rubber	Euphorbiaceae	m3	Total volume under bark	Log (Volume) = -11.3509 + 1.8930 * Log (GBH) + 0.6848 * Log (Height)	583	0.97	12
Hevea	*brasiliensis*	Rubber	Euphorbiaceae	m3	Total volume over bark	Log (Volume) = -10.4946 + 2.1365 * Log (GBH)	388	0.93	12

Genus	Species	Local name	Family	Unit of Y	Vegetation Component	Equation	Sample size	R2	Ref. No
Hevea	*brasiliensis*	Rubber	Euphorbiaceae	m3	Total volume over bark	Log (Volume) = -11.355075 + 1.90505 * Log (GBH) + 0.67956 * Log (Height)	388	0.96	12
Hevea	*brasiliensis*	Rubber	Euphorbiaceae	m3	Total volume under bark	Log (Volume) = -10.58495 + 2.14861 * Log (GBH)	388	0.93	12
Hevea	*brasiliensis*	Rubber	Euphorbiaceae	m3	Total volume under bark	Log (Volume) = -11.43443 + 1.92013 * Log (GBH) + 0.670876 * Log (Height)	388	0.96	12
Hevea	*brasiliensis*	Rubber	Euphorbiaceae	m3	Total volume over bark	Volume = 0.01097 - 0.00064 * (GBH) + 0.000055 * (GDB)^(2)	195	0.96	12
Hevea	*brasiliensis*	Rubber	Euphorbiaceae	m3	Total volume under bark	Volume = 0.016931 - 0.00085 * (GBH) + 0.000055 * (GBH)^(2)	195	0.96	12
Acacia	*auriculiformis*	Akashmoni	Leguminosae	m3	Timber volume over bark	Volume = 0.027119694 + 0.00000240953 * (GBH)^(2) * (Height)	141	0.942	33
Acacia	*auriculiformis*	Akashmoni	Leguminosae	m3	Timber volume over bark	Volume = 0.02059085 + 0.00000257258 * (GBH)^(2) * (Height)	68	0.929	33
Acacia	*auriculiformis*	Akashmoni	Leguminosae	kg	Branch and stem less than 30 cm girth to 10 cm girth green biomass	Green biomass = 17.17526 + 0.011026 * (GBH)^(2)	68	0.857	33
Eucalyptus	*camaldulensis*	Eucalyptus	Myrtaceae	m3	Timber volume over bark	Volume = 0.003083594 + 0.00000291538 * (GBH)^(2) * (Height)	117	0.974	33
Eucalyptus	*camaldulensis*	Eucalyptus	Myrtaceae	m3	Timber volume over bark	Volume = 0.005034521 + 0.00000269095 * (GBH)^(2) * (Height)	60	0.96	33
Eucalyptus	*camaldulensis*	Eucalyptus	Myrtaceae	m3	Total volume over bark	Volume = 0.076339 - 0.00058066 * (Height) + 0.000016216 * (GBH)^(2) + 0.0000032565 * (GBH)^(2) * (Height)	94	0.978	33
Eucalyptus	*camaldulensis*	Eucalyptus	Myrtaceae	m3	Timber volume over bark	Volume = 0.00444242 + 0.00000274348 * (GBH)^(2) * (Height)	94	0.975	33
Acacia	*mangium*	Mangium	Fabaceae	m3	Total volume over bark	Volume = 0.0379401 - 0.0027469 * (GBH) + 0.000099945 * (GBH)^(2)	44	0.935	33
Acacia	*mangium*	Mangium	Fabaceae	m3	Total volume over bark	Volume = 0.01368013 - 0.00018226 * (Height) + 0.000005503 * (GBH)^(2) + 0.00000352188 * (GBH)^(2) * (Height)	44	0.971	33
Acacia	*mangium*	Mangium	Fabaceae	m3	Timber volume over bark	Volume = 0.047423 - 0.00387 * (GBH) + 0.000109 * (GBH)^(2)	37	0.908	33
Acacia	*mangium*	Mangium	Fabaceae	m3	Total volume over bark	Volume = -0.04085 + 0.00437656 * (Height) + 0.0000627199 * (GBH)^(2) + 0.00000248335 * (GBH)^(2) * (Height)	159	0.965	33
Acacia	*mangium*	Mangium	Fabaceae	m3	Timber volume over bark	Volume = 0.010632025 + 0.00000289124 * (GBH)^(2) * (Height)	133	0.95	33
Dalbergia	*sissoo*	Sissoo	Fabaceae	m3	Total volume over bark	Volume = 0.012282107 + 0.00168945 * (Height) - 0.000019455 * (GBH)^(2) + 0.00000392037 * (GBH)^(2) * (Height)	80	0.972	33

Genus	**Species**	**Local name**	**Family**	**Unit e of Y**	**Vegetation Component**	**Equation**	**Sampl e size**	**R2**	**Ref . No**
Dalbergia	*sissoo*	Sissoo	Fabaceae	m3	Total volume under bark	Log (Volume) = -12.14678171 + 2.49978991 * Log (GBH)	181	0.973	30
Dalbergia	*sissoo*	Sissoo	Fabaceae	m3	Total volume under bark	Log (Volume)= -11.8405276 + 2.07000287 * Log (GBH) + 0.6152993 * Log (Height)	181	0.982	30
Swietenia	*macrophylla*	Mahogany	Meliaceae	m3	Total volume under bark	Log (Volume) = -12.045383 + 2.460647 * Log (GBH)	120	0.979	30
Swietenia	*macrophylla*	Mahogany	Meliaceae	m3	Total volume under bark	Log (Volume) = -11.716535 + 2.084968 * Log (GBH) + 0.534389 * Log (Height)	120	0.99	30
Albizia	spp	Koroi	Mimosaceae	m3	Total volume under bark	Log (Volume) = -12.093533 + 2.463398 * Log (GBH)	103	0.931	30
Albizia	spp	Koroi	Mimosaceae	m3	Total volume under bark	Log (Volume) = -11.961135 + 1.967741 * Log (GBH) + 0.907724 * Log (Height)	103	0.947	30
Eucalyptus	*camaldulensis*	Eucalyptus	Myrtaceae	m3	Total volume under bark	Log (Volume) = -11.177929 + 2.297689 * Log (GBH)	151	0.94	30
Eucalyptus	*camaldulensis*	Eucalyptus	Myrtaceae	m3	Total volume under bark	Log (Volume) = -11.523307 + 1.911628 * Log (GBH) + 0.738982 * Log (Height)	151	0.955	30
Melia	*azadarach*	Bokain	Meliaceae	m3	Total volume under bark	Log (Volume) = -11.041653 + 2.1705 * Log (GBH)	143	0.935	30
Melia	*azadarach*	Bokain	Meliaceae	m3	Total volume under bark	Log (Volume) = -10.962743 + 1.888957 * Log (GBH) + 0.505435 * Log (Height)	143	0.951	30
Mangifera	*indica*	Am	Anacardiaceae	m3	Total over bark volume	Log (Volume) = -11.27269 + 2.24506 * Log (GBH)	343	0.975	32
Mangifera	*indica*	Am	Anacardiaceae	m3	Total over bark volume	Log (Volume) = -11.25377 + 1.96697 * Log (GBH) + 0.52237 * Log (Height)	343	0.981	32
Lannea	*coromandelica*	Badi	Anacardiaceae	m3	Total over bark volume	Log (Volume) = -11.519102 +2.01724 * Log (GBH) + 0.56356 * Log (Height)	87	0.971	32
Syzygium	*cumini*	Kalojam	Myrtaceae	m3	Total over bark volume	Log (Volume) = -11.24854 + 2.24804 * Log (GBH)	99	0.966	32
Artocarpus	*heterophyllus*	Kathal	Moraceeae	m3	Total over bark volume	Log (Volume) = -11.06320 + 2.18203 * Log (GBH)	119	0.97	32
Artocarpus	*heterophyllus*	Kathal	Moraceeae	m3	Total over bark volume	Log (Volume) = -10.99533 + 1.80823 * Log (GBH) + 0.68951 * Log (Height)	119	0.983	32
Albizia	spp	Koroi	Mimosaceae	m3	Total over bark volume	Log (Volume)= -11.50692 + 2.31757 * Log (GBH)	140	0.968	32
Albizia	spp	Koroi	Mimosaceae	m3	Total over bark volume	Log (Volume) = -11.19651 + 1.85690 * Log (GBH) + 0.67878 * Log (Height)	140	0.979	32
Swietenia	*macrophylla*	Mahogany	Meliaceae	m3	Total over bark volume	Log (Volume) = -11.46122 + 2.29592 * Log (GBH)	105	0.981	32
Swietenia	*macrophylla*	Mahogany	Meliaceae	m3	Total over bark volume	Log (Volume) = -11.27102 + 1.88064 * Log (GBH) + 0.64629 * Log (Height)	105	0.99	32
Azadirachta	*indica*	Neem	Meliaceae	m3	Total over bark volume	Log (Volume) = -11.33340 + 2.25814 * Log (GBH)	36	0.974	32
Azadirachta	*indica*	Neem	Meliaceae	m3	Total over bark volume	Log (Volume) = -11.42823 + 1.89235 * Log (GBH) + 0.71493 * Log (Height)	36	0.985	32
Aphanamixis	*polystachya*	Pitraj	Meliaceae	m3	Total over bark volume	Log (Volume) = -11.25645 + 2.25821 * Log (GBH)	105	0.973	32

Aphanamixis	*polystachya*	Pitraj	Meliaceae	m3	Total over bark volume	Log (Volume) = -11.25528 + 1.98544 * Log (GBH) + 0.47163 * Log (Height)	105	0.987	32
Albizia	*saman*	Rain tree	Mimosaceae	m3	Total over bark volume	Log (Volume) = -11.37623 + 2.26924 * Log (GBH)	153	0.981	32

Genus	Species	Local name	Family	Unite of Y	Vegetation Component	Equation	Sample size	R2	MSE	RMSE	AIC	FI	Ref. No
Albizia	*saman*	Rain tree	Mimosaceae	m3	Total over bark volume	Log (Volume) = -11.31983 + 1.91118 * Log (GBH) + 0.63606 * Log (Height)	153	0.99					32
Breonia	*chinensis*	Kadam	Rubiaceae	m3	Total volume over bark	Log (Volume) = -10.4647 + 2.3911 * Log (DBH) + 0.6373 * Log (Height)	51	0.99065					10
Dipterocarpus	*turbinatus*	Telya garjan	Dipterocarpaceae	m3	Total volume over bark	Log (Volume) = -9.5258 + 2.1229 * Log (DBH) + 0.5993 * Log (Height)	49	0.96667					10
Lagerstroemia	*speciosa*	Jarul	Lythraceae	m3	Total volume over bark	Log (Volume) = -9.6744 + 2.1065 * Log (DBH) + 0.6675 * Log (Height)	74	0.98628					10
Xylia	*xylocarpa*	Lohakat	Leguminosae	m3	Total volume over bark	Log (Volume) = -9.4303 + 2.0988 * Log (DBH) + 0.6042 * Log (Height)	94	0.98723					10
Shorea	*robusta*	Sal	Dipterocarpaceae	m3	Total volume over bark	Log (Volume) = -10.0253 + 2.1163 * Log (DBH) + 0.7588 * Log (Height)	79	0.98787					10
Sonneratia	*apetala*	Keora	Lythraceae	m3	Total volume over bark	Log (Volume) = -8.66152 + 1.5856 * Log (DBH) + 0.77152 * Log (Height)	91	0.98					9
Sonneratia	*apetala*	Keora	Lythraceae	m3	Total volume over bark	Log (Volume) = -9.29715 + 1.70514 * Log (DBH) + 0.95088 * Log (Height)	236	0.98					9
Sonneratia	*apetala*	Keora	Lythraceae	m3	Total volume over bark	Log (Volume) = -9.23507 + 1.69673 * Log (DBH) + 0.92309 * Log (Height)	133	0.98					9
Sonneratia	*apetala*	Keora	Lythraceae	m3	Total volume over bark	Log (Volume) = -8.75215 + 1.75034 * Log (DBH) + 0.64233 * Log (Height)	214	0.92					9
Aegiceras	*corniculatum*	Khulshi	Myrsinaceae	kg	Leaf	Log 10 (Oven-dried biomass) = 0.76 * Log 10 ((DBH^(2)) - 1.39	29	0.93	0.02	0.12	-119.05	0.05	38

Aegiceras	*corniculatum*	Khulshi	Myrsinaceae	kg	Bark	Log 10 (Oven-dried biomass) = 1.04 * Log 10 ((DBH^(2)) - 1.80	29	0.99	0.004	0.07	-154.68	0.02	38
Aegiceras	*corniculatum*	Khulshi	Myrsinaceae	kg	Stem without bark	Log 10 (Oven-dried biomass) = 1.04 * Log 10 ((DBH^(2)) - 0.99	29	0.99	0.004	0.07	-154.68	0.14	38
Aegiceras	*corniculatum*	Khulshi	Myrsinaceae	kg	Total above-ground	Sqrt (Oven-dried biomass) = 0.48 * DBH - 0.13	29	0.99	0.03	0.18	-96.57	0.68	38
Aegiceras	*corniculatum*	Khulshi	Myrsinaceae	g	Total above-ground	Sqrt (Nitrogen) = 0.67 * DBH + 0.11	29	0.99	0.09	0.31	-66.27	1.85	38
Aegiceras	*corniculatum*	Khulshi	Myrsinaceae	g	Total above-ground	Sqrt (Phosphorus) = 0.94 * DBH + 0.08	29	0.98	0.19	0.43	-45.94	3.69	38
Aegiceras	*corniculatum*	Khulshi	Myrsinaceae	g	Total above-ground	Sqrt (Potassium) = 1.06 * DBH - 0.18	29	0.99	0.17	0.41	-49.25	3.66	38
Aegiceras	*corniculatum*	Khulshi	Myrsinaceae	kg	Total above-ground	Sqrt (Carbon)= 0.33 * DBH - 0.09	29	0.99	0.02	0.13	-177.67	0.39	38

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