TREE SPECIES DIVERSITY IN THE FOREST OF RENIKHAYONG PARA VILLAGE IN BANDARBAN, BANGLADESH: A CASE STUDY

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Abstract

The study was conducted to explore tree species diversity of Renikhayong para Village Common Forest (VCF) of Bandarban hill district. Stratified random sampling was carried out to assess the tree species diversity of the VCF. Renikhayong Para VCF with an area of 40 acres of land has more than 85 tree species belonging to 31 families, where Euphorbiaceae family was dominant containing 11 species followed by Rubiaceae (7 species), Moraceae (7 species), Meliaceae (5 species), Mimosaceae (5 species), Combretaceae (4 species), Lauraceae (4 species) and Anacardiaceae (3 species). Dominant tree species was *Grewia nervosa*. Renikhayong para VCF has diverse floristic resources that are known from the Shannon-Wiener's diversity index (4.007), Simpson's diversity index (0.028), Margalef's richness index (13.21) and Species evenness index (0.90). However, number of species and number of individuals both were highest in the height range of 5 - <10 m. Similar trend was observed in dbh classes. Number of individuals were highest in dbh range of 5 - <15 cm and the lowest in ≥ 55 cm. The results depict the presence of maximum small trees in the VCF and decreasing the number of trees with the increase of tree height (m) and dbh (cm). Presence of diverse tree species and diversity indices indicate the importance and potential of the VCF for conservation and sustainable use.

***Key words*:** Village Common Forest; Indigenous communities; Importance Value Index; Biological diversity; Diversity indices; Heterogeneous composition.

INTRODUCTION

Village common forests (VCF), managed by indigenous communities in Chittagong Hill Tracts (CHT), are essentially repositories of food, biodiversity and medicinal plants and their management have set a standard model for the protection of biodiversity, environment and natural resources (Baten *et al.* 2010). VCF shows a rich biodiversity in comparison to government managed reserve forests in Chittagong Hill Tracts (CHT) (Baten *et al.* 2010, Adnan and Dastidar 2011). VCF are good examples of effective community based forest management under certain customary rules and regulations in CHT (Halim and Roy 2006, Baten *et al.* 2010). Since time immemorial forest has been used by the tribal population for hunting ground, gathering food, swidden (jhum) cultivation, grazing, charcoal making and collection of minor forest products including medicinal or herbal produces as major means of livelihood (Roy 2000, 2002, Halim and Roy 2006, Chowdhury 2008).

The world is now in a stage of transition, triggered by environmental crises and vulnerabilities where maintaining sustainability in all development initiatives is crucial, not only for scientist and decision makers, but for long term survival of the earth system (Azam and Sarker 2011). There is growing evidence that local community-based entities are good and often better managers of forests in comparison to regional, national and local governments (White and Martin 2002, Rasul and Thapa 2005, Rasul and Karki 2006). In Chittagong Hill Tracts (CHT) different ethnic communities traditionally maintain a common forest area which is known as Village Common Forest (VCF) or Parabon or Mouza reserve etc. (Jashimuddin and Inoue 2012). The VCF's management responsibility goes to the respective community which depends largely on water sources and forest common to fulfill its basic subsistence requirements and cash income (Miah and Chowdhury 2004, Rasul and Karki 2006, Rasul 2007).

However, there is no valid information on the tree species diversity of Renikhayong para VCF, a

fascinating hill region of Bandarban hill district situated in the southeastern part of the country. Thus, the present study was carried out with the aim of exploring tree species diversity of Renikhayong para Village Common Forest (VCF) in Bandarban hill district.

MATERIAL AND METHODS

Study area

The study was carried out in Bandarban hill district located in the Southeast side of Bangladesh between 21.15 ° and 22.20 °N latitudes, and 91.05 ° and 92.40 ° E longitudes. The area of Bandarban district is about 4,479 square kilometers with two-thirds of its area characterized by steep slopes. Renikhayong para village was established in 1990 and at present about 32 families are living there. On the other hand, Renikhayong para VCF was established after three years of village establishment. The VCF area is about 40 acres and 22 kilometers away from sadar upazila. There is no electricity in this village. Inhabitants of this village use GFS or Chora as their source of drinking water.

Sampling methods

The methods of the study consist of reconnaissance survey, field survey, data analysis and report writing. To have an idea about location, accessibility, communication means and VCF area prior to selection of sampling procedure, field visits as well as formal discussion was conducted with Tahzingdong a local Non-Governmental Organization.

Stratified random sampling was carried out for the inventory of the tree species. The sampling plot size for tree species diversity was 20m×20m. Height and dbh of tree species in each plot were measured. All the trees having dbh of ≥5 cm were measured and recorded. Basal area, relative density, relative frequency, relative dominance and Importance Value Index (IVI) were calculated following Shukla and Chandal (2000). Four diversity indices, i.e. Shannon-Wiener's index (H), Simpson's diversity index (D), Margalef's species richness index (R) and Species evenness index (E) were analyzed following Shannon and Wiener (1963), Simpson (1949), Margalef (1958) and Pielou (1966), respectively to get a picture of tree species diversity in Renikhayong para VCF. Several transact walks across the VCF was made following Chattergy *et al.* (2000).

RESULTS AND DISCUSSION

The study was carried out in Renikhayong para VCF of Bandarban district. It is about 22 km away from the Sadar Upazila. This VCF was established in 1993 (Table 1).

Table 1. General information of VCF studied in Bandarban district.

Village	Renikhayong para
Mouza	9 no. ward Renikhayong mouza
Year of village establishment	1990
Total household (No.)	32
Current population of the village (No.)	180
Year of VCF establishment	1993
Area (Acre)	40
Distance (km) from Sadar Upazilla	22
Electricity availability	No
Drinking water sources	GFS, Chora

The results of the study revealed that Renikhayong para VCF possesses 576 individuals of 85 tree species belonging to 31 families. Among the recorded species, six species are not yet identified. The dominant family was Euphorbiaceae with 11 species followed by Rubiaceae (7 species), Moraceae (7

species), Meliaceae (5 species), Mimosaceae (5 species), Combretaceae (4 species), Lauraceae (4) and Anacardiaceae (3 species) (Table 2). Apocynaceae, Bignoniaceae, Burseraceae, Clusiaceae, Dilleniaceae, Ebenaceae, Myrtaceae, Sterculiaceae and Tiliaceae families have two species in each family and the remaining families possess only one species each (Table 2).

Table 2. Tree species with their local, scientific and family names at Renikhayong para VCF.

Family	Scientific name	Local name	No. of trees
Anacardiaceae	*Lannea coromandelica* (Houtt.) Merr.	Bhadi	13
	*Spondias pinnata (*L.f) Kurz	Jongli amra	3
	Mangifera sylvatica Roxb.	Uriam	8
Apocynaceae	*Alstonia scholaris* (L.) R. Br.	Chatian	12
	Holarrhena antidysenterica (L.) Wall. *ex* Decne	Kuruch	9
Bignoniaceae	*Stereospermum colais* (Buch.-*ex* Dillw.) Mabberley	Dharmara	22
	Oroxylum indicum (L.) Kurz	Thona/Kanaidinga	4
Bombacaceae	*Bombax insigne* Wall.	Shimul Tula	10
Burseraceae	*Canarium resiniferum* Brace *ex* King.	Dhup	3
	Protium serratum (Wall. *ex* Coelbr.) Engl.	Gutgutiya	16
Caesalpiniaceae	*Saraca asoca* (Roxb.) de Wild.	Ashok	2
Clusiaceae	*Garcinia cowa* Roxb. *ex* DC.	Jongli Kao	1
	Mesua ferrea L.	Nageshwar	4
Combretaceae	*Terminalia bellirica* (Gaertn.) Roxb.	Bohera	6
	Terminalia chebula Retz.	Haritaki	4
	Anogeissus acuminata (Roxb. *ex* DC.) Gull. & Perr.	Sikori	11
	Terminalia sp.	Badam	14
Dilleniaceae	*Dillenia indica* L.	Chalta	3
	Dillenia pentagyna Roxb.	Hargeza	2
Dipterocarpaceae	*Anisoptera scaphula* (Roxb.) Pierre	Boilam	4
Ebenaceae	*Diospyros montana* Roxb.	Bon Gab	1
	Diospyros sp.	Gab	2
Elaeocarpaceae	*Elaeocarpus tectorius* (Lour.) Poir.	Jalpai	3
Euphorbiaceae	*Glochidion multiloculare* (Roxb. *ex* Wild.) Muell.-Arg.	Aniatori/Pannyatori	26
	Suregada multiflora (A. Juss.) Bail.	Ban-naranga	4
	Callicarpa arborea Roxb.	Bormala	7
	Bridelia sp.	Bridelia sp.	3
	Macaranga denticulata (Blume) Mull.-Arg.	Bura	3
	Sapium baccatum Roxb.	Champata	1
	Gmelina arborea Roxb.	Gamar	43
	Aporosa dioica (Roxb.) Muell.-Arg.	Harula	3
	Aporosa wallichii Hook.f.	Kechua	5
	Baccaurea ramiflora Lour.	Lotkon	1
	Mallotus philippensis (Lamk.) Mull.-Arg.	Sindhuri	3
Fabaceae	*Erythrina fusca* Lour.	Mandar	2
Fagaceae	*Lithocarpus* sp.	Batna	1
Flacourtiaceae	*Flacourtia jangomas (Lour.) Raeusch.*	Painnagula	2
Lauraceae	*Actinodaphne* sp.	Bhuiya	4
	Cinnamomum verum C.Presl	Jongli Daruchini	1
	Litsea glutinosa (Lour.) Robinson	Menda	8
	Actinodaphne angustifolia Ness	Modon mosta/Tejmatan	4
	Litsea monopetala (Roxb.) Pers.	Oirga	2
Leeaceae	*Leea macrophylla* Roxb. *ex* Hornem.	Chaigas	8
Lythraceae	*Lagerstroemia speciosa* (L.) Pers.	Jongli Jarul	1
Magnoliaceae	*Michelia champaca* L.	Champa	2
Meliaceae	*Walsura robusta* Roxb.	Bon Lichu	2

	Chukrasia tabularis A. Juss.	Chickrassi	1
	Swietenia macrophylla King	Mehogoni	3
	Aphanamixis polystachya (Wall.) R.N. Parker	Pitraj	3
	Toona ciliata M. Roem.	Toon	3
Mimosaceae	*Albizia chinensis* (Osb.) Merr.	Chakua Koroi	14
	Albizia procera (Roxb.) Benth	Koroi	8
	Albizia lebbeck (L.) Benth. & Hook.	Kalo Koroi	5
	Albizia lucidior (Steud.) I.C.Nielsen	Sil-Koroi	11
	Albizia odoratissima (L.f.) Benth.	Tetuya Koroi	5
Moraceae	*Ficus pyriformis* Hook. & Arn.	Bon Dumur	2
	Artocarpus lacucha Buch.-Ham	Borta	2
	Ficus benghalensis L.	Bot	2
	Artocarpus chama Buch.-Ham. *ex* Wall.	Chapalish	16
	Ficus hispida L.f.	Dumur	5
	Ficus sp.	Ficus sp.	11
	Ficus racemosa L.	Jogya Dumur	2
Myristicaceae	*Myristica linifolia* Roxb.	Amberala	9
Myrtaceae	*Syzygium cumini* (L.) Skeels	Jam	7
	Syzygium fruticosum (Wall.) Masamune	Putijam	10
Rubiaceae	*Hymenodictyon orixensis* (Roxb.) Mabb.	Ful Gamari	4
	Neolamarckia cadamba (Roxb.) Bosser	Kadam	8
	Neonauclea sessilifolia (Roxb.) Merr.	Kom	4
	Haldina cordifolia (Roxb.) Ridsdale	Konnaari	2
	Mussaenda sp.	Musanda	3
	Psychotria sp.	Bara Sudma	5
	Morinda angustifolia Roxb.	Ronggas	9
Sonneratiaceae	*Duabanga grandiflora* (Roxb. *ex* DC.) Wall.	Bandorhola	8
Sterculiaceae	*Sterospermum semisegitattum* Buch. –Ham. *ex* Roxb.	Lana-achar	5
	Sterculia villosa Roxb. *ex* Smith	Udal	8
Theaceae	*Schima wallichii* (DC.) Korth.	Kanak	7
Tiliaceae	*Grewia nervosa* (Lour.) Panigr.	Assargula	53
	Brownlowia elata Roxb.	Moos	8
Verbenaceae	*Vitex peduncularis* Wall. *ex* Schauer	Goda/Arsol	13
Unidentified	*Unidentified-1*	Dormum sing	2
	Unidentified-2	Mamching	4
	Unidentified-3	Puronja	5
	Unidentified-4	Puronma	9
	Unidentified-5	Ramiyat	4
	Unidentified-6	Turong	3

Diversity indices

Different biological diversity index values were calculated to depict tree species diversity of the VCF studied. Shannon-Wiener's Diversity Index was found 4.007 where Simpson's Diversity Index was 0.028. Moreover, Margalef's Richness Index was calculated as 13.21 and Species Evenness Index was 0.90 (Table 3).

Table 3. Biological diversity indices for recorded tree species in the VCF.

Name of the indices	Diversity index Values
Shannon-Wiener's Diversity Index (H)	4.007
Simpson's Diversity Index (D)	0.028
Margalef's Richness Index (R)	13.21
Species Evenness Index (E)	0.90

Quantitative structure of tree species at Renikhayong para VCF

Grewia nervosa possesses the highest (88.33) stem/ha followed by *Gmelina arborea* (71.67), *Glochidion multiloculare* (43.33), *Stereospermum colais* (36.67), *Protium serratum* (26.67) and *Artocarpus chama* (26.67). The study reveals that *Artocarpus lacucha* occupied the highest basal area (0.16 m^2) followed by *Ficus benghalensis* (0.15 m^2), *Terminalia bellirica* (0.14 m^2) and *Diospyros montana* (0.12 m^2). Relative density was found maximum in *Grewia nervosa* (9.20%) followed by *Gmelina arborea* (7.47%), *Glochidion multiloculare* (4.51%), *Stereospermum colais* (3.82%), *Protium serratum* (2.78%) and *Artocarpus chama* (2.78%).

Grewia nervosa showed the highest (3.94%) relative frequency followed by *Glochidion multiloculare* (3.66%), *Gmelina arborea* (3.38%), *Stereospermum colais* (3.28%), *Protium serratum* (2.82%) and *Artocarpus chama* (2.54%). Relative dominance was found highest in *Artocarpus lacucha* (5.38%) followed by *Ficus benghalensis* (5.15%), *Terminalia bellirica* (4.76%) and *Diospyros montana* (4.2%).

The highest Importance Value Index (IVI) was found in *Grewia nervosa* (13.41) followed by *Gmelina arborea* (12.87), *Stereospermum colais* (10.96), *Glochidion multiloculare* (8.37), *Albizia lucidior* (7.21) and *Terminalia* spp. (7.15) (Table 4). The IVI value helps in decision to select priority species for conservation program (Shibru 2002).

Table 4. Stem/ha, BA (m^2), relative density, relative frequency, relative dominance and Importance Value Index (IVI) of tree species recorded at Renikhayong para VCF.

Scientific name	Stem/ha	BA (m^2)	RD (%)	RF (%)	RDo (%)	IVI
Actinodaphne sp.	6.67	0.01	0.69	0.85	0.33	1.87
Myristica linifolia	15.00	0.05	1.56	1.41	1.62	4.59
Glochidion multiloculare	43.33	0.01	4.51	3.66	0.19	8.37
Saraca asoca	3.33	0.01	0.35	0.56	0.40	1.31
Grewia nervosa	88.33	0.01	9.20	3.94	0.26	13.41
Duabanga grandiflora	13.33	0.09	1.39	1.41	3.16	5.95
Suregada multiflora	6.67	0.06	0.69	0.85	1.99	3.53
Lithocarpus sp.	1.67	0.04	0.17	0.28	1.24	1.70
Lannea coromandelica	21.67	0.06	2.26	1.97	1.88	6.11
Terminalia bellirica	10.00	0.14	1.04	1.13	4.76	6.93
Anisoptera scaphula	6.67	0.03	0.69	0.85	1.13	2.67
Ficus pyriformis	3.33	0.01	0.35	0.56	0.38	1.29
Diospyros montana	1.67	0.12	0.17	0.56	4.20	4.94
Walsura robusta	3.33	0.04	0.35	0.28	1.23	1.86
Callicarpa arborea	11.67	0.06	1.22	1.69	1.94	4.84
Artocarpus lacucha	3.33	0.16	0.35	0.56	5.38	6.29
Ficus benghalensis	3.33	0.15	0.35	0.56	5.15	6.06
Bridelia sp.	5.00	0.02	0.52	0.56	0.51	1.59
Macaranga denticulata	5.00	0.02	0.52	0.56	0.73	1.81
Leea macrophylla	13.33	0.01	1.39	1.41	0.10	2.90
Albizia chinensis	23.33	0.05	2.43	1.97	1.59	5.99
Dillenia indica	5.00	0.01	0.52	0.56	0.48	1.56
Michelia champaca	3.33	0.01	0.35	0.56	0.23	1.14
Sapium baccatum	1.67	0.01	0.17	0.28	0.07	0.53
Artocarpus chama	26.67	0.01	2.78	2.54	0.44	5.75
Alstonia scholaris	20.00	0.03	2.08	2.25	0.88	5.22
Chukrasia tabularis	1.67	0.01	0.17	0.28	0.51	0.96
Stereospermum colais	36.67	0.11	3.82	3.38	3.76	10.96
Canarium resiniferum	5.00	0.01	0.52	0.85	0.47	1.84
Diospyros sp.	3.33	0.01	0.35	0.56	0.50	1.41
Ficus hispida	8.33	0.03	0.87	1.13	0.89	2.88

Ficus sp.	18.33	0.01	1.91	2.54	0.37	4.82
Hymenodictyon orixensis	6.67	0.05	0.69	0.85	1.68	3.22
Gmelina arborea	71.67	0.06	7.47	3.38	2.03	12.87
Vitex peduncularis	21.67	0.01	2.26	1.97	0.23	4.46
Protium serratum	26.67	0.01	2.78	2.82	0.33	5.92
Dillenia pentagyna	3.33	0.06	0.35	0.56	2.00	2.91
Terminalia chebula	6.67	0.06	0.69	0.85	2.16	3.70
Aporosa dioica	5.00	0.01	0.52	0.85	0.46	1.82
Elaeocarpus tectorius	5.00	0.04	0.52	0.85	1.28	2.64
Syzygium cumini	11.67	0.01	1.22	1.69	0.27	3.18
Ficus racemosa	3.33	0.02	0.35	0.56	0.52	1.43
Spondias pinnata	5.00	0.07	0.52	0.85	2.36	3.73
Cinnamomum verum	1.67	0.01	0.17	0.28	0.20	0.66
Lagerstroemia speciosa	1.67	0.04	0.17	0.28	1.36	1.81
Garcinia cowa	1.67	0.04	0.17	0.28	1.23	1.68
Swietenia macrophylla	5.00	0.01	0.52	0.56	0.07	1.15
Neolamarckia cadamba	13.33	0.11	1.39	1.41	3.60	6.40
Schima wallichii	11.67	0.06	1.22	1.13	1.90	4.24
Aporosa octandra	8.33	0.01	0.87	1.13	0.14	2.14
Neonauclea sessilifolia	6.67	0.03	0.69	0.85	1.17	2.71
Haldina cordifolia	3.33	0.03	0.35	0.56	1.01	1.92
Albizia procera	13.33	0.07	1.39	1.69	2.31	5.39
Holarrhena antidysenterica	15.00	0.01	1.56	1.97	0.43	3.96
Sterospermum semisegitattum	8.33	0.01	0.87	0.85	0.41	2.12
Baccaurea ramiflora	1.67	0.01	0.17	0.28	0.10	0.55
Erythrina fusca	3.33	0.01	0.35	0.28	0.48	1.11
Litsea glutinosa	13.33	0.01	1.39	1.69	0.28	3.36
Actinodaphne angustifolia	6.67	0.01	0.69	1.13	0.25	2.07
Brownlowia elata	13.33	0.01	1.39	1.41	0.33	3.13
Mussaenda sp.	5.00	0.01	0.52	1.13	0.27	1.92
Mesua ferrea	6.67	0.01	0.69	0.85	0.21	1.75
Litsea monopetala	3.33	0.01	0.35	0.28	0.23	0.85
Flacourtia jangomas	3.33	0.01	0.35	0.56	0.35	1.26
Aphanamixis polystachya	5.00	0.01	0.52	0.56	0.25	1.33
Psychotria sp.	8.33	0.02	0.87	0.85	0.74	2.45
Syzygium fruticosum	16.67	0.01	1.74	1.41	0.25	3.39
Morinda angustifolia	15.00	0.01	1.56	1.69	0.38	3.63
Albizia lebbeck	8.33	0.03	0.87	0.85	0.93	2.64
Bombax insigne	16.67	0.04	1.74	1.69	1.26	4.68
Anogeissus acuminata	18.33	0.02	1.91	1.97	0.78	4.66
Albizia lucidior	18.33	0.10	1.91	1.97	3.32	7.21
Mallotus philippensis	5.00	0.01	0.52	0.56	0.45	1.53
Terminalia sp.	23.33	0.06	2.43	2.54	2.18	7.15
Albizia odoratissima	8.33	0.05	0.87	0.85	1.78	3.49
Oroxylum indicum	6.67	0.01	0.69	0.85	0.29	1.83
Toona ciliata	5.00	0.09	0.52	0.85	2.95	4.32
Sterculia villosa	13.33	0.01	1.39	1.13	0.40	2.92
Mangifera sylvatica	13.33	0.01	1.39	1.69	0.09	3.17
Unidentified-1	3.33	0.04	0.35	0.56	1.22	2.13
Unidentified-2	6.67	0.08	0.69	1.13	2.78	4.60
Unidentified-3	8.33	0.01	0.87	1.13	0.47	2.47
Unidentified-4	15.00	0.01	1.56	1.69	0.39	3.65
Unidentified-5	6.67	0.02	0.69	1.13	0.65	2.47
Unidentified-6	5.00	0.06	0.52	0.56	2.03	3.11
Total			**100.00**	**100.00**	**100.00**	**300.00**

Percentage distribution of tree species in height (m) classes

Percentage distribution of tree individuals into different height (m) classes showed that height range (5 - <10) m holds maximum (45.49%) percentage of tree individuals. The minimum percentage (2.78%) was represented by the height range (25 - <30) m. Both the number of species and number of individuals decreased regularly with the increase of total height (m) (Fig. 1).

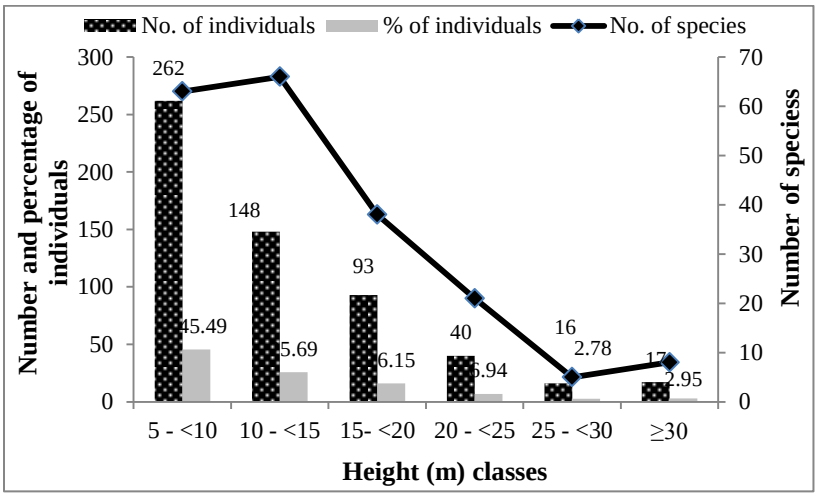

Fig. 1. Distribution of tree height (m) classes at Renikhayong Para VCF.

Percentage distribution of tree species in DBH (cm) classes

Percentage distribution of tree individuals into different dbh (cm) classes showed that dbh range (5 - <15) cm holds maximum (56.60%) percentage of tree individuals. The minimum percentage (3.3%) was represented by the height range ≥55 cm. Both the number of species and number of individuals decreased regularly with the increase of total dbh (Fig. 2).

The study revealed that Renikhayong para VCF supports 576 individuals of 85 tree species belonging to 31 families. Baten *et al.* (2010) recorded 173 floral species from the VCF in CHT. Similarly Basak *et al*. (2014) recorded 148 plant species from Murong community managed 20 ha sized Ampupara VCF in Bandarban of which 82 are tree species. Mohiuddin and Paul (2018) recorded 76 indigenous tree species from Nirbanpur Buddha Bihar (kiyang) in Rangamati. Whereas tree diversity is higher in Protected Areas, e.g. Hossain and Hossain (2014) reported 240 tree species under 61 families from Chunati Wildlife Sanctuary. A total of 182 tree species belonging to 50 families was recorded from Dhudpukuria-Dophachari Wildlife Sanctuary (DDWS) (Feeroz *et al.* 2012). Feeroz *et al.* (2011) reported 142 tree species belonging to 57 families from Rema- Kalenga Wildlife Sanctuary. Renikhayong para VCF has more than 85 tree species belonging to 31 families which is quite poor than that of the PAs. This may be because of smaller area (only 40 acre) of VCF studied. However, Malaker *et al.* (2010) reported 78 tree species from Lawachara National Park. Sobuj and Rahman (2010) reported 26 tree species from Khadimnagar National Park. About 82 species under 31 families were found in Dulahazara Safari Park (Uddin and Misbahuzzaman, 2007). Renikhayong para VCF shows a rich biodiversity compared to government managed reserve forests in CHT (Baten *et al*. 2010, Adnan and Dastidar 2011, Jashimuddin and Inoue 2012) and the results are in accordance with the present findings.

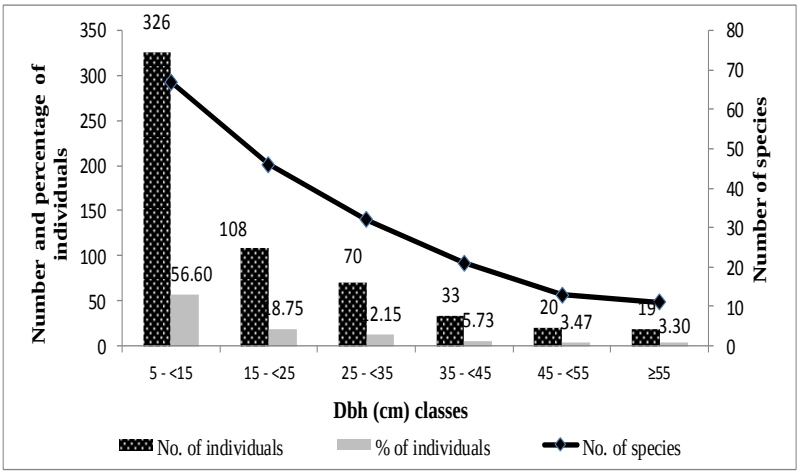

Fig. 2. Distribution of tree dbh (cm) classes at Renikhayong para VCF.

The Shannon-Wiener's Diversity Index (4.007) found in the present study is higher than that of 2.98 in Sitapahar reserve forest (Nath *et al.* 2000) and 3.25 in Tankawati natural forest in Chittagong (South) Forest Division (Motaleb and Hossain 2011). The index is comparable to Shannon-Wiener's Diversity Index (4.449) found in Dhudpukuria- Dhopachori Wildlife Sanctuary (Hossain *et al.* 2013) and 4.27 of Garo Hills of India (Kumar *et al.* 2006). The Value of Shannon-Wiener's Index (4.007) and Margalef's Index (13.21) and lower value of Simpson's Index (0.028) in the present study indicate higher species diversity in Renikhayong para VCF of Bandarban compared to other natural forests of the country. Shannon-Wiener Index found in the present study was 4.007 which is similar to the findings of Tripathi *et al.* (2004), Kumar *et al.* (2006), Velho and Krishnadas (2011), and Ndah *et al.* (2013). They found Shannon-Wiener Index within 3.50 – 4.27 for natural forests.

Species Evenness Index was found 0.90 in the present study which is similar to the findings of Tripathi *et al.* (2004), Ndah *et al.* (2013), Panda *et al.* (2013). They reported species Evenness Index within 0.88-0.99. However, present findings are quite higher compared to the findings of Bhuiyan *et al*. (2003) and Hayat *et al*. (2010). Simpson's index was found 0.028 which is comparable with the findings of Ndah *et al.* (2013) and Panda *et al.* (2013).

In the present study, both the number of species and number of individuals were highest in the height range of 5 - <10 m. Number of species and number of individuals were found highest in the dbh range of 5 - <15 cm in the present study which is almost similar with the findings of Nath *et al*. (1997). They found maximum individuals in the dbh range of 10-19.9 cm for the natural forests of CHT South Forest Division.

Most of the VCFs in Bandarban are more heterogeneous both in floral and faunal composition. Even though biodiversity is decreasing day by day, but still the VCFs are enriched with high biodiversity. In CHT, local people are dependent on forest produces for their everyday needs and Jannat *et al.* (2018) investigated the people's dependency and contribution of forest to the livelihoods in three hill district of Bangladesh. Moreover, present study provides a complete view of tree species diversity, quantitative structure of Renikhayong para VCF which are situated in Bandarban district. Presence of 85 tree species and value of diversity indices indicate the importance and potentiality of the VCF for conservation of natural ecosystem. Various diversity indices, regular distribution of tree species in different height and dbh (diameter at breast height) classes indicate the rich biodiversity and existence of complex ecosystem functions in the study area. The present study may serve as a primary input towards further study on vegetation structure and carbon pool assessment.

ACKNOWLEDGEMENTS

The authors are thankful to the Arannayk Foundation and Tahzingdong for providing the supports for this study in Bandarban hill District. Sincere thanks to the Bangladesh Forest Research Institute (BFRI) and local people of Renikhayong Para VCF in Bandarban district for their support in the field.

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