DIVERSITY OF FRUIT AND TIMBER TREE SPECIES IN THE COASTAL HOMESTEADS OF SOUTHERN BANGLADESH

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Abstract

In a study conducted in three southern districts (Bhola, Borguna and Patuakhali) of Bangladesh, a total of 69 tree species was recorded from the homegardens, of which 32 were fruit tree and 37 were timber tree species. Among the fruit tree species, coconut, betel nut, mango, jackfruit, guava, velvety apple were found in more than 80% households. The stocking of fruit trees per homestead was found highest for betel nut (265) followed by velvety apple (212), mango (38) coconut (25), jackfruit (20) and guava (9). Among the timber tree species, rain tree, mehogoni, raj koroi were most prevalent and found in more than 65% homesteads. The stocking of timber trees/ homestead was found highest for mehogoni (79) and then for rain tree (57), raj koroi (29) and katbadam (6).

Key wards: Fruit tree, Timber tree, Diversity, Coastal, Homesteads

Introduction

Bangladesh is one of the most densely populated countries in the world with a population of 152.5 million and with an annual growth rate of 1.37 (BBS 2011). There are 32.07 million homesteads in Bangladesh and over 74% of the population lives in the rural areas. Approximately 7% area (0.53 million ha) of the total 8.4 million ha of cultivable land in Bangladesh is occupied by homesteads which is extremely productive (BBS 2005). Homesteads play a vital role in providing timber, fuelwood, fodder, and fruits. Record of 70% of timber, 90% of fuelwood, 48% sawn and veneer logs and almost 90% of bamboo requirement is available from homegardens of Bangladesh (Uddin *et al.* 2002). But state forest of Bangladesh covers 2.52 million ha of lands, representing 17% of the countries land area and supplying only 12% wood (Poffenberger 2000). It is difficult to meet the country's huge demand for timber, fuel, fruit and fodder from the state forests. Villages of Bangladesh have a long heritage of growing timber and fruit trees along with other perennial shrubs and herbs (Rahman *et al.* 2009). The homegardens of Bangladesh is a source of livelihood for many farmers and serve as safety net during the time of hardship and natural disaster. Most of the homesteads of landlord houses contained improved cultivars of different fruits and other aesthetic plants, which are very much important from horticultural and breeding point of view. Homesteads represent a land use system involving deliberate management of multipurpose trees and shrubs in limited association with seasonal vegetables (Fernandes and Nair 1986).

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The coastal region of Bangladesh covers an area of about 47,201 km^2 extending along the Bay of Bengal. This region now covers 19 coastal districts facing, or in proximity to, the Bay of Bengal (Islam *et al*. 2006). The coastal and offshore areas include tidal, estuaries and river floodplains in the south along the Bay of Bengal. There are numerous old and new islands of varying size. The coastal zone constitutes 20% of the area and 28% of the population of Bangladesh (Islam 2004a). Agricultural labourers, small farmers, fishermen folk and the urban poor make up 71% of the 6.85 million households (Ahmad 2004).

The cultivable areas in coastal districts are affected by varying degrees of soil salinity. It has been recognized that 8,142 km^2 (5.5% of the country) land is salt affected and it is increasing at the rate of 146 km^2 per year (SRDI 2003). Although homesteads are the main source of fruit and timber production in the coastal areas but increased salinity hinders growth and survivability of trees in this region. Salinity causes unfavorable environment and hydrological situation that restrict the normal growth and crop production throughout the year (Haque 2006). The effect of salinity causes significant reduction in vegetation in the salt affected areas (Dutta and Iftekhar 2004). Besides, majority of the farmers cultivates their homesteads by different fruit and timber species in unplanned way. It is necessary to develop sound plans and procedure for planting more prevalent fruit and timber tree species in scientific way. So, exploration of existing timber and fruit tree species adaptive with changing climatic condition is needed first to have a clear understanding of the homgardens. Adaptability of a species and its suitability to a site is indicated by its frequency and growth. Therefore, this study was carried out to identify fruit and timber tree species and their distribution pattern in the coastal homesteads of Bangladesh.

Materials and Methods

The coastal zone of Bangladesh forms the lowest landmass and is a part of the delta of the extended Himalayan drainage ecosystem and covers 19 coastal districts. Among them three districts namely Bhola, Borguna and Patuakhali were selected for the present study. These coastal districts lie between the latitude 22^{0}10'-22^{0}39'N and longitude 90^{0}39'-91^{0}05'E. The climate is humid. Temperature ranges between 18^0 and 32^0 Celsius. The amount of rainfall varies between 2000-2500 mm at Borguna, 2500-3000 mm at Patuakhali and 3000 mm at Bhola district (Siddiqi and Khan 2004). Soils in the delta consist primarily of sands, silts, silty sands, sandy silts and clayey silts (Anon 1987). The delta soils occur in the coastal region of the Ganges tidal flood plain, the young Meghna estuarine flood plain and the old Meghna estuarine flood plain. The estuarine floodplain landscape occupies Bhola and Borguna districts. The landscape has been formed by the combined actions of rivers Meghna, Brahmaputra and Ganges. Usually, silty and clay deposits are finely stratified, and sandy deposits, as well as mixed sandy and silty deposits are coarsely stratified. The greater part of Borguna district consists of Gangetic meander floodplain soil having non-calcareous grey floodplain soil. It includes recent

accretions as well as the young and old Meander floodplain deposits. The soils of these areas are slightly saline (0.5-9.9 ds/m) and the pH values range from 5.8-7.8 and soil organic matter varies between 1.2 and 3.6%. Salinity of the soil and water at this region decreases toward north and increases toward east and west taking Bhola in the centre (Hassan 1999). Almost all the soils are silty to clayey in texture.

Two upazillas from each of three districts and five villages from each upazilla were selected. Then five homesteads from each village and 25 homesteads from each upazillas, totally 50 homesteads from each district were randomly selected (Table 1). Thus a total of 150 homesteads were selected from 3 districts. A multistage random sampling method was applied to select representative villages for the study. Sampling was done at four levels: district, upazilla, village and homestead.

Table 1. Name and location of the sampled area.

Sl.no.	District	Upzilla	Village
1	Bhola	Char-Fashon	Shahabajpur, Zinnagor, Aslampur, Nurabad and Aminabad.
		Lalmohon	Goneshpur, Satdarun, Romaganj, Collegepara and Lalmohon.
2	Barguna	Barguna Sadar	Gazi Mahmud, Borobaliatali, Amlokitala, Keorabunia and Amtoli-Nimtoli.
		Amtoli	Rahamatpur, Boythakata, Gotkhali, Sotonasnapara and Mohishvanga
3	Patuakhali	Kolapara	Panjupara, Misripara, Porgoja, Shirajpur and Bipinpur.
		Galachipa	Char Nandail, Majgram, Gramardan, Kamarhaola and Badarpur

Information was collected through a semi structured questionnaire and field survey which included interviews, group discussion and field observations. The respondents from selected homestead were interviewed with this pre-formulated questionnaire. Information was recorded through interview of family members like head of the family, housewife and others. The name and number of different timber and fruit tree species from sapling to big trees were recorded from the selected homesteads. The survey was conducted during January-March 2010. Microsoft Excel was used to process and analyze the collected data.

Results and Discussion

The size of the homesteads varied from home to home. It ranged from 0.08-2.53 ha in Bhola, 0.04-2.14 ha in Borguna and 0.08-2.51 ha in Patuakhali district. A total of 69 different tree species (both fruit and timber) were identified in all three districts of which, 61 species were found in Bhola, 55 species in Borguna and 61 species in Patuakhali districts (Table 2). Abedin and Quddus (1990) reported that the number of plant species (excluding vegetable species) in the coastal areas was higher (70 spp) than those found in the homesteads of Tangail (52 spp), Ishurdi (34 spp) Jessore (28 spp), Patuakhali (20 spp)

Rajshahi (28 spp) and Rangpur (21 spp) district respectively. Anam (1999) reported only 28 tree species in the plain area of Barind tract.

Table 2. Species richness of fruit and timber tree species at different coastal districts.

Sl. no.	District	Total sampled area (ha)	No. of fruit tree species	No. of timber tree species	Total
1	Bhola	36.49	31	30	61
2	Borguna	20.83	30	25	55
3	Patuakhali	21.17	30	31	61
	All	-	32	37	69

Fruit tree species diversity: The fruit tree species diversity was almost same in three coastal districts. A total of 31 different fruit tree species in Bhola, 30 species in Borguna and 30 species in Patuakhali districts was recorded. In all study areas 32 different fruit tree species were identified (Table 2).   Vernacular, English and scientific names of recorded fruit tree species and their occurrence in the households are presented in Table 3.

The study showed that the total number of fruit trees/ homestead was 794, 666 and 356 in Bhola, Borguna and Patuakhali districts respectively. Bhola possessed a larger number of fruit tree stocking /homestead. This site falls under the estuaries of Meghna which are less saline due to fresh water flow during rainy season.

The occurrence of different fruit tree species in terms of percentage of households was calculated and is presented in Table 3. In Bhola district, coconut was found in 100% households, followed by betel nut, mango (98%), jackfruit (96%), guava (94%), velvety apple (92%), pummelo (80%), hog plum (72%) and palmyra palm (62%). In Borguna district, coconut was found in 96% households, followed by mango (94%), betel nut, guava (88%), jujube/ ber, jackfruit (84%), pummelo, velvety apple (78%), date palm (70%) and palmyra palm (66%). In Patuakhali district, coconut and mango were found in 100% households, followed by guava (94%), jackfruit (92%), betel nut (90%), palmyra palm, pummelo (74%), and velvety apple (72%). The result also revealed that the average percentage of households for all three districts coconut was found in 98.67% homesteads followed by mango (97.33%), betel nut and guava (92%), jackfruit (90.67%), velvety apple (80.67%), pummelo (77.33%) and palmyra palm (67.33%).

In Bhola district, the highest number of fruit trees/ homestead was found for betel nut (516) and then for velvety apple (115), mango (59), jackfruit (33) and coconut (31). In Borguna, the highest number of trees/ homesteads was found for velvety apple (362) followed by betel nut (199), mango (24) and coconut (20). In Patuakhali, the highest number of trees/ homestead was recorded for velvety apple (160) followed by betel nut (78), mango (31), coconut (24) and jackfruit (16). From the average data for all three districts the highest number of trees/ homestead were recorded for betel nut (265) followed by velvety apple (212), mango (38), coconut (25), jackfruit (20) and guava (9) (Table 4). The result revealed that some species were abundant and some others were scare in the homesteads. This is probably due to farmer's choice to some economically important fruit bearing species like coconut, betel nut, mango, guava etc. These species

grow well in the southern districts and fruit production is also high. Therefore, farmers planted more seedlings with some selected fruit tree species for earning more money.

Table 3. Percentage (%) of homesteads containing fruit tree species in the coastal areas.

Sl. no.	Name of fruit tree species			% homestead containing fruit tree species			
	Local	English	Scientific	Bhola	Borguna	Patuakhali	Mean of all districts
1	Narikel	Coconut	*Cocos nucifera*	100	96	100	98.67
2	Supari	Betel nut	*Areca catechu*	98	88	90	92.00
3	Bilati gab	Velvety apple	*Diospyros discolor*	92	78	72	80.67
4	Aam	Mango	*Mangifera indica*	98	94	100	97.33
5	Kanthal	Jackfruit	*Artocarpus heterophyllus*	96	84	92	90.67
6	Peyara	Guava	*Psidium guajava*	94	88	94	92.00
7	Jambura	Pummelo	*Citrus grandis*	80	78	74	77.33
8	Tal	Palmyra palm	*Borassus flabellifer*	62	66	74	67.33
9	Amra	Golden apple	*Spondias pinnata*	72	28	46	48.67
10	Tentul	Tamarind	*Tamarindus indica*	54	54	54	54.00
11	Boroi	Jujube	*Zizypus mauritania*	56	84	60	66.67
12	Jamrul	Wax apple	*Syzygium samarangense*	54	60	62	58.67
13	Kamranga	Carambola	*Averrhoa carambola*	54	40	44	46.00
14	Lebu	Lemon	*Citrus limon*	56	54	60	56.67
15	Khejur	Date palm	*Phoenix sylvestris*	40	70	56	55.33
16	Kalojam	Blackberry	*Syzygium cumini*	32	42	68	47.33
17	Dewa	Monkey jack	*Artocarpus lakoocha*	22	40	38	33.33
18	Chalta	Elephant apple	*Dillenia indica*	36	24	32	30.67
19	Letchu	Litchi	*Litchi chinensis*	26	44	42	37.33
20	Jalpai	Indian olive	*Elaeocarpus floribundus*	24	28	28	26.67
21	Amloki	Aonla	*Emblica officinalis*	16	24	30	23.33
22	Ata	Bullock's heart	*Annona reticulata*	40	12	14	22.00
23	Kaophal	Cowa	*Garcinia cowa*	24	8	10	14.00
24	Bel	Wood apple	*Aegle marmelos*	10	14	34	19.33
25	Sofeda	Sapota	*Achras sapota*	8	26	32	22.00
26	Dalim	Pomegranate	*Punica granatum*	12	18	24	18.00
27	Sarifa	Custard apple	*Annona squamosa*	16	16	18	16.67
28	Gab	Riverebony	*Diospyros peregrina*	6	-	12	6.00
29	Kamala	Orange	*Citrus chinensis*	8	10	10	9.33
30	Kadbel	Elephant's foot apple	*Feronia limonia*	2	2	12	5.33
31	Gulapjam	Rose apple	*Syzygium jambos*	2	-	-	0.67
32	Malta	Sweet orange	*Citrus sinensis*	-	2	-	0.67

Bangladesh has a number of varieties of tropical and sub-tropical fruits. About 70 different kinds of fruit are grown in Bangladesh of which 90% fruits come from the homesteads (Islam 2004b). Rahman *et al.* (2009) observed that mango and jujube were in 100% homesteads in Hatiya island followed by coconut (98.7%), guava (97.5%), betel

Table 4. Distribution of fruit tree species in three coastal districts of Bangladesh.

Sl. no.	Name of fruit tree species		Bhola		Borguna		Patuakhali		Mean of all districts
	English	Scientific	Total no. of trees	Trees/ home stead	Total no. of trees	Trees/ home stead	Total no. of trees	Trees/ home stead	Trees/ home stead
1	Coconut	*Cocos nucifera*	1575	31.5	992	19.84	1220	24.4	25.25
2	Betel nut	*Areca catechu*	25823	516.46	9938	198.76	3926	78.52	264.58
3	Velvety apple	*Diospyros discolor*	5732	114.64	18109	362.18	7999	159.98	212.27
4	Mango	*Mangifera indica*	2929	58.58	1190	23.80	1556	31.12	37.83
5	Jackfruit	*Artocarpus heterophyllus*	1638	32.76	597	11.94	805	16.10	20.27
6	Guava	*Psidium guajava*	285	5.70	684	13.68	379	7.58	8.99
7	Pummelo	*Citrus grandis*	172	3.44	161	3.22	224	4.48	3.71
8	Palmyra palm	*Borassus flabellifer*	276	5.52	401	8.02	359	7.18	6.91
9	Golden apple	*Spondias pinnata*	80	1.60	27	0.54	44	0.88	1.01
10	Tamarind	*Tamarindus indica*	80	1.60	133	2.66	172	3.44	2.57
11	Jujube	*Zizypus mauritania*	81	1.62	139	2.78	76	1.52	1.97
12	Wax apple	*Syzygium samarangense*	54	1.08	78	1.56	72	1.47	1.37
13	Carambola	*Averrhoa carambola*	53	1.06	52	1.04	52	1.04	1.05
14	Lemon	*Citrus limon*	218	4.36	139	2.78	130	2.60	3.25
15	Date palm	*Phoenix sylvestris*	336	6.72	322	6.44	306	6.12	6.43
16	Blackberry	*Syzygium cumini*	50	1.00	86	1.72	107	2.14	1.62
17	Monkey jack	*Artocarpus lakoocha*	27	0.54	33	0.66	42	0.84	0.68
18	Elephant apple	*Dillenia indica*	52	1.04	24	0.48	68	1.36	0.96
19	Litchi	*Litchi chinensis*	20	0.40	60	1.20	46	0.92	0.84
20	Indian olive	*Elaeocarpus floribundus*	22	0.44	30	0.60	22	0.44	0.49
21	Aonla	*Emblica officinalis*	20	0.40	22	0.44	30	0.61	0.48
22	Bullock's heart	*Annona reticulata*	66	1.32	9	0.18	15	0.3	0.60
23	Cowa	*Garcinia cowa*	30	0.60	8	0.16	8	0.16	0.31
24	Wood apple	*Aegle marmelos*	9	0.18	17	0.34	37	0.74	0.42
25	Sapota	*Achras sapota*	6	0.08	22	0.44	20	0.40	0.31
26	Pomegranate	*Punica granatum*	7	0.14	15	0.30	20	0.40	0.28
27	Custard apple	*Annona squamosa*	19	0.38	11	0.22	13	0.26	0.29
28	Riverebony	*Diospyros peregrina*	35	0.70	-	-	38	0.76	0.49
29	Orange	*Citrus chinensis*	8	0.16	7	0.14	14	0.28	0.19
30	Elephant's foot apple	*Feronia limonia*	1	0.02	2	0.04	6	0.12	0.06
31	Rose apple	*Syzygium jambos*	4	0.08	-	-	-	-	0.03
32	Sweet orange	*Citrus sinensis*	-	-	1	0.02	-	-	0.01
	Total :		39708	794.12	33309	666.18	17806	356.16	605.49

nut (96.2%) and jackfruit (95%). Abedin and Quddus (1990) found mango at 95% homesteads of Tangail and above 67% homesteads of Ishurdi, Jessore and Rangpur district. Momen *et al.* (2006) recorded a total of 33 plant species from the homegarden on an off-shore Sandwip island, of which 19 were fruit and 14 were timber tree species. They stated that betel nut was the highest in number (4.72 stems/household) and guava (2.02 per household). It was also observed that 98.5% of households possessed betel nut followed by coconut (96.3%) and lemon (93.3%). Rahman *et al.* (2009) recorded 28 fruit species in the homestead of Hatiya island of Noakhali district. Among them banana, mango and jujube were found in 100% homesteads followed by coconut (98.7%), guava (97.5%), betel nut (96.2%) and jackfruit (95%). They reported that black berry and jujube were found highly diverse fruit species followed by mango and jackfruit.

Uddin *et al.* (2002) studied plant biodiversity in the homesteads of saline areas of greater Noakhali district. They found 17 fruit species in the study areas. Coconut was found in 98.63% household followed by mango (96.72%), betel nut (93.44%), banana (90.16%), guava (85.24%) and date palm (80.32%). Alam *et al.* (1990) observed that mango, jackfruit, coconut and banana were available at more than 65% homesteads in Jessore. Alam and Masum (2005) found 34 fruit species, 24 timber species and 21 fuel wood species in the Sandwip offshore island. They mentioned that coconut, betel nut, guava, date palm and mango were cultivated in more than 75% of the homesteads.

Timber tree species diversity: A total of 30 timber species in Bhola, 25 species in Borguna and 31 in Patuakhali districts was recorded. In all three districts, 37 different timber tree species were identified (Table 5). Almost 13 timber tree species were found common in all districts. The mean number of timber trees/ homestead was 214, 169 and 205 in Bhola, Borguna and Patuakhali respectively (Table 6).

The percentage of households containing different timber tree species was calculated and presented in Table 5. In Bhola district, rain tree was found in 96% households, followed by mehogoni (74%), raj koroi (54%), bamboo grove (50%), katbadam (46%) and sada koroi (40%). In Borguna district, rain tree was found in 78% households, followed by raj koroi (64%), mehogoni (60%) and katbadam (54%). In Patuakhali district, mehogoni was found in 92% households followed by rain tree and raj koroi (86%) and sada koroi (56%). The result also showed that the average percentage of households for all three districts rain tree was found in 86.67% homesteads followed by mehogoni (75.33%), raj koroi (68%), katbadam (44%) bamboo grove (44%) and sada koroi (42%).

In Bhola district, the highest number of timber trees/ homestead was found for mehogoni (73) and then for rain tree (66) and raj koroi (31). In Borguna, the highest number of trees/ homestead was found for rain tree (67) and then for mehogoni (50), raj koroi (29) and katbadam (13). In Patuakhali, the highest number of trees/ homestead was recorded for mehogoni (115) followed by rain tree (36) and raj koroi (28). From the average data for all three districts the highest number of trees/ homestead was found for mehogoni (79) and then for rain tree (57), raj koroi (29) and katbadam (6) (Table 6). Momen *et al.*

(2006) recorded 14 timber tree species in the homegarden on an off-shore Sandwip island. They observed that the mean number of trees for rain tree/ household was the highest (3.57) followed by kala koroi (2.07) and sada koroi (1.62). They stated that 92.1% household contained rain tree followed by kala koroi (91.3%) and sada koroi (90.1%).

Table 5. Percentage (%) of homesteads containing timber tree species in the coastal areas.

Sl. no.	Name of timber tree species		% homestead containing timber tree species			
	Local	Scientific	Bhola	Borguna	Patuakhali	Mean of all districts
1	Mehogoni	*Swietenia macrophylla*	74	60	92	75.33
2	Rain tree	*Samanea saman*	96	78	86	86.67
3	Raj koroi	*Albizia richardiana*	54	64	86	68.00
4	Kala koroi	*Albizia lebbeck*	14	6	28	16.00
5	Sada koroi	*Albizia procera*	40	30	56	42.00
6	Neem	*Azadirachta indica*	8	30	34	24.00
7	Simul	*Bombax ceiba*	18	16	18	17.33
8	Sonalu	*Cassia fistula*	2	8	4	4.67
9	Karanja	*Pongamia pinnata*	12	16	14	14.00
10	Payra	*Pithecellobium dulce*	30	4	6	13.33
11	Akashmoni	*Acacia auriculiformis*	16	10	28	18.00
12	Katbadam	*Terminalia catappa*	46	54	32	44.00
13	Bamboo grove	*Bambusa sp.*	50	38	44	44.00
14	Babla	*Acacia nilotica*	2	-	2	1.33
15	Sisso	*Dalbergia sissoo*	10	-	8	6.00
16	Segun/Teak	*Tectona grandis*	2	-	4	2.00
17	Pitraj	*Aphanamixis polystachya*	12	-	4	5.33
18	Sonboloi	*Thespesia populnea*	6	-	-	2.00
19	Sundari	*Heritiera fomes*	8	6	-	4.67
20	Gewa	*Excoecaria agallocha*	4	4	2	3.33
21	Ipil-Ipil	*Leucaena leucocephala*	8	28	24	20.00
22	Mander	*Erythrina sp.*	18	2	4	8.00
23	Aurjune	*Terminalia arjuna*	4	2	4	3.33
24	Debdaru	*Polyalthia longifolia*	2	6	-	2.67
25	Khoir	*Acacia catechu*	2	8	14	8.00
26	Eucalyptus	*Eucalyptus camaldulensis*	2	4	2	2.67
27	Jial badhi	*Lannea coromandelica*	4	4	14	7.33
28	Bot	*Ficus bengalensis*	2	2	-	1.33
29	Bohera	*Terminalia belerica*	2	-	-	0.67
30	Ponial	*Calophyllum inophyllum*	4	-	-	1.33
31	Jarul	*Lagerstroemia speciosa*	-	4	2	2.00
32	Bokain	*Melia sempervirens*	-	2	2	1.33
33	Sheora	*Streblus asper*	-	-	4	1.33
34	Gamar	*Gmelina arborea*	-	-	2	0.67
35	Hijol	*Barringtonia acutangula*	-	-	6	2.00
36	Kadam	*Anthocephalus chinensis*	-	-	4	1.33
37	Jhao	*Casuarina equsetifolia*	-	-	2	0.67

Table 6. Distribution of timber tree species in three coastal districts of Bangladesh.

Sl. no.	Name of timber tree species		Bhola		Borguna		Patuakhali		Mean of all districts
	Local	Scientific	Total no. of trees	Trees/ homestead	Total no. of trees	Trees/ homestead	Total no. of trees	Trees/ home stead	Trees/ home stead
1	Mehogoni	Swietenia macrophylla	3637	72.74	2523	50.46	5739	114.78	79.33
2	Rain tree	Samanea saman	3318	66.36	3376	67.52	1805	36.1	56.66
3	Raj koroi	Albizia richardiana	1531	30.62	1429	28.58	1412	28.24	29.15
4	Kala koroi	Albizia lebbeck	189	3.78	11	0.22	81	1.62	1.87
5	Sada koroi	Albizia procera	144	2.88	103	2.06	244	4.88	3.27
6	Neem	Azadirachta indica	12	0.24	31	0.62	50	1	0.62
7	Simul	Bombax ceiba	21	0.42	14	0.28	16	0.32	0.34
8	Sonalu	Cassia fistula	50	1	17	0.34	4	0.08	0.47
9	Karanja	Pongamia pinnata	263	5.26	51	1.02	51	1.02	2.43
10	Payra	Pithecellobium dulce	174	3.48	8	0.16	10	0.2	1.28
11	Akashmoni	Acacia auriculiformis	131	2.62	38	0.76	350	7	3.46
12	Katbadam	Terminalia catappa	215	4.3	630	12.60	89	1.78	6.23
13	Bamboo grove	Bambusa sp.	161	3.22	42	0.84	104	2.08	2.05
14	Babla	Acacia nilotica	2	0.04	-	-	12	0.24	0.09
15	Sisso	Dalbergia sissoo	75	1.5	-	-	49	0.98	0.83
16	Segun	Tectona grandis	2	0.04	-	-	16	0.32	0.12
17	Pitraj	Aphanamixis polystachya	45	0.9	-	-	55	1.10	0.67
18	Sonboloi	Thespesia populnea	107	2.14	-	-	-	-	0.71
19	Sundari	Heritiera fomes	255	5.1	17	0.34	-	-	1.81
20	Gewa	Excoecaria agallocha	18	0.36	4	0.08	1	0.02	0.15
21	Ipil-Ipil	Leucaena leucocephala	19	0.38	95	1.9	62	1.24	1.17
22	Mander	Erythrina sp.	238	4.76	7	0.14	4	0.08	1.66
23	Aurjune	Terminalia arjuna	13	0.26	3	0.06	3	0.06	0.13
24	Debdaru	Polyalthia longifolia	7	0.14	19	0.38			0.17
25	Khoir	Acacia catechu	1	0.02	10	0.20	21	0.42	0.21
26	Eucalyptus	Eucalyptus camaldulensis	6	0.12	12	0.24	2	0.04	0.13
27	Jial badhi	Lannea coromandelica	31	0.62	25	0.5	40	0.80	0.64
28	Bot	Ficus bengalensis	1	0.02	1	0.02	-	-	0.01
29	Bohera	Terminalia belerica	2	0.04	-	-	-	-	0.01
30	Ponial	Calophyllum inophyllum	10	0.20	-	-	-	-	0.07
31	Jarul	Lagerstroemia speciosa	-	-	6	0.12	1	0.02	0.05
32	Bokain	Melia sempervirens	-	-	2	0.04	1	0.02	0.02
33	Sheora	Streblus asper	-	-	-	-	17	0.34	0.11
34	Gamar	Gmelina arborea	-	-	-	-	13	0.26	0.09
35	Hijol	Barringtonia acutangula	-	-	-	-	4	0.08	0.03
36	Kadam	Anthocephalus chinensis	-	-	-	-	2	0.04	0.01
37	Jhao	Casuarina equsetifolia	-	-	-	-	2	0.04	0.01
		Total :	10678	213.56	8474	169.48	10260	205.00	196.02

Nath *et al.* (2004) found that rain tree was the most dominant timber tree species grown in the coastal homesteads of Sitakunda Upazilla. Uddin *et al.* (2002) found 16 timber species in greater Noakhali coastal district. mehogani, jial badhi and neem were found at more than 50% household. Alam and Masum (2005) observed that mehogani, raintree, sada koroi and segun/teak were common in most of the homesteads in Sandwip.

Effect of salinity on tree crops: The diversity and distribution pattern of the plant species are influenced by macro and micro environmental factors of the homesteads. Most fruit trees are relatively sensitive to salinity with little exception and few other species believed to be moderately salt tolerant. It is generally believed that growth and yield of woody fruit crops suffer from both osmotic effect and toxicities caused by chloride or sodium accumulation (Bernstein 1980). The vegetation coverage is reducing due to increasing soil salinity in different countries. But there are some terrestrial plants that can grow well in saline soil. In this study, some fruit tree species were found growing well in more or less saline condition. The common dominant species in all districts of the study areas are coconut, betel nut, velvety apple, mango, jackfruit, guava, date palm and palmyra palm. From the available information, coconut and date palm are high salt or strong salinity (12.1-16.0 dS/m) tolerant species in the coastal areas of Bangladesh (Dutta and Iftekhar 2004). Nandy *et al.* (2002) reported that coconut is highly adaptive in moderately saline zone (8.1-12.0 dS/m) for embankment plantation. According to the farmer's opinion, coconut, velvety apple, tamarind, date palm are high salt tolerant species. On the other hand, guava, mango, bullocks heart, lemon, palmyra palm, carambola, pummelo are moderately salt tolerant species.

This information might help to understand the tree diversity, and selection of salt tolerant species of any environmental stress condition. Present study reveals only occurrence and diversity of different fruit and timber tree species in the coastal regions, but intensive research should be undertaken to improve homegardens for more productivity.

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