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Species Composition and Plant Diversity as Influenced by Altitude and Size of Homegardens in Mizoram, North-East India

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ABSTRACT

Floristic assemblage, crop diversity, occurrence, vertical stratification of species and use aspects of 92 homegardens in twenty two villages in Mizoram, northeast India was studied. An attempt was made to assess the influence of altitude and size of homegardens on different attributes of vegetation. A total of 351 plants belonging to 101 families were recorded from the survey which included 170 trees, 42 shrubs, 94 herbs, 5 epiphytes, 34 climbers and 6 bamboo species. An average of 34 plant species (sd, ±14) per garden were recorded; more than fifty percent of the gardens contain 21-40 plant species while very few gardens have less than 10 species or more than 60 species per garden. Density of trees per unit area was significantly ($p<0.01$) more in low altitudes and least in the high altitude gardens and it ranged from 15 trees in a garden in mid altitude to 720 trees in low altitude. Shannon Weiner diversity index of trees and shrubs varied significantly ($p<0.01$) across the altitudes and was higher (H'=3.89) in the mid altitudes and minimum (H' =2.73) in the low altitudes. The importance value index (IVI) of plants showed that *Parkia timoriana* was more ecologically important in the high altitude (19.76) and mid altitude gardens (5.61) while it was *Areca cachecu* (16.61) in the low altitude. The former showed a decreasing stem density per garden with decreasing altitude. The relationship between garden size and the number of species encountered at different altitudes showed an weak increasing trend but was significant at the high altitude gardens ($p<0.01$).

Key Words: Crop Diversity; Homegarden Size; Altititudinal Gradient; Northeast India

INTRODUCTION

Homegarden agroforestry systems in the tropics are known for their structural complexity and diversity in crop and other plant species (Michon et al. 1983, Fernandes and Nair 1986, Sahoo 2009). They are frequently identified as traditional agroforestry system with complex structure and multiple functions. Species diversity that is of immediate homestead use is the most prominent features of home garden (Hoggerbrugge and Fresco 1993, Soemarwoto 1987). The high and maintained diversity of both cultivated and wild plant species makes home-gardens suitable for *in situ* conservation of plant genetic resources (Maxted et al. 1997, Watson and Eyzaguirre 2002). The cultivation of different crops is regarded as a strategy of farmers to diversify their subsistence and cash needs. Diversification also helps to stabilise yield or income in cases of incidences of disease and pests, and market price fluctuations. They may also help in conserving plants, both wild and domesticated, because of their use by the house-holds (Abdoellah et al. 2006). They are also an attractive model for research and the design of sustainable agroecosystem (Das and Das 2005, Sahoo et al. 2012). Moreover, the intimate association between the different herbaceous and woody components in these gardens is believed to enhance nutrient recycling and reduce hazards of leaching and soil erosion (Wiersum 1982, Fernandes and Nair 1986).

It is not only humans who benefit from the carefully

managed, complex structure of home gardens. By imitating the form of the surrounding forest, these areas also provide habitat for wild animals, especially birds, in an area where few primary forests still stand (Steinberg 1998). The multi layered, forest like vegetation structure of homegardens contributes substantially to the ecological sustainability of the village ecosystem (Kehlenbeck and Maass 2004). The species composition of homegardens varies according to climatic, topographic and edaphic factors and socio-economic conditions of the farmers. These homegarden agroforestry systems also ensure food security, play a significant role in the regional and national economies, and also contribute to environmental resilience. Despite these contributions, only few studies have been undertaken on the systems in north eastern region of India and little is known about these homegardens in the state of Mizoram. The species richness and heterogeneity of crops in the systems as a whole, and at farm and plot levels is not known.

The present paper reports the diversity of plant species in the traditional homegardens of Mizoram in north east India with special reference to (a) the plant species richness and the diversity of the homegardens, (b) the share of major plants, (c) the diversity of plant species distributed at plot level, and (d) the structural pattern of the homegardens, across garden size and altitude.

Study Sites

The present study was conducted in sample villages located in the undivided Aizawl district (northern Mizoram) located at different altitudinal zones ranging from about 40 m above msl to the higher altitudes in eastern ranges bordering Myanmar (Figure 1). The field sampling was done in homegardens located in the study villages of Zote, Zotlang, Ruantlang, Hmunhmeltha, Vengsang in Champhai; Vairengte, Bilkhawthlir, Rengtekawn, Meidum, Bairabi, Kolasib, Thingdawl in Kolasib; Selesih, Siphir, Thingsulthlia, Sairang, Phungchawn, Rangvamawl, Chawlhhmun in Aizawl; Dampui, Darlak, Bawngva in Mamit. Individual households with homegardens were considered as a unit of analysis and treated as a system. Ninety two households were sampled randomly in three altitudinal zones namely high altitudes (>1200 m above mean sea level [MSL]), mid altitudes (300-1200 m above MSL) and low altitudes (<300 m above MSL).

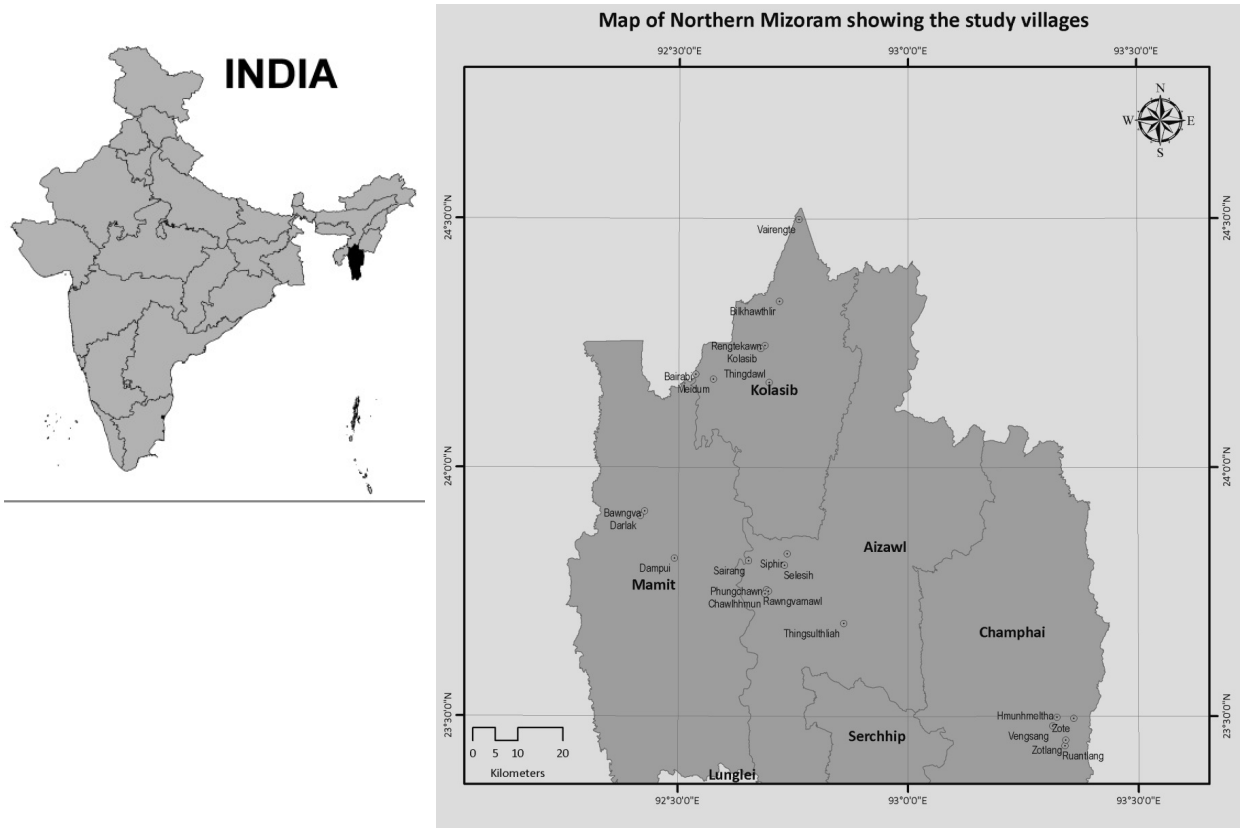

Figure 1. Map showing the location of study sites

METHODS

Data Collection

In each sampled homegarden the area of the garden was measured using a tape along the boundary and a sketch of the garden plot was drawn along with the measurements. Vegetation enumeration of the homegardens was done in different seasons of the year. All species present in each sampled homegarden were identified and recorded by their botanical name, or by local name and later confirmed from published books. All individual trees and shrubs were counted and their height and GBH recorded following Kabir and Webb (2008). No herb or climber was counted. The location and altitude of each sample household was recorded using a Garmin global positioning system (GPS).

Data Analysis

Each species recorded in the homegarden was classified by family, habit based on morphology of the plant when it was full grown (tree, shrub, herb or climber) and plant use. Frequency – the fraction of homegarden containing the species (Cox 1990) – was calculated for all recorded species. Abundance – number of individuals per species – was calculated for trees and shrub species. The sum of the relative values of frequency, abundance and dominance for each species of trees and shrub was used for deriving the importance value index of individual species (Curtis 1959). For trees and shrubs relative importance value was used to rank species per life form and only relative frequency for herbs and climbers. Shannon-Weiner index as used to determine the species richness, $H' = \Sigma p_i \ln p_i$ (Magurran 1988), where *pi* is the proportional abundance of species *i* (i.e., number of species divided by total number in the community). The dominance index (Simpson 1949) of the community was calculated as $C = \Sigma pi^2$, where *C* is the dominance index and pi is same for Shannon's index. Floristic similarity gardens of different altitudes were calculated with Jaccard's similarity index using the formula $Cj=j/(a+b-j)$ where *Cj* is Jaccard's similarity index, *j* is the number of species shared by the two sites, *a* is number of species in site a, and *b* is the number of species in site b (Magurran 1988). The values obtained were then statistically compared across the different altitudes.

RESULTS

Floristic Assemblage in the Homegarden

During the survey a total of 351 plants belonging to 101 families were recorded from the survey of 92 gardens across the study area. Complete list of the plants, their occurrence and information on their utilization are given in Appendix 1. Euphorbiaceae was represented by maximum number of species (27) followed by Moraceae and Pappillonaceae (15 each) while 52 families were represented by only 1 species. Of the 351 species 170 were trees, 42 were shrubs, 94 herbs, 5 epiphytes, 34 climbers and 6 bamboo species. The frequency of occurrence of the species across homegardens was rather variable (Figure 1). Five of the plant species (fruit trees like *Mangifera indica*, *Psidium guajava*, medicinal traditional vegetable *Clerodendrum colebrookianum*, *Musa paradisiaca* and nutritious pod bearing *Parkia tomoriana*) were grown in more than 60 % of the garden. Crops like ginger, fruits like *prunus*, passion fruit, *Ipomea batatas*, *Hibiscus sabdarifa*, *Dysoxylum*, *Citrus grandis*, *Colocasia esculenta*, capsicum, areca nut tree, papaya, *Brassica juncea* were present in more than 30% of the garden while 155 plants were recorded very rarely, in less than 3% of the gardens. *Mangifera indica* was the most frequent species recorded in 83% of the gardens followed by *Psidium guajava* (79 %). An average of 34 plant species (sd, ±14) per garden were recorded in the 92 gardens. More than fifty percent of the gardens contain 21-40 plant species while very few gardens have less than 10 species or more than 60 species per garden (Figure 2).

Altitudinal Variation in Plant Diversity

Plant species was recorded highest in the low altitude gardens (227, 65%) and lesser (206, 59%) in the high and mid altitude gardens (Table 1). Tree species was also recorded higher in the low altitudes (109) than mid (106) and high altitude gardens (82) while herbs and climbers were recorded more in high altitudes. Bamboo and cane were also recorded more in mid and low altitude. The diversity of plant species per garden was slightly higher in the high altitudes than mid altitudes but significantly ($p<0.01$) less in the low altitudes (Table 2). The diversity of trees and shrubs per garden was higher in the mid altitudes than low and high altitudes (Figure 3) but was not significant. Basal area of trees and woody shrubs per unit area in the garden was significantly higher ($p<0.05$)

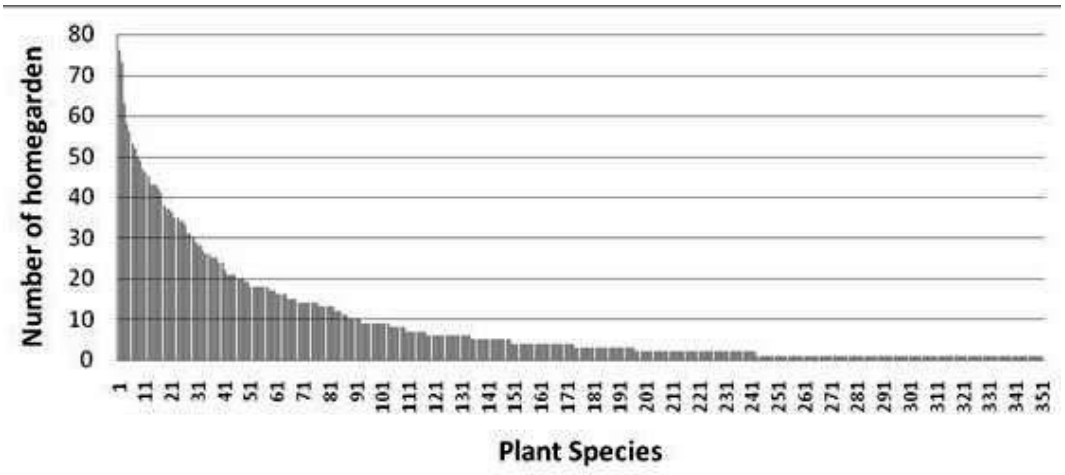

Figure 2. Frequency distribution of the plant species in the homegardens (n = 92)

Table 1. Species richness in the homegardens of three different altitudes

Parameters	High altitude	Mid altitude	Low altitude
Species	206	206	227
Families	57	69	80
Trees	82	106	109
Shrubs	27	21	31
Herbs, climbers, epiphytes	95	76	82
Canes	0	4	2
Bamboos	4	3	5
Median garden area (m^2)	1990	1330	2000

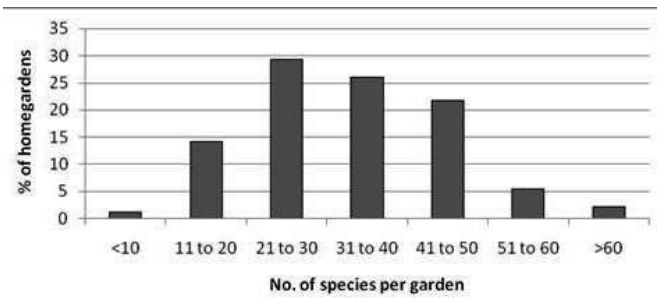

Figure 3. Plant species encountered per homegarden

in the mid altitude gardens and lesser in the low and high altitudes. Density of trees per unit area was significantly ($p<0.01$) more in low altitudes and least in the high altitude gardens and it ranged from 15 trees in a garden in mid altitude to 720 trees in low altitude. Shannon Weiner diversity index of trees and shrubs varied significantly ($p<0.01$) across the altitudes and was higher (H'=3.89) in the mid altitudes and minimum (H' = 2.73) in the low altitudes.

Although species diversity were high, the majority of species were rare. Abundance of trees and shrubs showed that many of the species were represented only by very few individuals especially in mid and low altitudes (Figure 4) and majority of the individuals belongs to a single species (areca nut) in case of low altitude and thus dominance index of trees and shrubs was higher in the low altitude gardens (Table 2). In more detail, 19 species in high altitude, 30 species in mid altitude and 47 species in low altitude were represented by only one single individual each. Also tree and shrub species which were represented by less than 10 individuals were more in low (74%) and mid altitude (79%) and comparatively lesser (55%) in high altitude gardens.

Altitudinal Variation in Frequency, Density and IVI

In the high altitude gardens *Psidium guajava, Clerodendrum colebrookianum, Parkia timoriana* were the most frequently found trees and in mid altitude *Mangifera indica, Trevesia palmata* and *Psidium guajava* were more commonly found while *Areca catechu, Mangifera indica* and *Artocarpus heterophyllus* were frequently found trees at low altitude (Table 3). *Colocasia esculenta* was common across the altitudes, passion fruit was more common at the high altitude and *Acacia pennata* more common in mid and low altitude.

The density of trees and shrubs per garden varied across the altitudes. Density of areca nut per garden was very high in the low altitudes (average 43.61 per garden)

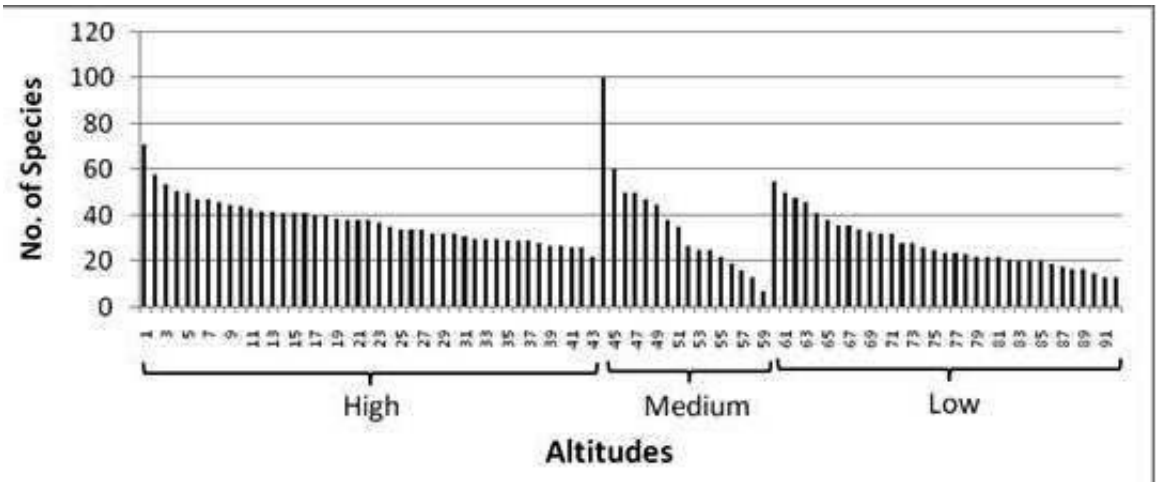

Figure 4. Number of plant species per garden across the altitudes.

Table 2. Diversity and dominance of plant in homegarden at different altitudes

Parameters	High altitude	Mid altitude	Low altitude	F-test
No of species per garden	37.91 ± 1.51	36.19 ± 5.91	27.82 ± 1.95	
(Trees, shrubs and herbs)	(22-71)	(7-100)	(13-55)	5.63**
No of trees and shrubs pergarden	17.98 ± 1.23	23.06 ± 3.52	17.55 ± 1.275	
	(7-52)	(5-57)	(9-40)	2.32^{ns}
Basal area (m^2 ha^{-1})	4.99 ± 0.66	9.15 ± 2.09	5.67 ± 0.89	
(Trees and shrubs)	(0.54-18.75)	(1.09-27.63)	(1.27-24.28)	3.57*
Density of trees (No. ha^{-1})	143.02 ± 10.39	191.99 ± 28.76	262.86 ± 33.73	
	(27-292)	(15-310)	(52-720)	7.78**
Diversity (*H'*)	3,64	3.89	2.73	
(Trees and shrubs)	(0.93-3.56)	(1.48-3.55)	(0.43-3.08)	4.23*
Dominance (*C*)				
(Trees and shrubs)	0.048	0.035	0.24	

- ± SE mean, *-P<0.01, **P<0.01

while coffee plant (6.75) followed by *Citrus reticulata* (5.75) dominated the mid altitude gardens and phuinam (*Clerodendrum colebrookianum*) density per garden was high (9.21) in the high altitudes followed by guava (Table .4).

The importance value index (IVI) of plants (detail list shown in Appendix 2) showed that *Parkia timoriana* was more ecologically important in the high altitude (19.76) and mid altitude gardens (5.61) while it was Areca nut (16.61) in the low altitude (Table 5). *Artocarpus heterophyllus* was the second most ecologically important plant in the mid altitude (4.97) and low altitude (7.19) gardens.

Species similarity among the trees and shrubs showed that similarity was higher in between mid altitude and low altitude (85 species) and Jaccards' similarity index also showed the same pattern (Table 6 and Table 7). Table 7 shows the different plant species with their comparative occurrence at different altitudes. In the high altitudes trees which are favourable to colder climates like *Alnus nepalensis, Myrica esculenta, Quercus* species were found although with lesser frequency of occurrence and in mid altitudes trees like *Albizia chinensis, Acrocarpus fraxinifolius, Tetrameles nudiflora* were recorded while trees like *Dillenia indica*, *Artocarpus chama*, *Mallotus phillipensis, Diospyros*

Table 3. Prominent plant species based on frequency (%) at the three altitudes

High altitude	Frequency	Mid altitude	Frequency	Low altitude	Frequency
Trees		Trees		Trees	
Psidium guajava	88.37	*Mangifera indica*	93.75	*Areca catechu*	90.91
Clerodendrum colebrookianum	86.05	*Trevesia palmate*	81.25	*Mangifera indica*	87.88
Parkia timoriana	79.07	*Psidium guajava*	75.00	*Artocarpus heterophyllus*	72.73
Mangifera indica	74.42	*Artocarpus heterophyllus*	68.75	*Psidium guajava*	66.67
Prunus domestica	67.44	*Clerodendrum colebrookianum*	62.50	*Carica papaya*	66.67
Shrubs		Shrubs		Shrubs	
Citrus sp.	55.81	*Citrus reticulate*	81.25	*Citrus medica var. acidus*	48.48
Elaeagnus caudate	53.49	*Coffea Arabica*	50.00	*Garcinia lanceaefolia*	24.24
Camellia sinensis	46.51	*Camellia sinensis*	43.75	*Eleagnus caudata*	15.15
Herbs		Herbs		Herbs	
Colocasia esculenta	83.72	*Colocasia eculenta*	62.50	*Musa paradisiaca*	78.79
Cucurbita maxima	79.07	*Musa paradisiacal*	50.00	*Ananas comosus*	57.58
Hibiscus sabdariffa	76.74	*Colocasia affinis*	50.00	*Colocasia affinis*	54.55
Brassica juncea	72.09	*Phrynium capitatum*	37.50	*Colocasia esculenta*	42.42
Climbers		Climbers		Climbers	
Passiflora edulis	74.42	*Acacia pennata*	56.25	*Acacia pennata*	45.45
Sechium edule	41.86	*Piper betle*	50.00	*Piper betle*	18.18
Phaseolus vulgaris	30.23	*Sechium edule*	37.50	*Momordica charantia*	15.15

Table 4 Prominent trees and shrubs based on density (trees per garden) in the three altitudes

High Altitude			Mid Altitude			Low Altitude		
Botanical Name	Life Form	Density	Botanical Name	Life Form	Density	Botanical Name	Life Form	Density
C. colebrookianum	T	9.21	*Coffea arabica*	S	6.75	*Areca catechu*	T	43.61
Psidium guajava	T	4.95	*Citrus reticulata*	S	5.75	*Mangifera indica*	T	2.88
Camellia sinensis	S	4.60	*C. colebrookianum*	T	4.69	*Psidium guajava*	T	2.76
Parkia timoriana	T	4.09	*Trevesia palmata*	T	4.25	*C. medica* var. *acidus*	S	2.64
Citrus reticulata	S	3.70	*Mangifera indica*	T	3.88	*C. macroptera* var. *anamensis*	T	2.48
Mangifera indica	T	2.91	*Areca catechu*	T	3.69	*Camellia sinensis*	S	2.42
Trevesia palmata	T	2.26	*Camellia sinensis*	S	3.50	*Cocos nucifera*	T	2.18
Quercus serrata	T	1.74	*Psidium guajava*	T	2.69	*C. colebrookianum*	T	2.12
Prunus domestica	T	1.44	*Vernicia montana*	T	2.56	*Artocarpus heterophyllus*	T	1.94
Citrus sp.	S	1.42	*Tectona grandis*	T	2.50	*Carica papaya*	T	1.85

toposia were encountered only in the low altitude gardens. *Areca catechu, Cocos nucifera, Derris robusta, Litchi sinensis, Ziziphus mauritiana* although recorded both in the low and mid altitudes the frequency of occurrence was higher in the low altitudes.

Tree species common to all the gardens across the altitudes are shown in Table 8. The eleven tree species were encountered in the homegardens of all the altitudes but the frequency of occurrence of *Artocarpus heterophyllus* and *Carica papaya* were more in the low altitudes, while *Clerodendrum colebrookianum* and *Psidium guajava* were more in the high altitudes and frequency of *Trevesia palmata* were more in mid altitudes. The numbers of species encountered in the different sized homegardens varied and seems to follow an increasing trend with increase in homegarden size.

Table 5. Top ten species with high IVI in the three altitudes

High Altitude	IVI	Mid Altitude	IVI	Low Altitude	IVI
Parkia timoriana	19.76	*Parkia timoriana*	5.61	*Areca catechu*	16.61
C.colebrookianum	8.04	*Artocarpus heterophyllus*	4.97	*Artocarpus heterophyllus*	7.19
Psidium guajava	6.13	*Mangifera indica*	2.83	*Cocos nucifera*	3.75
Quercus serrata	5.06	*Tectona grandis*	2.80	*Parkia timoriana*	3.71
Artocarpus heterophyllus	4.12	*Psidium guajava*	1.92	*Litchi sinensis*	3.69
Mangifera indica	3.36	*Carica papaya*	1.87	*Tamarindus indica*	3.67
Eleagnus caudata	3.08	*C. macroptera var anamensis*	1.50	*Psidium guajava*	3.25
Morus alba	2.70	*C.colebrookianum*	1.41	*Carica papaya*	3.08
Carica papaya	2.53	*Tetrameles nudiflora*	1.40	*Mangifera indica*	2.75
Leucaena leucocephala	2.48	*Citrus reticulata*	1.32	*C. macroptera var anamensis*	2.59

Table 6. Plant Similarity index across different altitudes

Altitude	High	Mid	Low
High	-	0.35	0.36
Mid	0.35	-	0.47
Low	0.36	0.47	-

The relationship between garden size and the number of species encountered at different altitudes showed an weak increasing trend (Figure 6) but was significant at the high altitude gardens ($p<0.01$). Similar pattern was observed in case of diversity index with garden size (Figure 5)

Vertical Stratification of Plants in Gardens at Different Altitudes

The vertical distribution of plant species in the home-gardens at different altitudes are detailed in Table 9. *Parkia timoriana* was found to be occupying the top canopy (>14 m height) in all the altitudes but the density of stem per garden decreased with decreasing altitude. *Areca catechu* was found to dominate the top canopy in term of stem density in the low altitude followed by *Tectona grandis*, *Gmelina arborea* and *Derris robusta* was also co-dominant in the top canopy in low altitude. *Artocarpus heterophyllus* occupy the upper middle stratum (10-14m) in all the altitudes but the stem density increase with decreasing altitude. *Quercus serrata, Areca catechu* and *Cocos nucifera* were the dominant stems in the second strata in high, mid and low altitudes,

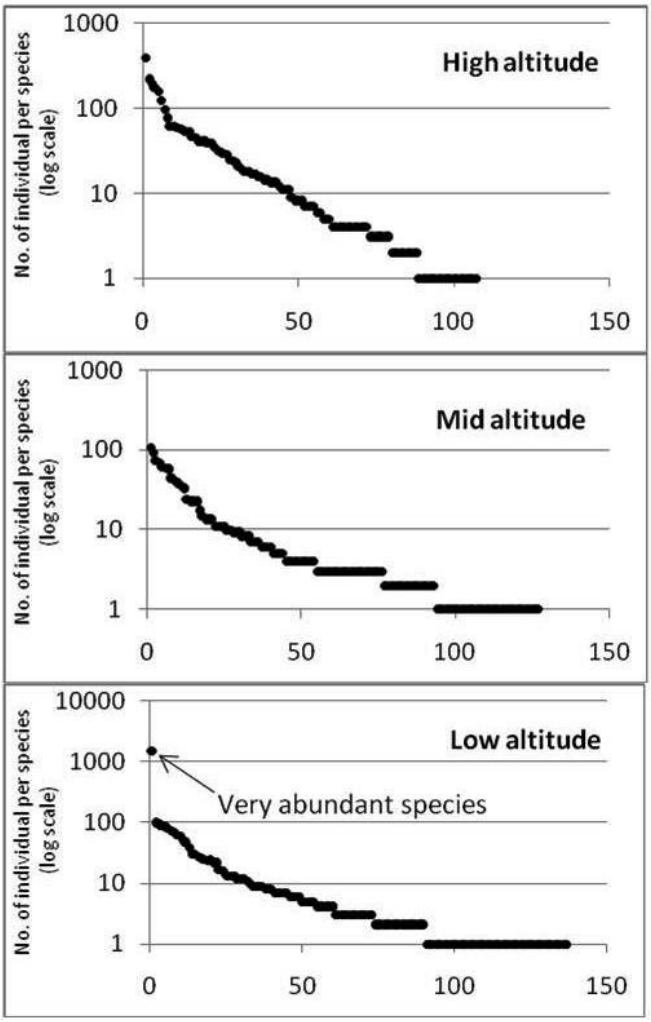

Figure 5. Abundance of tree and shrub species in homegardens of the three altitudes

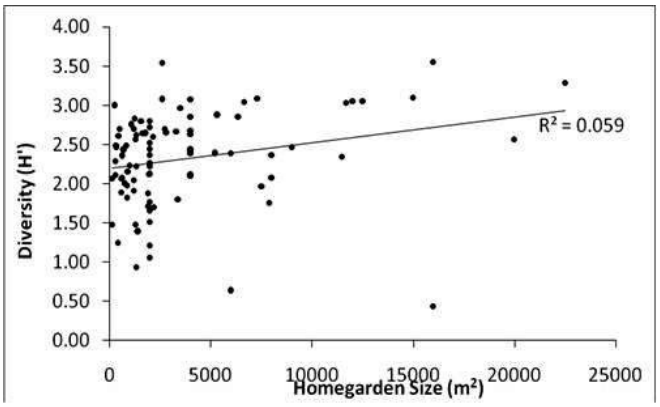

Figure 6. Relationship between diversity index and homegarden size

respectively. *Mangifera indica* was common in the lower middle stratum (5-10m) across all the altitudes and *Citrus reticulata* was recorded higher stem density in high and mid altitudes. In the lowest stratum (<5m) *Camellia sinensis* was common across all the altitudes but the density decreased with decrease in altitude. *Trevesia palmate* was the common species in the lowest stratum among the high and mid altitude while *C. colebrook-ianum* was common in the high and low altitude and *Citrus macroptera* var. *anamensis* in the mid and low altitudes. Profiles of typical traditional homegarden are shown in Figures 7 to 9 for different altitudes.

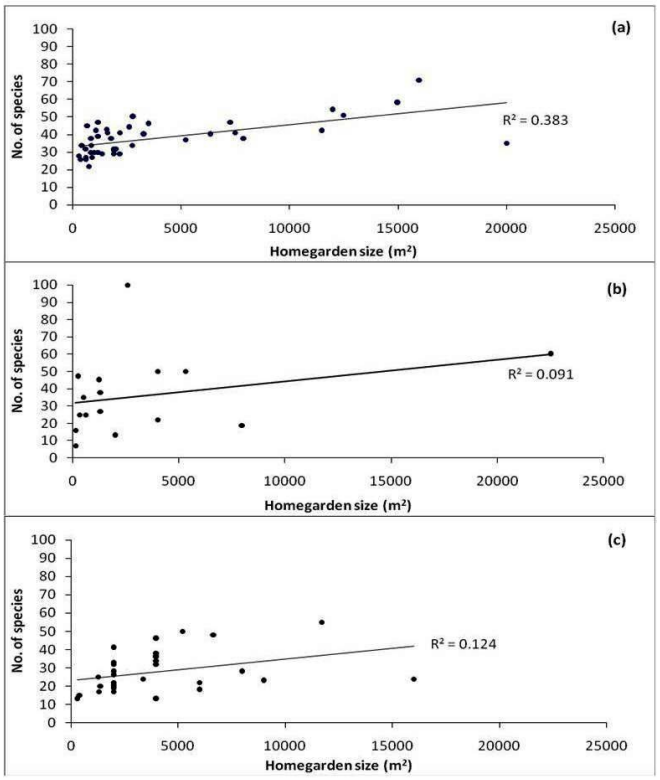

Figure 7 Relationship of species richness with the size of homegardens at different altitudes: (a) High, (b) Mid, (c) Low.

Table 7. Floristic variations among trees in the homegarden across the three altitutes

Botanical names	Local name	% Frequency		
		High altitude	Mid altitude	Low altitude
Alnus nepalensis	Hriangpui	06.98	-	-
Citrus aurantifolium	Champara/ser te	13.95	-	-
Litsea cubeba	Sêr-nam	11.63	-	-
Myrica esculenta	Keifang	27.91	-	-
Pyrus pashia	Chalthei	09.30	-	-
Quercus leucotrichophora	Then	04.65	-	-
Quercus polystachya	Thil	09.30	-	-
Quercus serrata	Sa-sua	20.93	-	-
Rhus succedanea	Chhimhruk	09.30	-	-
Castanopsis tribuloides	Thing sia	25.58	12.50	-
Michelia oblonga	Ngiau	09.30	12.50	-
Pyrus communis	pear thei	39.53	25.00	-
Rhus semialata	khawmhma	32.56	18.75	-
Acrocarpus fraxinifolius	Nganbawn	-	18.75	-
Albizzia chinensis	Vang thing	-	31.25	-
Artocarpus nitidus ssp *griffithii*	Tat	-	18.75	-
Tetrameles nudiflora	Thingdawl	-	31.25	-
Areca catechu	Kuhva	-	31.25	90.91
Citrus macroptera var *anamensis*	Hatkora	-	56.25	48.48

Table 7. (Continued)

Botanical names	Local name	% Frequency		
		High altitude	Mid altitude	Low altitude
Cocos nucifera	Coconut	-	18.75	63.64
Derris robusta	Thingkha	-	06.25	39.39
Lagerstroema speciosa	Thlado	-	06.25	21.21
Litchi sinensis	Vai-thei-fei-mung	-	06.25	36.36
Mesua ferrea	Herse	-	06.25	06.06
Sapindus mukorossi	Hling si	-	12.50	3.03
Tectona grandis	Teak	-	25.00	30.30
Ziziphus mauritiana	Borai	-	06.25	24.24
Artocarpus chama	Tatkawng	-	-	15.15
Dillenia indica	Kawthindeng	-	-	15.15
Diospyros toposia	Zo thing hang	-	-	06.06
Ficus hispida	Paite maien	-	-	15.15
Garuga pinnata	Bungbutuairam	-	-	06.06
Mallotus phillipensis	Thingkhei	-	-	06.06

Table 8. Tree species common to homegarden at all the three altitudes

Botanical names	Local name	%Frequency		
		High altitude	Mid altitude	Low altitude
Artocarpus heterophyllus	Lamkhuang	30.23	68.75	75.76
Carica papaya	Thingfanghma	44.19	50.00	69.70
Citrus grandis	Sertawk	37.21	62.50	24.24
Clerodendrum colebrookianum	Phui-hnam	86.05	62.50	48.48
Mangifera indica	Thei hai	74.42	93.75	87.88
Psidium guajava	Kawlthei	88.37	75.00	69.70
Parkia timoriana	Zawngtah	79.07	50.00	42.42
Trevesia palmata	Kawh-te-bêl	67.44	81.25	30.30
Dysoxylum gobara	Thing thu pui	46.51	50.00	3.03
Callicarpa arborea	Hnah kiah	18.60	12.50	9.09
Leucaena leucocephala	Japan Zawngtah	41.86	25.00	9.09

DISCUSSION

Farmers cultivate a diverse variety of crops and trees in homegarden for different reasons and the homegardens of Mizoram are very rich in species. The surveyed gardens were highly variable concerning size, plant species composition, richness and diversity and vertical vegetation structure. Most of the gardens resembled species rich complex agroforestry systems and some big gardens have big patch of plot for commercial cultivation but that too also in a mixture of shade trees. Compared with similar studies in Barak valley of Assam, India, Das and Das (2005) have reported 122 trees and shrubs with 87 of them trees from a survey of 50 homegardens. In the present study 170 of the 351 species were trees and 42 were shrubs which is comparatively much higher than Barak homegardens but less than the report from Bangladesh homegarden where 419 species belonging to 109 families as reported by Kabir and Webb (2008). Still the trees species recorded in the present study (170) is higher than the Bangladesh homegarden which must be due to the wide range of topographical and climatic conditions in the present surveyed villages ranging from low lying foot hills (80m above MSL) to high altitudes

Table 9. Vertical distribution of trees and shrubs and their average density (per garden) in the homegardens at different altitudes

Vertical strata	High altitude	Density	Mid altitude	Density	Low altitude	Density
Emergent layer >15 m	*Parkia timoriana*	4.09	*Parkia timoriana*	1.31	*Parkia timoriana*	0.91
			Gmelina arborea	0.38	*Derris robusta*	0.70
			Vernicia montana	2.56	*A. lakoocha*	0.36
					Areca catechu	43.61
					Gmelina arborea	0.79
					Tectona grandis	1.15
Canopy layer 10-15 m	*Quercus serrata*	1.74	*Albizzia chinensis*	0.50	*A. heterophyllus*	1.94
	Artocarpus heterophyllus	0.91	*A. heterophyllus*	1.38	*Cocos nucifera*	2.18
	Myrica esculenta	0.72	*Areca catechu*	3.69	*Tamarindus indica*	1.15
			Tetrameles nudiflora	0.69		
Understory layer 5-10m	*Mangifera indica*	2.91	*Mangifera indica*	3.8	*G. lanceaefolia*	0.91
	Pyrus communis	1.09	*Citrus reticulata*	5.75	*Mangifera indica*	2.88
	Litsea cubeba	0.40	*Citrus grandis*	0.94	*Litchi sinensis*	1.39
	Citrus reticulata	3.70				
Shrub layer <5 m	*Camellia sinensis*	4.60	*Psidium guajava*	2.69		
	C. colebrookianum	9.21	*C. m. var. anamensis*	2.31	*C. m. var. anamensis*	2.48
	Trevesia palmata	2.26	*Camellia sinensis*	3.50	*C. colebrookianum*	2.12
	Carica papaya	1.35	*Dysoxylum gobara*	1.50	*C. medica var. acidus*	2.64
			Trevesia palmata	4.25	*Camellia sinensis*	2.42

(>1300 m aove MSL). The higher report of plant species from the Bangladesh homegardens may be due to their large sample size (402 gardens) and larger geographical extent of the samples. In the Khasi Hills homegarden, Meghalaya, India, Tynson and Tiwari (2010) have reported 197 plants species (70 trees and 41 shrubs) belonging to 77 families from 150 homegardens while Saikia et al. (2012) have reported 294 plant species belonging to 92 families from 80 homegardens consisting of 142 trees and 56 shrubs from Upper Assam. In the Kerala homegardens, India, 127 trees and shrubs have been reported (Kumar et al. 1994) and 68 tree species in Karnataka homegardens (Sastri et al. 2002). A total of 602 species and a mean of 7 to 24 species per garden were found in small homegardens in Java, Indonesia (Karyono 1990), 338 species in homegardens of humid Mexico (Alvarez-Buylla Roces et al. 1989) and 324 plant species in the homegardens of Nicaragua (Mendez et al. 2001). The homegardens in the tropics usually exhibit very high diversity and the average of 34 plant species in the present study is much less than 89 reported from Khasi Hills by Tynsong and Tiwari (2010)

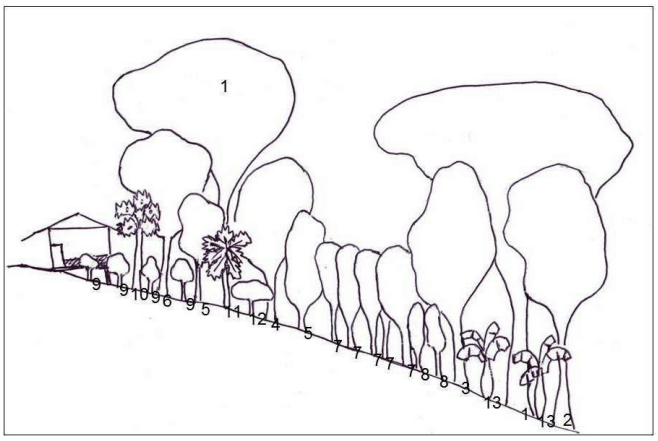

Figure 8. Homegarden profile depicting vertical strata in High altitude. 1- *Parkia timoriana, 2- Quercus serrata, 3- Artocarpus heterophyllus, 4- Mangifera indica, 5- Pyrus communis, 6- Litsea cubeba, 7- Citrus reticulate, 8- Camellia sinensis, 9-Clerodendron colebrookianum, 10-Trevesia palmate, 11-Carica papaya, 12-Acacia pennata, 13-Ensete superbum*

but in very close range with that reported from homegardens in Kerala (Mohan 2004), Nepal (Sunwar et al. 2006) and the same as reported from Bangladesh homegarden (Kabir and Webb 2008). The total number of species encountered in the present study may increase if more homegardens are surveyed as many of the species were recorded in single or very few homegardens and thus more rare plants may be encountered if we increase the sample size.

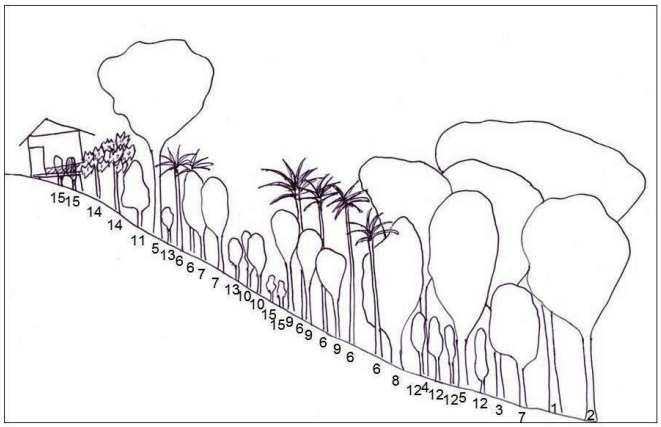

Figure 9. Homegarden profile depicting vertical strata in Mid altitude. 1-*Parkia timoriana, 2-Gmelina arborea,3-Vernicia Montana,4-Albizzia chinensis,5-Artocarpus heterophyllus, 6-Areca catechu,7-Mangifera indica,8-Citrus grandis,9-Citrus reticulate,10-Psidium guajava,11-Citrus macroptera* var *anamensis,12-Camellia sinensis,13-Dysoxylum gobara,14-Trevsia palmate,15-Clerodendron colebrookianum*

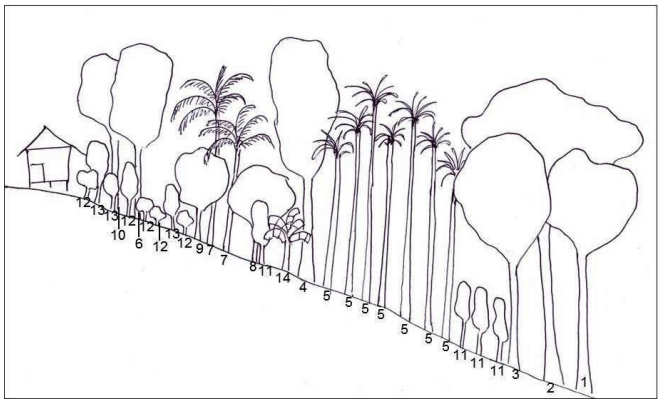

Figure 10. Homegarden profile depicting vertical strata in Low altitude. 1-*Tectona grandis,2-Derris robusta,3-Gmelina arborea,4-Artocarpus lakoocha,5-Areca catechu,6-Artocarpus heterophyllus,7-Cocos nucifera,8-Tamarindus indica,9-Mangifera indica,10-Litsea sinensis,11-Camellia sinensis,12-Clerodendron colebrookianum,13-Citrus macroptera* var *anamensis,14-Musa pardisiaca*

Many of these crops were grown as vegetable, medicine, fuel wood, fruit, or spice, few ones as staple, stimulant, or for multi-purpose- or other uses (Appendix II). Therefore, diverse homegarden crops provide a diverse range of valuable produce for fulfilling the daily needs (both for subsistence and cash) of gardeners and their families.The species composition in all the homegardens within the altitudinal zone was fairly similar to each other. The number of species and trees were recorded lesser in the mid and higher altitudes. Similar observation of decrease in herbs and shrubs species with increase altitude was reported by Verma and Kapoor (2013) on a study on floristic diversity along altitudinal gradient in Himachal Pradesh, India. The lesser number of species recorded in the low altitude gardens may be due to the high dominance by few species and higher diversity index in the mid altitude may be due to presence of species of both the high altitude and low altitudes. The density of tree individuals per hectare was higher in the mid and low altitude which may be due the dense presence of small crown areca nut trees at very close spacing.

The species diversity in the homegardens is always high. Higher species diversity always promotes high soil fertility and retains soil humidity (Ninez 1985, Rico-Gray et al. 1990, Nair 1997, Declerk and Negreros Castillo 2000, Nair 2001). According to Nair (1997) horizontal and vertical distribution of the species brings a dynamic equilibrium with respect to organic matter and plant nutrients on the garden floor because the root systems have little or no-overlapping at this layer. The root systems help in continuous addition of leaf litter and its constant removal though decomposition and the compatible admixture of the species in homegarden offer to enrich the top soil. However, at lower soil depth, the root competition will be high, which may be in proportion to the canopy volume (Nair 1997). Although we found species diversity to be quite similar in all gardens, the species density and species richness between the gardens was statistically significant (Table 2). Nevertheless, the species diversity indices of the homegarden in this present study are fairly comparable to those reported for natural forest ecosystem (Gajaseni and Gajaseni 1999) and Kerala homegardens (Kumar 1994). The plant species richness increase with increasing garden area significantly which suggests that owners maintain a diverse group of plants to fulfill their regular needs and with more available land they could opt for different variety of plants for variety of needs. The high floristic diversity is, perhaps, a reflection of the potential of homegardens to serve as repositories of

genetic diversity as well. With increase in holding size, more variations in species composition were also reported by Das and Das (2005) in Barak valley, Assam and Kabir and Webb (2008) also found a strong relationship between homegarden size with species richness in Bangladesh homegardens.

The density of trees in the studied homegardens is in range similar to that in Kerala homegardens (238-319 ha^{-1}, Kumar et al. 1994) and Philippines (220-409 ha^{-1}, Snelder 2008). Being a hilly region with steep slopes and frequent occurrence of large crown trees like *Parkia timoriana* lesser tree density might have been recorded in the surveyed gardens. Fruit trees dominated the trees and shrubs recorded and their IVI values are also high across the altitudes. Similar observation was also reported by Zaman et al (2010) in Bangladesh, Das and Das (2005) in Barak valley, Bernholt et al. (2009) in Sulawesi, Indonesia, Akinnifesi et al. (2009) in Maranhao, Brazil. Fruit cropping systems provide valuable market benefits and services, of which some have significant objectives (Withrow-Robinson et al. 1999). In general, homegarden produce contributes more to meet the demands of protein and micronutrients (Kehlenbeck 2007) and the homegarden owners in Mizoram usually prefer to plant more fruit trees whenever an option is given and may be the farmers also consider the importance of cash crop production of fruits in homegardens located close to market opportunities and along the major roads. The tendency to plant more fruit trees and ornamental plants for those villages close to market opportunities were also observed in many studies elsewhere (Soemarwoto and Conway 1992, Karyono 2000, Mendez et al. 2001)

Parkia timoriana recorded the highest IVI value in the mid hills and high altitudes while it was areca nut in the low altitudes. And interestingly both trees are of commercial in nature apart from the household use. The fruit (pods) of *Parkia* are nutritious and a good source of protein and relished by different tribes of *Mizos, Meiteis, Ku*kis and *Nagas* in the north eastern region of India. Owing to its taste it is highly demanded winter vegetable. Rocky and Sahoo (2002) have reported that this tree contributes a good part to the farmers' family income. Kuhwa (the local name for arecanut fruit) is consumed by majority of the population in this part of the north eastern region and their demand is high. Thus apart from the fruits trees for sale of the excess from the gardens these trees of economic importance are also high in the phytosociology which links the income generating tendency of the farmers from the homegarden products.

Floristic similarity and dissimilarity would vary across an altitudinal gradient and in the present study it is observed that certain trees are recorded only in high altitudes and some only in the low altitudes depending on the favourable conditions. This is due to the tree physiology, its climatic requirements and related to distribution of trees in different agroclimatic zones. The similarity index indicates a low percentage of similarity between low and high altitude. Bornkamm (1981) considered low similarity to be an indicative of higher rate of species changes and *vice-versa*. These changes may be attributed to the cultural differences among the tribal communities and confounded by the needs and beliefs. The low similarity in the present study between the high altitude and low altitude might be due to the difference in climatic conditions where species which thrive well in low altitude might not be favourable to grow in high altitude.

Traditional homegardens often exhibit complex vertical and horizontal structures. The wide range of species of different heights and life forms found in traditional homegardens add to their ecological efficiency in terms of use of physical and chemical resources such as water, sunlight and nutrients (Blanckaert et al. 2004, Wiersum 1982). Multilayered canopy configuration of the homegardens with lower plant density and species richness in the upper strata was also observed in Bangladesh homegardens (Millat-e-Mustafa et al. 1996) and the neighboring forests in physiognomic terms (Barrera 1980). However, such strata vary in numbers in different areas and may range from three to six (Fernandez and Nair 1986, Millat-e-Mustafa et al. 1996, Das and Das 2005). In Thailand Gajaseni and Gajaseni (1999) reported four vertical layers, in north eastern Brazil (Albuquerque et al. 2005) reported 3 strata. In the present analysis 4 vertical strata are observed with different species occupying different stratum in the homegardens at different altitudes. The ground or herbaceous layer is usually cropped with zinger, colocasia, *Phrynium capitatum,* etc., and other medicinal plants. Mustard, *Hibiscus sabdariffa*, cauliflower, etc., are cropped in slightly open area and not under the thick canopies. Climbers like *Passiflora edulis, Sechium edule* etc., are grown in open space with *Parkia timoriana* as shade trees.

CONCLUSIONS

The study revealed that homegardens of Mizoram are the depositories of diverse plant resources of both ecological

and economic significance. The homegardens are fairly similar in structure and but different in species composition across the altitudes, indicating that the farmers purposely retained certain plant species (need not necessary be planted) that they consider important, regardless of the economic value. More plant species were recorded in the low land gardens but the diversity index was higher in the mid altitude gardens. The tree density was higher in the low altitudes with more *Areca* nut trees and it was lesser in high altitude gardens with more prevalence of *Parkia timoriana*. Species composition was slightly more similar between the low altitudes and mid altitudes than with high altitudes. Number of species and diversity of trees and shrubs increased with increasing garden size.

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REFERENCES

Abdoellah, O.S.; Hadikusumah, H.Y.; Takeuchi, K.; Okubo, S. and Parikesit 2006. Commercialization of home gardens in an Indonesian village: Vegetation composition and functional changes. Agroforestry Systems 68:1-13.

Akinnifesi, F.K.; Sileshi, G.; Ajayi, O.C.; Akinnifesi, A.I.; de Moura, E.G.; Linhares, J.F.P. and Rodrigues, I. 2009. Biodiversity of the urban home-gardens of São Luís city, Northern Brazil. Urban Ecosystems 13: 129-146.

Albuquerque, U.P.; Andrade, L.H.C. and Caballero, J. 2005. Structure and floristics of homegardens in northeastern Brazil. Journal of Arid Environments 62: 491–506.

Alvarez-Buylla Roces, M.E.; Lazos Chavero, E. and Garcia-Barrios, J.R. 1989. Homegardens of humid tropical region in Southeast Mexico: an example of an agroforestry cropping system in a recently established community. Agroforestry Systems 8: 133-156

Barrera, A. 1980. Sobre la unidad de habitacio´n tradicional campesina y el manejo de recursos bio´ticos en el area Maya Yucatense. Biotica 5: 115–129.

Bernholt, H.; Kehlenbeck, K.; Gebauer, J. and Buerkert, A. 2009. Plant species richness and diversity in urban and peri-urban gardens of Niamey, Niger. Agroforestry Systems 77: 159-179.

Blanckaert, I.; Swennen, R.; Paredes, M.; Rosa, S.R. and Lira Saade, R. 2004. Floristic composition, plant uses and management practices in homegardens of San Rafael Coxcatlán, Valley of Tehuacán, Mexico. Journal of Arid Environments 57: 179-202.

Bornkamm, R. 1981. Rates of change in vegetation during secondary succession. Vegetatio 47: 213-220.

Cox, G. 1990. Population and community structure: Quadrat sampling techniques. Pages 69-73, In: Laboratory Manual of General Ecology. 6th edition. W.C. Brown Co., Dubuque, IA.

Curtis, J.T. 1959. The Vegetation of Wisconsin: An Ordination of Plant Communities. The University of Wisconsin Press, Madison. WI. 640 pages.

Das, T. and Das, A.K. 2005. Inventorying plant biodiversity in homegardens: A case study in Barak Valley, Assam, North-East India. Current Science 89(1):155-163.

De Clerck, F.A.J. and Negreros-Castillo, P. 2000. Plant species of traditional Mayan homegardens of Mexico as analogs for multistrata agroforests. Agroforestry Systems 48: 303–317.

Fernandes, E.C.M. and Nair, P.K.R. 1986. An Evaluation of the structure and function of tropical homegardens. Agricultural Systems 21: 279-310.

Gajaseni, J. and Gajaseni, N. 1999. Ecological rationalities of the traditional homegarden system in the Chao Phraya Basin, Thailand. Agroforestry Systems 46: 3-23.

Hoogerbrugge, I.D. and Fresco, L.O. 1993. Homegarden Systems: Agricultural Characteristics and Challenges. Gatekeeper Series no. 39. International Institute for Environment and Development, London. 23 pages.

Kabir, M.E. and Webb, E.L. 2008. Floristics and structure of southwestern Bangladesh homegardens. International Journal of Biodiversity Science and Management 4: 54-64.

Karyono 1990. Home gardens in Java. Their structure and function. Pages 138-146, In: Landauer, K. and Brazil, M. (Editors) Tropical Homegardens. The United Nations University, Tokyo, Japan.

Karyono. 2000. Traditional homegardens and its transforming trend. Jurnal Bionatura 2: 117-124.

Kehlenbeck, K. 2007. Rural Homegarden in Central Sulawesi, Indonesia: An Example for Sustainable Agro-ecosystems? Ph.D. Thesis, Georg-August-University, Göttingen, Germany, 220 pages.

Kehlenbeck, K. and Maass, B.L. 2004. Crop diversity and classification of homegardens in Central Sulawesi, Indonesia. Agroforestry Systems 63: 53-62.

Kumar, B.M.; George, S.J. and Chinnamanis, S. 1994. Diversity, structure and standing stock of wood in the homegardens of Kerala in Peninsular India. Agroforestry Systems 25: 243-262.

Margurran, A.E. 1988. Ecological Diversity and its Measurements. Princeton University Press, Princeton, NJ. 179 pages.

Maxted, N.; Scholten, M.A.; Codd, R. and Ford-Lloyd, B.V. 2007. Creation and use of a national inventory of crop wild relatives. Biological Conservation 140: 142–159.

Mendez, V.E.; Lok, R. and Somarriba, E. 2001. Interdisciplinary analysis of homegardens in Nicaragua: Microzonation, plant use and socioeconomic importance. Agroforestry Systems 51: 85-96.

Michon, G.; Bompard, J.; Hecketsweiler, P. and Ducatillon, C. 1983. Tropical forest architectural analysis to agroforests in the humid

tropics: The examples of traditional village-agroforests in west Java. Agroforestry Systems 1: 117-129.

Millat-e-Mustafa, M.D.; Hall, J.B. and Teklehaimanot, Z. 1996. Structure and floristics of Bangladesh homegardens. Agroforestry Systems 33: 263-280.

Mohan, S. 2004. An Assessment of the Ecological and Socio-economic Benefits Provided by Homegardens: A Case Study of Kerala, India. Ph.D. Thesis, University of Florida, Gainesville, FL. 120 pages.

Nair, P.K.R. 2001. Do tropical homegardens elude science, or is it the other way around? Agroforestry Systems 53: 239-245

Nair, P.K.R. 1997. Directions in tropical agroforestry. Agroforestry Systems 38: 223-246

Ninez, V.K. 1985. Working at half-potential: Constructive analysis of home garden programmes in the Lima slums with suggestions for an alternative approach. Food and Nutrition Bulletin 7: 6-14.

Rico-Gray, V.; Garcia-Franco, J.G.; Alexandra, C.; Armando, P. and Paulino, S. 1990. Species composition, similarity and structure of Mayan homegardens in Tixpeual and Nicaragua: micro-zonation, plant use and socioeconomic importance. Agroforestry Systems 51: 85-96.

Rocky, P. and Sahoo, U.K. 2002.Tree bean (*Parkiaroxburghii*G.Don) in Imphal West district of Manipur. MFP News XII: 4-5.

Sahoo, U.K. 2009. Traditional home gardens and livelihood security in North-East India. Journal of Food, Agriculture and Environment 7(2): 665-670.

Sahoo, U.K.; Rocky, P.; Vanlalhriatpuia, K. and Upadhyaya, K. 2012. Species composition, production and energetic sustainability of homegardens in the highlands of eastern Mizoram, India. In: Xi, Weimin (Editor) Forest Restoration. Tree and Forestry Science and Biotechnology (Special Issue 1): 81-92. Global Science Books, Ikenobe, Japan.

Saikia, P.; Choudhury, B.I. and Khan, M.L. 2012. Floristic composition and plant utilization pattern in homegardens of Upper Assam, India. Tropical Ecology 53: 105-118.

Shastri, C.M.; Bhat, D.M.; Nagaraja, B.C.; Murali, K.S. and Ravindranath, N.H. 2002. Tree species diversity in a village ecosystem in Uttara Kannada district in Western Ghats, Karnataka. Current Science 82: 1080-1084.

Simpson, E.H. 1949. Measurement of diversity. Nature 163: 688.

Snelder, D.J. 2008. Smallholder tree growing in Philippine back yards: homegarden characteristics in different environmental settings. Pages 37-74, In: Snelder, D.J. and Lasco, R. (Editors) Smallholder Tree Growing for Rural Development and Environmental Services. Springer Science + Business Media, Amsterdam.

Soemarwoto, O. and Conway, G.R. 1992. The Javanese homegarden. Journal for Farming System Research Extension 2(3): 95-118.

Soemarwoto, O. 1987. Homegadens: A traditional agrforestry system with a promising future. Pages 157-170, In: Steppler, H. and Nair, P.K.R. (Editors) Agroforestry: A Decade of Development. International Council for Research in Agroforestry (ICRAF), Nairobi.

Steinberg, M.K. 1998. Political ecology and cultural change: impacts on swidden-fallow agroforestry practices among Mopan Maya in southern Belize. Professional Geographer 50: 407-417.

Sunwar, S.; Thornstrom, C.G.; Subedi, A. and Bystrom, M. 2006. Home gardens in western Nepal: opportunities and challenges for on-farm management of agrobiodiversity. Biodiversity Conservation 15: 4211-4238.

Tynsong, H. and Tiwari, B.K. 2010. Plant diversity in the home-gardens and their significance in the livelihoods of *War Khasi c*ommunity of Meghalaya, North-east India. Journal of Biodiversity 1(1):1-11.

Verma, R.K. and Kapoor, K.S. 2013. Floristic diversity along an altitudinal gradient in Namgia Valley of cold desert in District Kinnaur, Himachal Pradesh. Indian Forester 139: 202-211.

Watson, J.W. and Eyzaguirre, P.B. 2002. Homegardens and in-situ Conservation of Plant Genetic Resources in Farming Systems. Witzenhausen, Germany: Paper presented at 2nd International Homegarden Workshop, 17-19 July 2001, Witzenhausen, Germany.

Wiersum, K.F. 1982. Tree gardening and Taungya on Java: examples of agroforestry techniques in the humid tropics. Agroforestry Systems 1: 53-70.

Withrow-Robinson, B.; Hibbs, D.E.; Gypmatasiri, P. and Thomas, D. 1999. A preliminary classification of fruit-based agroforestry in a highland area of northern Thailand. Agroforestry Systems 42: 195–205.

Zaman, S.; Siddiquee, S. and Katoh, M. 2010. Structure and diversity of homegarden agroforestry in Thakurgaon District, Bangladesh. The Open Forest Science Journal 3: 38-44.

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Appendix-1

Plant species inventoried in the homegardens, with their local names and common use

Botanical Name	Local Name	Life Form	Family	Uses
Abelmoschus esculentus (L.) Moench	Bawrseibe	Herb	Malvaceae	Food
Acacia auriculiformis A. Cunn.	Kalsiamthing	Tree	Mimosaceae	Timber
Acacia penneta (L.) Willd.	Khanghu	Climber	Mimosaceae	Food
Acorus calamus (L.)	Sweet flag	Herb	Acoraceae	Medicinal
Acrocarpus fraxinifolius Wight. & Arn.	Nganbawn	Tree	Caesalpiniaceae	Timber
Aegle marmelos (L.) Correa	Thuamriat	Tree	Rutaceae	Timber
Ageratum conyzoides L.	Vailen hlo	Herb	Compositae	Medicinal
Ailanthus integrifolia ssp *calycina* (Pierre) Noot.	Thing ar thau	Tree	Simarubaceae	Timber
Alangium chinense (Lour.) Harms	Arsarimnam	Tree	Alangiaceae	Firewood
Albizia chinensis (Osbeck) Merr.	Vang thing	Tree	Mimosaceae	Timber
Albizia lebbeck (L.) Benth.	Thing chawk e	Tree	Mimosaceae	Timber
Albizia myriophylla Benth.	Zamjou/Zang-zu	Climber	Mimosaceae	Medicinal
Albizia procera (Roxb.) Benth.	kangtek	Tree	Mimosaceae	Timber
Allium cepa var. *cepa* L.	Purun (zo)	Herb	Liliaceae	Food
Allium hookeri Thw.	Mizo purun	Herb	Liliaceae	Food
Alnus nepalensis D. Don.	Hriangpui	Tree	Betulaceae	Firewood
Alocasia indica (Lour.) Koch.	Taro	Herb	Araceae	Food
Alocasia macrorrhiza (L.) Schott.	Batra	Herb	Araceae	Medicinal
Aloe vera (L.) Burm. f.	Aloe vera	Herb	Xanthorrhoeaceae	Ornamental
Alpina galanga (L.) Willd.	Aichal	Herb	Zingiberaceae	Food
Alstonia scholaris (L.) R. Br.	Thuamriat	Tree	Apocycaneae	Medicinal
Amomum dealbatum Roxb.	Aidu	Herb	Zingiberaceae	Food
Amorphophallus paeonifolius (Dennst.) Nicolson	Batel hawng	Herb	Araceae	Food
Ananas comosus (L.) Merr.	Lakhuithei	Herb	Bromeliaceae	Food
Anogeissus acuminata Roxb.	Zairum	Tree	Combretaceae	Timber
Antidesma acidium Retz.	Thurte an	Shrub	Euphorbiaceae	Firewood
Antidesma bunius (L.) Spreng.	Tuai tit	Tree	Euphorbiaceae	Firewood
Aphananthe cuspidate (Bl.) Planch	Thei-she-rêt	Tree	Ulmaceae	Firewood
Aporusa octandra (Buch.-Ham. ex D. Don) A.R. Vickery	Chhawntual	Tree	Euphorbiaceae	Timber
Aquilarria malaccensis Lamk.	Thingrai	Tree	Thymeleaceae	Firewood
Aralia foliosa var. *sikkimensis*	Chimchawk	Tree	Araliaceae	Food
Areca catechu L.	Kuhva	Tree	Palmae	Food
Artocarpus chama Buch.-Hum.	Tatkawng	Tree	Moraceae	Timber
Artocarpus heterophyllus Lamk.	Lamkhuang	Tree	Moraceae	Timber
Artocarpus lakoocha Roxb.	Thei tat	Tree	Moraceae	Timber
Artocarpus nitidus ssp *griffithii* (King) F.M. Jarrett	Tat	Tree	Moraceae	Timber
Asparagus racemosus Willd.	Arkebawk	Climber	Liliaceae	Ornamental
Averrhoa carambola L.	Thei her awt	Tree	Oxalidaceae	Timber
Azadirachta indica A. Juss.	Neem	Tree	Meliaceae	Timber
Baccaurea ramiflora Lour.	Pangkai	Tree	Euphorbiaceae	Firewood
Bambusa arundinaceae Retz.	Rua	Bamboo	Graminae	Misc
Bambusa bambos (L.) Voss.	Zoramthanga maw	Bamboo	Graminae	Misc
Basella alba L. var. *rubra*	Nawi nawk	Climber	Basellaceae	Food
Bauhinia variegata L.	Vau be	Tree	Caesalpiniaceae	Firewood
Benincasa hispida (Thunb) Cogn.	Maipawl	Climber	Cucurbitaceae	Food
Bidens biternata (Lour.) Merr. & Sherff.	Vawkpui thal	Herb	Compositae	Fodder
Bischofia javanica Blume	Khwangthli	Tree	Euphorbiaceae	Timber
Bombax insigne Wall.	Pang	Tree	Bombacaceae	Fibre
Borassus flabellifer L.	Sial lu	Tree	Palmae	Ornamental

Continued.

Botanical Name	Local Name	Life Form	Family	Uses
Bougainvillea spectabilis Willd.	Sarawn	Climber	Nyctaginaceae	Ornamental
Brassica juncea (L.) Czern. & Coss.	Antam	Herb	Cruciferae	Food
Brassica oleracea L. var. *capitata*	Ziklum	Herb	Cruciferae	Food
Brassica oleracea L. var. *gongylodes*	Bulbawk	Herb	Cruciferae	Food
Brassica oleracea L. var. *italica*	Brokoli	Herb	Cruciferae	Food
Brassica oleracea L. var. *botrytis*	Parbawr	Herb	Cruciferae	Food
Brassica rapa L.	Antam	Herb	Cruciferae	Food
Brassica sp.	Cabbage	Herb	Cruciferae	Food
Bridelia monoica Merr.	Phaktel	Tree	Euphorbiaceae	Timber
Bulbophyllum lobbii Lindl.	Naobang	Epiphyte	Orchidaceae	Ornamental
Butea parviflora Roxb.	Zathoh	Climber	Papilionaceae	Fibre
Cactus	Cactus	Herb	Euphorbiaceae	Ornamental
Cajanus cajan (L.) Millsp.	Behliang	Herb	Papilionaceae	Food
Calamus andamanicus Kurz.	Mawt	Climber	Palmae	Ornamental
Calamus erectus Roxb.	Hruipui	Climber	Palmae	Ornamental
Calamus sp.	Cane	Climber	Palmae	Ornamental
Calamus tenius Roxb.	Thilte	Climber	Palmae	Ornamental
Callicarpa arborea Roxb.	Hnah kiah	Tree	Verbenaceae	Timber
Callistemon citrinus (Curtis) Skeels	Bottle brush	Tree	Myrtaceae	Ornamental
Camellia sinensis (L.) O. Kuntze	Thingpui kung	Shrub	Theaceae	Beverage
Canavalia ensiformis (L.) DC.	Fangra	Herb	Papilionaceae	Food
Canna orientalis Rosc.	Kungpui muthi	Herb	Cannaceae	Medicinal
Cannabis sativa L.	Kanja	Herb	Cannabinaceae	Narcotics
Capsicum annuum L.	Hmarchate	Herb	Solanaceae	Food
Capsicum fructescens L. (Bail.)	Hmarcha pui	Herb	Solanaceae	Food
Carallia brachiata (Lour.) Merr.	Thei-ria	Tree	Rhizophoraceae	Timber
Carica papaya L.	Thingfanghma	Tree	Caricaceae	Food
Caryota mitis Lour.	Mei hle	Tree	Palmae	Ornamental
Caryota urens L.	Tum	Tree	Palmae	Ornamental
Cassia alata L.	Da du hlo	Shrub	Caesalpiniaceae	Medicinal
Cassia nodosa Buch.-Ham. ex Roxb.	Hmakpazangkang	Tree	Caesalpiniaceae	Firewood
Cassia occidentalis L.	Rengan	Herb	Caesalpiniaceae	Food
Castanopsis tribuloides (Sm.) A. DC.	Thing sia	Tree	Fagaceae	Timber
Catharanthus roseus (L.) G. Don.	Kumtlung	Herb	Apocycaneae	Ornamental
Celtis tetranda Roxb.	Anku	Tree	Ulmaceae	Timber
Celtis timorensis Span.	Thinghmarcha	Tree	Ulmaceae	Timber
Centella asiatica (Urb.)	Lambak	Herb	Umbelifereae	Food
Chimnocalamus longispiculata	Rawthing	Bamboo	Graminae	Misc
Chrysanthemum indicum L.	October par	Herb	Compositae	Ornamental
Cinnamomum tamala Fr. Nees	Tejpat	Tree	Lauraceae	Firewood
Cinnamomum verum J.S. Presl.	Thakthing	Tree	Lauraceae	Firewood
Citrus acida (L.)	Ser sawr	Tree	Rutaceae	Food
Citrus aurantifolium (Christm.) Swingle	Champara/ser te	Shrub	Rutaceae	Food
Citrus grandis L. Osbeck	Sertawk	Tree	Rutaceae	Food
Citrus indica Tanaka	Ser pui/ Ser	Shrub	Rutaceae	Food
Citrus limon L. Burm.	Sêr-fâng	Shrub	Rutaceae	Food
Citrus macroptera var. *anamensis* Montrouz	Hatkora	Tree	Rutaceae	Food
Citrus medica L. var. *acidus*	Limbu	Shrub	Rutaceae	Food
Citrus reticulata Blanco.	Sêr-thlum	Shrub	Rutaceae	Food
Citrus sp.	Zamir	Shrub	Rutaceae	Food
Clerodendrum colebrookianum Walp.	Phui-hnam	Tree	Verbenaceae	Food
Clerodendrum viscosum Vent.	Phuinam chhuak	Shrub	Verbenaceae	Medicinal
Cocos nucifera L.	Coconut	Tree	Palmae	Food

Continued.

Botanical Name	Local Name	Life Form	Family	Uses
Coffea arabica L.	Coffee	Shrub	Rubiacaea	Beverage
Coffea khasiana Hook. f.	Ngul ri thet	Shrub	Rubiacaea	Misc
Colocasia esculenta (L.) Schott	Dawl/bal	Herb	Araceae	Food
Colocasia sp.	Dawl	Herb	Araceae	Food
Colocassia affinis Schott.	Baibing	Herb	Araceae	Food
Cordia fragrantissima Kurz.	Mukh	Tree	Boraginaceae	Firewood
Coriandrum sativum L.	Dhania	Herb	Apiaceae	Spice
Costus speciosus (Koenig) Sm.	Sum bul	Herb	Zingiberaceae	Medicinal
Crotolaria juncea L.	Tumthang	Shrub	Papilionaceae	Food
Cucumis melo var. *saccharinus* H. Jacq.	Hmazil	Climber	Cucurbitaceae	Food
Cucumis sativus L.	Fanghma	Climber	Cucurbitaceae	Food
Cucurbita maxima Duchesne ex Lam.	Maien	Herb	Cucurbitaceae	Food
Cupressus torulosa D. Don.	Cedar	Tree	Cupressaceae	Timber
Curculigo crassifolia (Bak.) Hook. f.	Phaiphak	Herb	Amaryllidaceae	Medicinal
Curcuma caesia Roxb.	Ailiaidum	Herb	Zingiberaceae	Medicinal
Curcuma longa L.	Aieng	Herb	Zingiberaceae	Condiments
Cyathea spinosa Wall. ex Hook.	Tree fern	Herb	Cyatheaceae	Ornamental
Cyphomandra betacea (Cav.) Sendt.	Thing be râ	Tree	Solanaceae	Food
Dahlia rosea (Herb Smith)	Dalhia	Herb	Compositae	Ornamental
Debregeasia longifolia (Burm. f.) Wedd.	Lengau	Shrub	Urticaceae	Food
Delonix regia (Boj.) Raf.	April Par	Tree	Caesalpiniaceae	Firewood
Dendrobium chrysotoxum Lind.	Nau ban pui	Epiphyte	Orchidaceae	Ornamental
Dendrocalamus giganteus Munro.	Vaimaw	Bamboo	Graminae	Misc
Dendrocalamus longispathus Kurz.	Rawnel	Bamboo	Graminae	Misc
Dendrocnide sinuate (Bl.) Chew.	Thak pui	Shrub	Urticaceae	Food
Derris robusta (DC.) Benth.	Thingkha	Tree	Papilionaceae	MPT
Dichrocephala integrifolia (L. f.) Kuntze	Vawk ek a tum tual	Herb	Compositae	Medicinal
Dillenia indica L.	Kawthindeng	Tree	Dilleanaceae	Timber
Diospyros toposia Buch.-Ham.	Zo thing hang	Tree	Ebenaceae	Timber
Duabanga grandiflora Roxb. ex DC.	Zuang	Tree	Lythraceae	Timber
Duranta repens L.	Duranta	Shrub	Verbenaceae	Ornamental
Dysoxylum binectariferum Hook.	Saha tah	Tree	Meliaceae	Timber
Dysoxylum gobara (Buch.-Ham.) Merr.	Thing thu pui	Tree	Meliaceae	Food
Elaeagnus caudate Schl. ex Momiyana	Sarjuk	Shrub	Eleagnaceae	Food
Elaeis guineensis Jacq.	Red oil palm	Tree	Palmae	Misc
Elaeocarpus tectorius (Lour.) Poir	Umkhal	Tree	Tiliaceae	Timber
Eleocarpus floribundus Bl.	Thinglung	Tree	Tiliaceae	Timber
Elsholtzia communis (Collett & Hemsley) Diels.	Lengsher	Herb	Labiatae	spice
Embelia tsjeriam-cottam A.DC.	Raisentu	Tree	Myrsinaceae	Firewood
Emblica officinalis Gaertn.	Sun-hlû	Tree	Euphorbiaceae	Food
Ensete superbum (Roxb.) Cheesman	Saisu	Herb	Musaceae	Food
Entada pursaetha DC.	Kawi hrui	Climber	Mimosaceae	Food
Eryngium foetidum L.	Bakhawr	Herb	Umbelifereae	spice
Erythrina stricta Roxb.	Fartuah	Tree	Papilionaceae	Ornamental
Erythrina subumbrans (Hassk.) Merr.	Fartuah hling nei lo	Tree	Papilionaceae	Ornamental
Eucalyptus sp.	Eucalyptus	Tree	Myrtaceae	Timber
Euphorbia milli Ch. des Moulins	Christ thorn	Herb	Euphorbiaceae	Ornamental
Euphorbia milli var. *splendens*	Euphorbia	Herb	Euphorbiaceae	Ornamental
Euphorbia pulcherrima Willd. ex Klotz.	Hnah sen	Shrub	Euphorbiaceae	Ornamental
Euphorbia royleana Boiss.	Chawng	Shrub	Euphorbiaceae	Ornamental
Euphoria longan (Lour.) Steud.	Theifeihmung	Tree	Euphorbiaceae	Timber
Eurya cerasifolia (D. Don) Kobuski	Si neh	Tree	Theaceae	Timber
Ficus geniculata Kurz.	Bung	Tree	Moraceae	Firewood

Continued.

Botanical Name	Local Name	Life Form	Family	Uses
Ficus hispida L.	Thelret	Tree	Moraceae	Firewood
Ficus geniculata Kurz.	Rihnim	Tree	Moraceae	Firewood
Ficus hispida L.	Paite maien	Tree	Moraceae	Firewood
Ficus prostata	Theitit	Tree	Moraceae	Firewood
Ficus religiosa L.	Hmawng	Tree	Moraceae	Firewood
Ficus semicordata Buch.-Ham. ex Serr.	Thei-pui	Tree	Moraceae	Firewood
Ficus tinctoria G. Forster	Hmeithai thei	Tree	Moraceae	Firewood
Flacourtia jangomas (Lour.) Raeusch.	Sakhithei	Tree	Flacourtiacaea	Firewood
Garcinia lanceaefolia Roxb.	Chengkek	Shrub	Guttifereae	Food
Garuga pinnata Roxb.	Bungbutuairam	Tree	Burseraceae	Timber
Glinus oppositifolius (L.) Aug. DC	Bakhate	Herb	Aizoaceae	Food
Glochidion velutinum Wight.	Thingpawn chhia	Tree	Euphorbiaceae	Firewood
Glycine max (L.) Merr.	Bekang	Herb	Papilionaceae	Food
Gmelina arborea Roxb.	Thlan vawng	Tree	Verbenaceae	Timber
Grevillea robusta A. Cunn. ex R. Br.	Silver oak	Tree	Protaceae	Timber
Haldina cordifolia (Roxb.) Ridsd.	Lungkhup	Tree	Rubiaceae	Timber
Hedyotis scandens Roxb. ex G. Don	Kelhnamtur	Climber	Rubiacaea	Medicinal
Helica excelsa	Sialhmâ	Tree	Protaceae	Timber
Heteropanax fragrans (Roxb.) Seem	Chhankhen	Tree	Araliaceae	Timber
Hevea brasilensis (Willd. ex Adr. de Juss.) Muell.-Arg.	Rubber tree	Tree	Euphorbiaceae	Firewood
Hibiscus macrophyllus Roxb.	Vaiza	Tree	Malvaceae	Timber
Hibiscus rosa chinensis L.	Bangla par	Tree	Malvaceae	Ornamental
Hibiscus sabdariffa L.	Anthur	Herb	Malvaceae	Food
Hibiscus sabdariffa L.Var.. *sabdariffa*	Vai anthur	Herb	Malvaceae	Food
Hodgsonia macrocarpa (Bl.) Congn.	Kha um	Climber	Cucurbitaceae	Food
Homalomena aromatic (Roxb.) Schott	Anchiri	Herb	Araceae	Food
Impatiens balsamina L.	Nuai thang	Herb	Balsaminaceae	Ornamental
Imperata cylindrical (L.) P. Beauv.	Di pangpar	Herb	Graminae	Misc
Ipomea batatas (L.) Lam.	kawl ba hra	Herb	Convolvulaceae	Food
Jasminum amplexicaule Buch.-Ham. ex G. Don.	Rokhuah (hlo khâ)	Shrub	Oleaceae	Ornamental
Jatropha curcas L.	Kangdamdawi	Tree	Euphorbiaceae	Ornamental
Justicia gendarussa Burm. f.	Justicia	Herb	Acanthaceae	Ornamental
Kalanchoe pinnata (Lam.) Pers.	Bryophyllum	Herb	Crassulaceae	Ornamental
Kydia calycina Roxb.	Thral teh	Tree	Malvaceae	Timber
Lablab purpureus (L.) Sweet.	Bepui	Climber	Papilionaceae	Food
Lagenaria siceraria (Molina) Standley	Um mei	Climber	Cucurbitaceae	Food
Lagerstroema speciosa (L.) Pers.	Thlado	Tree	Lythraceae	Timber
Lantana camara L.	Shillong Tlang sam	Shrub	Verbenaceae	Misc
Lactuca indica L.	Khuang lawi	Herb	Compositae	Food
Leea indica (Burm. f.) Merr.	Kawlkarh	Shrub	Ampelidaceae	Misc
Lepionurus sylvestris Blume	Anpangthuam	Tree	Olacaceae	Food
Leucaena leucocephala (Lam.) de Wit	Japan Zawngtah	Tree	Mimosaceae	Food
Ligustrum robustum (Roxb.) Blume	Chawmzil	Tree	Oleaceae	Firewood
Lilium wallichianum Schult. f.	Ba dai	Herb	Liliaceae	Ornamental
Lindera nacusua (D. Don) Merr.	Saper	Tree	Lauraceae	Timber
Litchi sinensis Sonn.	Vai-thei-fei-mung	Tree	Sapindaceae	Food
Lithocarpus dealbata (Hook. f. & Thomson ex Miq.) Rehder	Fah	Tree	Fagaceae	Timber
Lithocarpus elegans (Blume.) Hatus. ex Soepadmo	Thingpuithing	Tree	Fagaceae	Timber
Litsea cubeba (Lour.) Pers.	Sêr-nam	Tree	Lauraceae	Timber
Litsea monopetala Pers.	Nauthak	Tree	Lauraceae	Timber
Livinstonia chinensis R. Br. ex Mart.	Buarpui	Tree	Palmae	Ornamental
Lobelia angulata (G. Forst.) Hook. f.	Cho ak a thi	Herb	Campanulaceae	Medicinal
Luculia pinceana Hook.	Chawkhlei	Shrub	Rubiacaea	Ornamental

Continued.

Botanical Name	Local Name	Life Form	Family	Uses
Luffa acutangula (L.) Roxb.	Awmpawng	Climber	Cucurbitaceae	Food
Lycopersicon esculentum Mill.	Sap bawk bawn	Herb	Solanaceae	Food
Lyonia ovalifolia (Wall.) Drude	Tlangham	Tree	Ericaceae	Timber
Macaranga indica Wight.	Hnakhar-nu	Tree	Euphorbiaceae	Timber
Macropanax dispermus (Blume.) Kuntze	Phunbarh	Tree	Araliaceae	Food
Magnolia hodgsonii (Hook. f. & Thomson) H. Keng	Thingtumbu	Tree	Magnoliaceae	Timber
Mallotus phillipensis Muell.-Arg.	Thingkhei	Tree	Euphorbiaceae	Firewood
Malus pumila Mill.	Apple	Tree	Rosaceae	Food
Mangifera indica L.	Thei hai	Tree	Anacardaceae	Food
Manihot esculenta Crantz.	Pâng-bal	Shrub	Euphorbiaceae	Food
Marsdenia maculate Hook. f.	Ankhapui	Climber	Asclepiadaceae	Food
Melocanna baccifera (Roxb.) Kurz.	Mautak	Bamboo	Graminae	Misc
Memecylon celastrinum Kurz.	Theikawarh	Tree	Melastomaceae	Timber
Mentha viridis L.	Pudina	Herb	Labiatae	Food
Mesua ferrea L.	Herse	Tree	Rubiacaea	Timber
Michelia oblonga Wall. ex Hook. f. & Thoms.	Ngiau	Tree	Magnoliaceae	Timber
Mikania micrantha Kunth.	Japan hlo	Climber	Compositae	Fodder
Millettia pachycarpa Benth.	Ru lei	Shrub	Papilionaceae	Misc
Mimosa pudica L.	Hlonuar	Shrub	Mimosaceae	Medicinal
Mirabilis jalapa L.	Artukhuan	Herb	Nyctaginaceae	Ornamental
Momordica charantia L.	Changkha	Climber	Cucurbitaceae	Food
Momordica mixta Roxb.	Maitamtawk	Climber	Cucurbitaceae	Food
Moringa oleifera Lamk.	Thing antam	Tree	Moringaceae	Food
Morus alba L.	Thing thei hmu	Tree	Moraceae	Food
Morus macroura Miq.	Mulberry (fruit big)	Tree	Moraceae	Food
Murraya koenigii (L.) Spreng.	Curry pata	Shrub	Rutaceae	Food
Musa paradisiaca L.	Banhla	Herb	Musaceae	Food
Musa paradisiaca L. var.. *sylvestri*s	Changel	Herb	Musaceae	Food
Myrica esculenta Buch.- Ham.	Keifang	Tree	Myricaceae	Food
Nerium indicum Mill.	Kananpar	Shrub	Apocycaneae	Ornamental
Nicotiana tobaccum L.	Vaihlo	Herb	Solanaceae	Narcotics
Occimum americanum L.	Run hmui	Herb	Labiatae	Medicinal
Oreocnide integrifolia Miq.	Zuk buh	Tree	Urticaceae	Timber
Oroxylum indicum (L.) Vent.	Archangkawm	Tree	Bignoniaceae	Timber
Oryza collina (Trimen) S.D Sharma & Shastry	Buh	Herb	Oryzeae	Food
Ostodes paniculata Bl.	Beltur	Tree	Euphorbiaceae	Timber
Parkia timoriana (A. DC.) Merr.	Zawngtah	Tree	Mimosaceae	Food
Passiflora edulis Sims.	Sapthei	Climber	Passifloraceae	Food
Persea americana Mill.	Butter thei	Tree	Lauraceae	Food
Persea minutiflora Kosterm	Ngha leng lu thar	Tree	Lauraceae	Firewood
Phaseolus vulgaris L.	Beans	Climber	Papilionaceae	Food
Phoenix sylvestris (L.) Roxb.	Date palm	Tree	Arecaceae	Ornamental
Phrynium capitatum Willd.	Hnathial	Herb	Marantaceae	Misc
Phyllanthus acidus (L.) Skeels	Kawlsunhlu	Tree	Euphorbiaceae	Food
Phyllanthus urinaria L.	Mithi sunhlu	Herb	Euphorbiaceae	Food
Pinus kesiya Royle ex Gordon	Fâr	Tree	Abeitaceae	Timber
Piper betle L.	Pan nah	Climber	Piperaceae	Condiments
Piper nigrum L.	Black pepper	Climber	Piperaceae	Spice
Pisum sativum L.	Pea	Herb	Papilionaceae	Food
Pithecellobium clypearia (Jack) Benth.	Ardahpui	Tree	Mimosaceae	Timber
Platycerium wallichii Hook.	Awm vel	Epiphyte	Polypodaceae	Ornamental
Plumeria acuminate Ait.	Par rim tui	Tree	Apocycaneae	Ornamental
Poikilospermum suaveolens (Bl.) Merr.	Khuang khau	Climber	Moraceae	Food

Continued.

Botanical Name	Local Name	Life Form	Family	Uses
Polygonum nepalense Meissn.	Chakaifuh	Herb	Polygonaceae	Food
Premna racemosa Wall. ex Schauer	Thingsawn	Tree	Verbenaceae	Firewood
Protium serratum Wall. ex Colebr.	Bil	Tree	Burseraceae	Timber
Prunus cerasoides D. Don.	Tlaizawng	Tree	Rosaceae	Food
Prunus domestica L.	Japan Thei te	Tree	Rosaceae	Food
Prunus jenkinsii Hook f. & Th.	Keipui	Tree	Rosaceae	Food
Prunus persica (L.) Strokes	Thei te hmul	Tree	Rosaceae	Food
Psidium guajava L.	Kawlthei	Tree	Myrtaceae	Food
Psophocarpus tetragonolobulus (A.P. de Cand.)	Bepuithlanei	Climber	Papilionaceae	Food
Pterospermum acerifolium Willd.	Siksil	Tree	Sterculiaceae	Timber
Punica granatum L.	Pom/manding	Shrub	Punicaceae	Food
Pyrus communis L.	Pear thei	Tree	Rosaceae	Food
Pyrus pashia Buch.-Ham. ex D. Don.	Chalthei	Tree	Rosaceae	Food
Quercus helferiana A. DC.	Hlai	Tree	Fagaceae	Firewood
Quercus leucotrichophora A. Camus	Then	Tree	Fagaceae	Timber
Quercus polystachya Wall. ex A. DC.	Thil	Tree	Fagaceae	Firewood
Quercus serrata Murray	Sa-sua	Tree	Fagaceae	Timber
Raphanus sativus L.	Bul uih	Herb	Cruciferae	Food
Renanthera imschootiana Rolfe	Sen hri	Epiphyte	Orchidaceae	Ornamental
Rhododendron arboreum Sm.	Chhawk hlei par sen	Tree	Ericaceae	Ornamental
Rhus semialata Murr.	khawmhma	Tree	Anacardaceae	Food
Rhus succedanea L.	Chhimhruk	Tree	Anacardaceae	Food
Ricinus communis L.	Mutih	Shrub	Euphorbiaceae	Misc
Rosa indica L.	Rose	Shrub	Rosaceae	Ornamental
Rubus acuminatus Sm.	Thei-hmu	Shrub	Rosaceae	Food
Saccharum longisetosum (Andersson) V. Naray. ex Bor.	Luang	Herb	Graminae	Fodder
Saccharum officinarum L.	Fuh	Herb	Graminae	Food
Sansevieria zeylanica Roxb.	Rul lei	Herb	Agavaceae	Ornamental
Santalum album L.	Sandal wood	Tree	Santalaceae	Timber
Sapindus mukorossi Gaertn.	Hling si	Tree	Sapindaceae	Firewood
Sapium baccatum Roxb.	Thingvawkpui	Tree	Euphorbiaceae	Firewood
Saraca asoca (Roxb.) de Wilde	Mualhawih	Tree	Caesalpiniaceae	Ornamental
Sarcococca coriacea (Hook.) Sweet.	Pawhrual	Shrub	Euphorbiaceae	Medicinal
Saurauia punduana Wall.	Tiar	Tree	Saurauiaceae	Timber
Schima wallichii (DC.) Korth.	Khiang	Tree	Theaceae	Firewood
Scoparia dulcis L.	Per pawng chaw	Shrub	Scrophulariaceae	Medicinal
Sechium edule (Jacq.) Sw.	Iskut	Climber	Cucurbitaceae	Food
Securinega virosa (Roxb. ex Willd.) Baill.	Saisiak	Tree	Euphorbiaceae	Timber
Sesamum orientale L.	Chhi bung	Herb	Pedaliaceae	Food
Sida acuta Burm. f.	Khingkhih	Herb	Malvaceae	Misc
Smilax perfoliata Lour.	Kai ha	Climber	Liliaceae	Medicinal
Solanum sp.	Tawkte	Shrub	Solanaceae	Food
Solanum anguivi Lamk.	Samtawk te	Shrub	Solanaceae	Food
Solanum melongena var. *esculentum* L.	Bawkbawn	Herb	Solanaceae	Food
Solanum nigrum L.	Anhling	Herb	Solanaceae	Food
Solanum torvum Swartz.	Tawkpui	Shrub	Solanaceae	Food
Solanum tuberosum L.	Alu	Herb	Solanaceae	Food
Solanum violaceum Ortega	Tawk	Herb	Solanaceae	Food
Sophora benthamii Steenis	Sentet	Tree	Papilionaceae	Timber
Sorghum cernum (Ard.) Host.	Chhawh chhi	Herb	Graminae	Food
Spathiphyllum wallisii Regel	Cobra	Herb	Araceae	Ornamental
Spilenthes acemella Murr.	Ankasa	Herb	Compositae	Food
Spilenthes acmella var. *oleracea* Hook. f.	Ansapui	Herb	Compositae	Food

Continued.

Botanical Name	Local Name	Life Form	Family	Uses
Spondias mangifera Willd.	Tawitawh	Tree	Anacardaceae	Food
Sterculia villosa Roxb.	Khopui	Tree	Sterculiaceae	Timber
Stereospermum colais Mabb.	Zih nghal	Tree	Bignoniaceae	Fodder
Strobilanthes flaccidifolius Nees.	Ting	Herb	Acanthaceae	Medicinal
Styrax serrulatum Roxb.	Hmarleng	Tree	Styraceae	Timber
Syzigium aromaticum (L.) Merr. & Perry	Clove	Tree	Myrtaceae	Spice
Syzigium cumini (L.) Skeel.	Len hmui	Tree	Myrtaceae	Food
Syzigium grandis (Wight.) Blume	Thei chhawl	Tree	Myrtaceae	Food
Taberna montana divarigata (L.) R. Br. ex Roem. & Schult.	Keltebengbe	Shrub	Apocycaneae	Ornamental
Tagetes patula L.	Derh ken buk	Herb	Compositae	Ornamental
Tamarindus indica L.	Tengtere	Tree	Caesalpiniaceae	Food
Tectona grandis L.	Teak	Tree	Verbenaceae	Timber
Terminalia bellerica (Gaertn.) Roxb.	Thingvandawt	Tree	Combretaceae	Timber
Terminalia myriocarpa Heurck & Muell.-Arg.	Chhar thing	Tree	Combretaceae	Timber
Toona ciliate M. Roem.	Thingdawl	Tree	Datiscaceae	Timber
Thevetia neriifolia Juss. ex Steud.	Yellow oleander	Shrub	Apocycaneae	Ornamental
Thuja compacta	Thuja	Shrub	Cupressaceae	Ornamental
Thysanolaena maxima (Roxb.) O. Kuntze	Hmunphia	Herb	Graminae	Misc
Toona ciliate M. Roem.	Tei	Tree	Meliaceae	Timber
Trachyspermum roxburghianum Benth. ex Kurz	Pardi	Herb	Umbelifereae	Food
Trema orientalis (L.) Blume	Belphuar	Tree	Ulmaceae	Timber
Trevesia palmate (Roxb. ex Lindl.) Visiani	Kawh-te-bêl	Tree	Araliaceae	Food
Trichosanthes anguina L.	Behrul	Climber	Cucurbitaceae	Food
Triticum aestivum L.	Wheat	Herb	Poaceae	Food
Urena lobata L.	Sehnap	Shrub	Malvaceae	Medicinal
Vaccinium sprengelii (G. Don) Sleum. ex Rehd.	Sir kâm	Tree	Vaccinaceae	Firewood
Vanda coerulea Griff. ex Lindl.	Lawh lei	Epiphyte	Orchidaceae	Ornamental
Vernicia montana Lour.	Tung	Tree	Euphorbiaceae	Misc
Vigna unguiculata (L.) Walp.	Behlawi	Climber	Papilionaceae	Food
Vitex negundo var. *heterophylla* (Franch.) Rehd.	Thleng reng	Tree	Verbenaceae	Firewood
Vitex peduncularis Wall. ex Schauer	Thingkhawihlu	Tree	Verbenaceae	Firewood
Vitis vinifera L.	Grapes	Climber	Ampelidaceae	Food
Wendlandia grandis Cowan	Batling	Tree	Rubiacaea	Timber
Zanthoxylum rhetsa (Roxb.) D.C.	Chingit	Tree	Rutaceae	Food
Zea mays L.	Vaimim	Herb	Graminae	Food
Zingiber officinale Roscoe	Sawthing	Herb	Zingiberaceae	Food
Ziziphus mauritiana Lamk.	Borai	Tree	Rhamnaceae	Food