

**IMPACT OF HOMESTEAD AGROFORESTRY ON
SOCIO-ECONOMIC CONDITION OF THE
RESPONDENTS AT KAMALGANJ UPAZILA OF
MOULVIBAZAR DISTRICT IN BANGLADESH**

ABSTRACT

This study was conducted at KamalganjUpazila of Moulvibazar District in Bangladesh during January to September 2015 to explore the impact of homestead agroforestry on the socio economic condition of the respondents and to explore their relationships with the selected characteristics of the respondents. Face to face interview was performed with 135 respondents to collect the data with the help of questionnaire. Eight different characteristics of the farmers namely; educations, farm size, homestead size, annual income, annual expenditure, savings, knowledge on homestead agroforestry, socio-economic class of the respondents showed significant positive relationships with the numbers of diversified plant species, while negative relationship of diversified plant species was observed with age and family size. Results conclude that homestead agroforestry is a unique area for maintaining both plant diversity and productivity for farmers' livelihood in the studied area.

Keywords: Homestead agroforestry, Socio-economic condition, KamalganjUpazila, Annual income, Gender participation, Plant diversity, Homestead size.

1. INTRODUCTION

Bangladesh is mainly agricultural based country and agriculture plays a great role in the national economy of the country. About 15.53% of the GDP comes from agriculture and it creates 45.10% employment opportunity of the country [1]. Like agriculture, another important resources i.e., forest which has important role in ecological balance and socio-economic upliftment of the rural people. Homestead is the most plant diversified ecosystem in Bangladesh. Homestead Agroforestry also plays a vital role in the economy of Bangladesh[2]. Trees and other woody species grown in the homesteads are significant source of food, fodder, fuel wood and timber. Most of the vegetable produced in the country are coming from the homesteads[3]. There are about 25.49 million of homesteads in our country covers about 0.80 million ha of lands [4]. Trees in the homesteads, often called, "homestead forests", play an important role in rural economy as well as national economy of Bangladesh. Homestead farming is getting importance as the way of investing minimum capital but earning maximum income with increased participation of respondents in economic activities. Homestead agroforestry may contribute to uplift the socio-economic condition of the respondents, supply fuel wood, give protection from hazards, provide food and other benefits etc[3]. Majority of the respondents cultivates their homesteads by different fruit and timber species in an unplanned way. So, exploration of existing timber and fruit tree species adaptive with changing climatic condition is needed first to have a clear

32 understanding of the home-gardens. Adaptability of a species and its suitability to a site is
33 indicated by its frequency and growth [5].

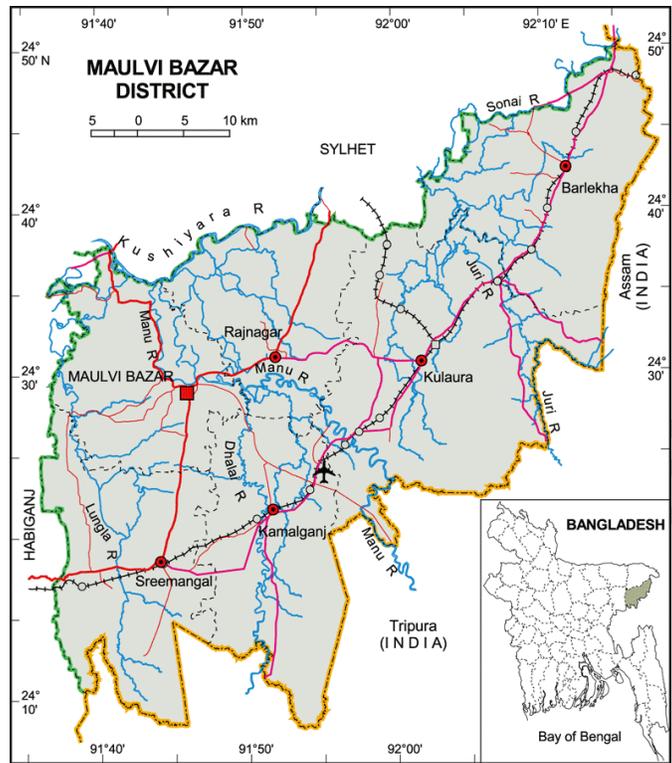
34 The accepted standard according to the experts of environmental science is that a country
35 should have at least 25 percent of its total land area covered with trees or forests [6]. Once
36 covered by dense forests, Bangladesh is now almost devoid of forest land, except in few
37 selected areas of the country [7], in terms of per capita forest land, Bangladesh ranks
38 amongst the lowest in the world, which is about 0.02 ha per person [8]. According to the
39 Forestry Master plan (FMP) total 7,69,000 hectares or 6 percent of the country's land mass
40 have actual tree cover [9].

41 For this above situation i.e. increased population and deforested condition, agroforestry
42 practices especially in the homestead area will be an appropriate alternate land
43 management option. Agroforestry is the combination of forestry and agriculture with the
44 attributes of productivity, sustainability and adoptability. Agroforestry can provide sound
45 ecological basis for increased crop and animal productivity, more dependable economic
46 returns and greater diversity in social benefits on sustained basis. Homestead agroforestry
47 consisting of an assemblage of plants which includes trees, shrubs, and herbaceous plants,
48 growing in or adjacent to a homestead or home compound, has a long tradition in the study
49 site. These are planted and maintained by members of the household with their products
50 intended primarily for household consumption; they have considerable ornamental value and
51 provide shade to people and animals [10].

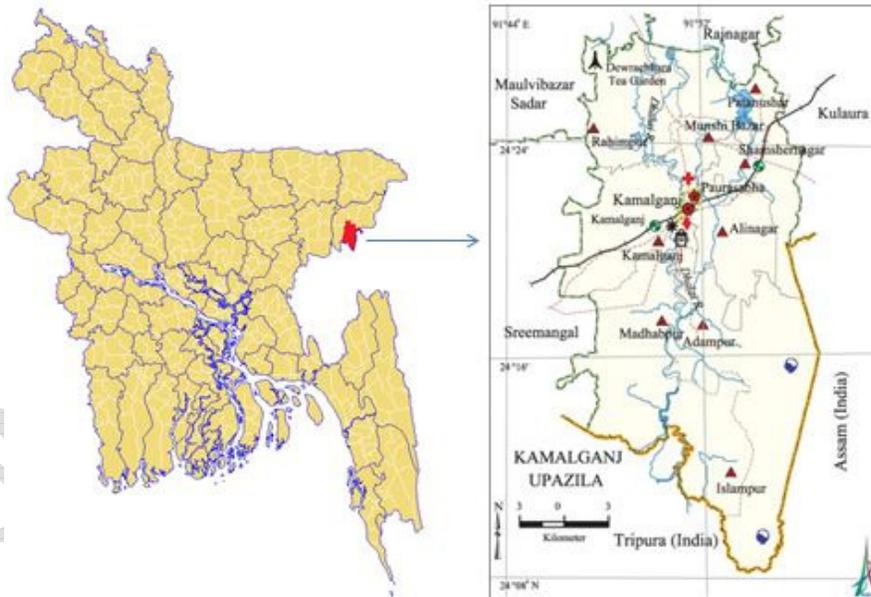
52 **2. MATERIAL AND METHODS**

53 The study was conducted at 9 unions of Kamalganjupazila under Moulvibazar district,
54 Bangladesh. To get valid information the researcher made all possible effort to explain the
55 purpose of the study to the respondents. Data were collected from a total of 135
56 respondents during January to September, 2015.

57 In order to collect relevant information from the respondents a set of preliminary survey
58 questionnaire was used which contained both open and closed form questions. The final
59 questionnaire was prepared on the basis of valid suggestions, logical sequences and
60 comment of the research supervisor.



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63 **Plate 1: Map of the study area (Kamalganjupazila of Moulvibazar district) [11]**

64 Data were collected by using the individual questionnaire. Before going to make interview,
 65 each respondent was given a brief introduction about the nature and purpose of the study
 66 and the researcher assured them that, all information would be kept confidential. The
 67 collected data was verified through surveying the villages and personal interview with the
 68 sample respondents. Interviews were normally conducted in respondents' house in their

69 leisure time and even in the field when they worked in the field. After the completion of each
 70 interview, each questionnaire was checked to be sure that information to each of the items
 71 had been properly recorded.

72 The collected data from all the interview schedules were coded, compiled, tabulated and
 73 analyzed in accordance with objectives of the study. Local units were converted into
 74 standard international units. Qualitative data were converted into quantitative ones by means
 75 of suitable scoring. The responses to the questions in the interview schedules were
 76 transferred to master sheet to facilitate tabulation for describing the different characteristics
 77 and their constraint facing, the respondents were classified into several categories according
 78 to requirement. These categories were developed by considering the nature of distribution
 79 of data, general understanding prevailing in the social system and possible scoring system.
 80 Descriptive analysis such as range, number, percentage, mean, standard deviation and rank
 81 order were used whenever possible. Pearson's Product Moment Co-efficient of Correlation
 82 (r) was used in order to explore the relationship between the concerned variables using MS
 83 Excel and SPSS (Statistical Package for Social Science) software. The computed values of
 84 correlation co-efficient (r) were compared against corresponding tabulated values.

85 3. RESULTS AND DISCUSSION

86 3.1 Age

87 Age of the respondents of KamalganjUpazila of Moulvibazar district was ranged from 25 to 80
 88 with an average of 43.66 years and standard deviation of 11.71 (Table 1). Begum (2012)
 89 found similar results as average age of the respondents of GopalpurUpazila of Tangail
 90 district which was average of 41.688 years. Age of the respondents ranged from 19-70 years
 91 with a standard deviation of 9.936[12].

92 Table 1: Description of respondents' age group at different unions of the studied area.

Category	Number of respondent	Age Range	Average Age (Years)	Standard Deviation S.D.(±)
Respondents	135	25-80	43.66	11.71

93 3.2 Education

94 In this study 12 percent of respondents had higher level education whereas 23 percent had
 95 both of primary and secondary level, 25 percent had college level and 17 percent of them
 96 were illiterate (Table 2).

97 Table 2: Description of respondents' education treated as independent variables at
 98 Kamalganjupazila of Moulvibazar district

Category	Frequency	Percent
Illiterate (0)	23	17
Primary (Class I-V)	31	23
Secondary(Class VI-X)	31	23
College (Class XI-XII)	34	25
Above class XII	16	12
Total	135	100

99 3.3 Occupation

100 Different occupations of the respondents of study area presented in Table 3 shows that
 101 service holder ranks highest with 37.8%, business 21.5%, foreign worker 20.7% and laborer
 102 14.1% and the lowest was housework(5.9%).

103 Table 3: Description of respondents' occupation treated as independent variables at
 104 KamalganjUpazila of Moulvibazar District.

Category	Frequency	Percent
Service holder	51	37.8
Foreign worker	28	20.7
Business	29	21.5

Laborer	19	14.1
House worker	8	5.9
Total	135	100

105 3.4 Family size

106 Family size in the study area ranged from 2 to 11 with an average of 4.71 and standard
 107 deviation 1.21. Most of the respondents (48.9 percent) had medium families compared to
 108 44.4 percent small families and 6.7 percent large families (Table 4). The average family size
 109 of Bangladesh is 5.6, which was higher than the present findings [13].

110 Table 4: Description of respondents' family size treated as independent variables at
 111 KamalganjUpazila of Moulvibazar District

Category	Frequency	Percent	Range	Mean	S.D. (±)
Small family (up to 4)	60	44.4	2-4		
Medium family (5 to 7)	66	48.9	5-7	4.71	1.21
Large family (8 and above)	9	6.7	8-11		
Total	135	100			

112 3.5 Farm size

113 Data presented in table 5 Shows that the highest proportion (65.9%) of the respondents
 114 were in small category compared to 28%, and 6.1% were for marginal and medium
 115 categories, respectively. The respondents having large farm size contains large homestead
 116 area whereas the marginal respondents have small farm size with smaller homestead area.
 117 The standard deviation and average farm size was 0.41 with mean 0.70 hectare.

118 Table 5: Respondents' farm size treated as independent variables at studied area.

Category	Frequency	Percent	Average farm size (ha)	Mean (ha)	S.D. (±)
Marginal (0.21-0.50 ha)	39	28	0.34		
Small (0.51-1.00 ha)	89	65.9	0.67	0.70	0.41
Medium (>2.00 ha)	7	6.1	1.29		
Total	135	100			

119 3.6 Homestead size

120 Average homestead size of the respondent in KamalganjUpazila of Moulvibazar district was
 121 0.13 hectares with a standard deviation of 0.06. Data presented in table 6 revealed that
 122 highest proportions of respondent were in medium category (48%) compared to small, large,
 123 Landless and Marginal categories (24%, 18%, 10%) respectively.

124 Table 6. Respondents' homestead size treated as independent variables at studied area.

Category	Respondent	Percent	Average homestead size (ha)	Mean (ha)	S.D. (±)
Landless and Marginal (Up to 0.02 ha)	14	10	0.01		
Small (0.03 to 0.05 ha)	33	24	0.04	0.13	0.06
Medium(0.06 to 0.09 ha)	65	48	0.08		
Large Above 0.09 ha	23	18	0.39		
Total	135	100			

125 3.7 Knowledge on homestead agroforestry

126 The computed knowledge on homestead agroforestry scores of the respondent ranged from
 127 6 to 20 with the mean 11.89 and standard deviation were 3.96 (Table 7). It was observed

128 that the highest proportion of (61.04%) respondent had medium agroforestry knowledge,
 129 27.21 percent had low and 11.75 had high knowledge on agroforestry respectively.

130 Table 7 Description of the respondents' knowledge on homestead agroforestry

Category	Respondent	Percent	Range (Scale score)	Mean	S.D. (±)
Low (Up to 8)	36	27.21	6-8		
Medium (9-16)	79	61.04	9-16	11.89	3.96
High (Above 16)	20	11.75	17-20		
Total	135	100			

131 **3.8 Annual income**

132 Most of the respondents (77.03%) of the study area had higher annual income compared to
 133 4.5% and 15.5% had low and medium income respectively with an average of 118.53
 134 thousands taka and standard deviation of 84.66 (Table 8).

135 Table 8. Description of respondents' annual income treated as independent variables.

Category	Respondent	Percent	Average income/Family (Thousands taka)	Mean (Tk./Family)	S.D. (±)
Low income (Up to 60 thousands)	6	4.5	43.20		
Medium income (61 to 120 thousands)	21	15.5	89.90	118.53	84.66
High income (Above 120 thousands)	104	77.03	222.605		

136

137 **3.9 Annual expenditure**

138 Most of the respondents (68.88%) of the study area had medium expenditure according to
 139 their annual expenditure compared to 5.9% and 22.96% had low and high expenditure
 140 respectively with an average of 111.22 thousands and standard deviation of 79.44 (Table 9).

141 Table 9. Description of respondents' expenditure treated as independent variables.

Category	Respondent	Percent	Average expenditure/Family (Thousands taka)	Mean (Tk./Family)	S.D. (±)
Low expenditure (Up to 60 thousands)	8	5.90	52.15		
Medium expenditure (61 to 120 thousands)	93	68.88	186.62	111.22	79.44
High expenditure (Above 120 thousands)	31	22.96	94.90		

142

143 **3.10 Savings per year**

144 Most of the respondents (80%) of the study area had low savings according to their annual
 145 savings compared to 13.3% and 5.1% had medium and high savings respectively with an
 146 average of 136.18 thousands and standard deviation of 90.7 (Table 10).

147 **Table 10.** Description of respondents' savings treated as independent variables of the study

Category	Respondent	Percent	Average savings/Family (Thousands taka)	Mean (Tk./Family)	S.D. (±)
Low saving (Up to 60 thousands)	108	80	25.48		
Medium saving (61 to 120 thousands)	18	13.3	79.38	136.18	90.7
High saving (Above 120 thousands)	7	5.1	303.70		

148 **3.11 Socio-economic class of the respondents**

149 Data presented in Table 11 indicates that majority (85%) of the respondents had medium
 150 socio economic class where 8 percent had low and 7 percent had high class with an average
 151 of 17.1 having standard deviation of 4.36.

152 **Table 11.** Description of respondents' socio-economic classes of the respondents

Category	Percent	Range(Scale score)	Mean	S.D. (±)
Low condition (Up to 12)	8	8-12		
Medium condition (13-20)	85	13-20	17.1	4.36
High condition (Above 20)	7	21-23		
Total	100			

153 **3.12 Medicinal uses of plants**

154 Respondents of the studied area opinioned that some of the plants like neem, arjun, basok
 155 grown in their homestead area for different medicinal purposes. Different plant parts are
 156 used for different medicinal uses.

157 **Table 12:** Uses of some medicinal plants by the respondents.

Name of the plant	Used plant parts	Uses
Neem (<i>Azadirachta Indica</i>)	Leaf, oil, seed	Skin problem, liver tonic, blood purifier
Arjun (<i>Terminalia arjuna</i>)	Bark	Heart tonic
Thankuni (<i>Centella asiatica</i>)	Whole plant	Memory booster, blood purifier
Basok (<i>Justicia adhatoda</i>)	Leaf	Cough remover
Tulsi (<i>Ocimum tenuiflorum</i>)	Leaf, flower	Good for heart, blood, lung, cough and flue cure, prevent tuberculosis
Lemon (<i>Citrus limon</i>)	Fruit, leaf	Reduce cholesterol, blood purifier, anti-vomiting
Pudina (<i>Mentha spicata</i>)	Leaf	increase digestion, prevent tuberculosis
Kalomegh (<i>Andrographis paniculata</i>)	Leaf mainly, root	Heal the liver, reduce hokeworm
Ginger (<i>Zingiber officinale</i>)	Rhizome, leaf	Reduces nausea, sickness and vomiting
Sajna (<i>Moringa oleifera</i>)	Fruit, leaf	Control blood pressure, prevent stroke
Nishinda (<i>Vitex trifolia</i>)	Leaf, root	Liver tonic
Nayantara (<i>Catharanthus roseus</i>)	Leaf	Blood purifier, anti-cancer
Bael (<i>Aegle marmelos</i>)	Fruit, leaf	Reduce diarrhoea, balance body temperature
Cucumber (<i>Cucumis sativus</i>)	Fruit	Good for heart
Papaya (<i>Carica papaya</i>)	Fruit	Cure ulcer, prevent cancer
Horitoki (<i>Terminalia chebula</i>)	Seed	Cure liver and stomach disease

158 **3.13 Plants having multiple uses**

159 Plants having multiple uses as perceived by the respondents were given in Table 13.
 160 According to the respondent's opinion jackfruit, coconut, olive, ipil-ipil and acasia are widely
 161 used as multiple purpose tree than other trees grown in homestead agroforestry system.

162 Table 13. Some plants having multiple uses found in the study area

Name of plants	Scientific name	Uses
Jackfruit	<i>Artocarpusheterophyllus</i>	Fruit, fodder, fuel, wood, shade
Acasia	<i>Acacia sp.</i>	Fodder, wood, shade, N-fixation
Olive	<i>Oleaeuropaea</i>	Fruit, medicine, shade, fuel, wood
Akashmoni	<i>Acacia auriculiformis</i>	Fuel, wood, N-fixation
Mango	<i>Mangiferaindica</i>	Fruit, shade, fuel, wood, fodder
Wood apple	<i>Aeglemarmelos</i>	Fruit, shade, fuel, wood
Banana	<i>Musa sp.</i>	Fruit, vegetable, fodder
Chapalish	<i>Artocarpuschama</i>	Wood, fuel, shade
Papaya	<i>Carica papaya</i>	Fruit, vegetable, medicine
Ipilipil	<i>Leucaenaleucocephala</i>	Fodder, timber, shade, N-fixation

163 3.14 Gender participation in decision making

164 The percentage of male and female on decision making in various activities such as tree
 165 plantation, housing, family planning, schooling, savings and expenditure, participation in
 166 training program, uses of agroforestry product presented in Table 14. In case of tree
 167 plantation and housing, respondents opined that 47% and 44% decisions come from the
 168 male, 30% and 32% from both male and female and rest 23% and 24% decisions comes
 169 from female. For family planning both male and female decide in 59% cases. For uses of
 170 agroforestry product and saving and expenditure the highest decisions comes from male
 171 45% and 41% followed by male 38% and 39% respectively.

172 Table 14. Gender participation in decision making at KamalganjUpazila.

Item	Decision maker (%)		
	Male	Female	Both male and female
Tree plantation	47	23	30
Housing	44	24	32
Family planning	21	20	59
Schooling	35	31	27
Saving and expenditure	39	41	20
Participation in training program	1.1	5.1	0.0
Uses of agroforestry product	38	45	17

173 4. CONCLUSION

174 The positive significant relationship was found with socio-economic condition of the
 175 respondents and the diversity of plant species which indicates the positive impact of
 176 agroforestry in socio-economic condition of the respondents. Gender balance is maintained
 177 for decision making is the family. Some medicinal plants are grown in homestead areas
 178 which are used for different medicinal purpose.

179 REFERENCES

- 180 1. Bangladesh Economic Review (BER). 2016. Ministry of Finance, The People's Republic
 181 of Bangladesh, Bangladesh Secretariat. Dhaka-1000.
- 182 2. Foyzal, A. M., Hossain, M. L., Rubaiyat, A., Hasan, M. B. 2013. Economics of
 183 homestead forestry and their management activities at FatickchariUpazila of Chittagong
 184 district, Bangladesh. Agriculture, Forestry and Fisheries. 2(4): 161-176.

- 185 3. Begum, M. Haque, M.A. Karim, M.R. Akter M. and Wadud, M.A., 2013. Study on
186 homestead Agroforestry and plant diversity in Gopalpurupazila of Tangail district. *for.*
187 *Environ.* 7 (1): 135-138.
- 188 4. BBS (Bangladesh Bureau of Statistics). 2010. Statistical Yearbook of Bangladesh.
189 Minist. Plan. Govt. People's Repub. Bangladesh, Dhaka.
- 190 5. Dutta, A.K. and M.S. Iftekhhar. 2004. Tree species survival in the homestead forests of
191 salt affected areas: A perception analysis for Bangladesh. *Advances in Biological*
192 *Research.* 4 (3): pp. 309-313.
- 193 6. Huda, N. and M.K. Roy. 1999. State of the Forest. In: Chowdhury Q. I. (ed.) Bangladesh
194 State of Environment report 1999. Forum of Environmental Journalists of Bangladesh
195 (FEJB) Dhaka. pp. 95-100.
- 196 7. Giri, C. and S. Shrestha. 1996. Land covers mapping and monitoring from AVHRR data
197 in Bangladesh. *International Journal of Remote Sensing.* 14: 2749-2759.
- 198 8. UNEP, 2002. Bangladesh: State of the Environment 2001. United Nations Environment
199 Programme, Regional Resources Center for Asia and the Pacific (UNEP RRC. AP),
200 Pathumthani, 12120, Thailand. pp. 5-121.
- 201 9. Huda, N. and M. K. Roy. 2001. State of the Forest. In: Chowdhury Q. I. (ed.) Bangladesh
202 State of Environment report 2000. Forum of Environmental Journalists of Bangladesh
203 (FEJB) Dhaka. pp. 247-254.
- 204 10. Ahmed, M.F.U. and S.M.L. Rahman. 2004. Profile and use of multi-species tree crops in
205 the homesteads of Gazipur district, central Bangladesh. *Journal of Sustainable*
206 *Agriculture.* 24: 81-93.
- 207 11. Singha, S., M. S. Uddin, S. C. Banik and M. A. Kasem. 2018. Homestead Agroforestry
208 Systems Practiced at Kamalganj Upazila of Moulvibazar District in Bangladesh. *Asian*
209 *Journal of Research in Agriculture and Forestry.* 2(2): pp. 1-8.
- 210 12. Begum M. 2012. Study on Homestead Agroforestry and Plant Diversity in
211 Gopalpur Upazila of Tangail District. MS thesis Department of Agroforestry, Bangladesh
212 agricultural university, Mymensingh. pp. 79.
- 213 13. Anonymous. 2005. Working paper for 3rd National Project Steering Committee Meeting.
214 3PFS, DAE, Dhaka.