Original Research Article

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 Kamalganj Upazila 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. Pearson's correlation was also used to find out the relationship between the farmers characteristics and plant species diversity existing in homestead area. Total six vertical layer was identified as (S_1 = > 1.0 m, S_2 = 1.1-3.0 m, S_3 = 3.1-5.0 m, S_4 = 5.1-7.0 m, S_5 = 7.1-9 m and S_6 = > 9.0 m). Eight different characteristics of the farmers namely; educations, farm size, homestead size, annual income, expenditure, savings, knowledge on homestead agroforestry, socio-economic conditions 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.

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. 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. There are about 25.49 million of homesteads in our country covers about 0.80 million ha of lands [2]. Trees in the homesteads, often called, "homestead forests", play an important role in rural economy as well as national economy of Bangladesh.

25 Homestead farming is getting importance as the way of investing minimum capital but
26 earning maximum income with increased participation of respondents in economic activities.
27 Homestead agroforestry may contribute to uplift the socio-economic condition of the
28 respondents, supply fuel wood, give protection from hazards, provide food and other benefits
29 etc. Majority of the respondents cultivates their homesteads by different fruit and timber
30 species in an unplanned way. So, exploration of existing timber and fruit tree species
31 adaptive with changing climatic condition is needed first to have a clear understanding of the
32 home-gardens. Adaptability of a species and its suitability to a site is indicated by its
33 frequency and growth [3].

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 [4]. Once
36 covered by dense forests, Bangladesh is now almost devoid of forest land, except in few
37 selected areas of the country [5], in terms of per capita forest land, Bangladesh ranks
38 amongst the lowest in the world, which is about 0.02 ha per person [6]. 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 [7].

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 [8].

2. MATERIAL AND METHODS

53 The study was conducted at 9 unions of Kamalganj upazila 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.

61

62   Plate 1: Map of the study area (Moulvibazar district)

63   Data were collected by using the individual questionnaire. Before going to make interview,
64   each respondent was given a brief introduction about the nature and purpose of the study
65   and the researcher assured them that, all information would be kept confidential. The
66   collected data was verified through surveying the villages and personal interview with the
67   sample respondents. Interviews were normally conducted in respondents' house in their
68   leisure time and even in the field when they worked in the field. After the completion of each
69   interview, each questionnaire was checked to be sure that information to each of the items
70   had been properly recorded.

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

84   **3. RESULTS AND DISCUSSION**

85   **3.1 Age**
86   Age of the respondents of Kamalganj Upazila of Moulvibazar district was ranged from 25 to
87   80 with an average of 43.66 years and standard deviation of 11.71 (Table 1). Begum (2012)
88   found similar results as average age of the respondents of Gopalpur Upazila of Tangail
89   district which was average of 41.688 years. Age of the respondents ranged from 19-70 years
90   with a standard deviation of 9.936 [9].
91

92 Table 1: Description of respondents' age group at different unions of Kamalgonj upazila of
93 Moulvibazar district.

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

3.2 Education

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

98 Table 2: Description of respondents' education treated as independent variables at
99 Kamalgonj upazila 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

3.3 Occupation

101 Different occupations of the respondents of study area presented in Table 3 shows that
102 service holder ranks highest with 37.8%, business 21.5%, foreign worker 20.7% and laborer
103 14.1% and the lowest was housework (5.9%).

104 Table 3: Description of respondents' occupation treated as independent variables at
105 Kamalganj Upazila 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

3.4 Family size

107 Family size in the study area ranged from 2 to 11 with an average of 4.71 and standard
108 deviation 1.21. Most of the respondents (48.9 percent) had medium families compared to
109 44.4 percent small families and 6.7 percent large families (Table 4). The average family size
110 of Bangladesh is 5.6, which was higher than the present findings [10].

111 Table 4: Description of respondents' family size treated as independent variables at
112 Kamalganj Upazila 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			

3.5 Farm size

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

119 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			

120 **3.6 Homestead size**
121 Average homestead size of the respondent in Kamalganj Upazila of Moulvibazar district was
122 0.13 hectares with a standard deviation of 0.06. Data presented in table 6 revealed that
123 highest proportions of respondent were in medium category (48%) compared to small, large,
124 Landless and Marginal categories (24%, 18%, 10%) respectively.

125 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			

126 **3.7 Knowledge on homestead agroforestry**
127 The computed knowledge on homestead agroforestry scores of the respondent ranged from
128 6 to 20 with the mean 11.89 and standard deviation were 3.96 (Table 7). It was observed
129 that the highest proportion of (61.04%) respondent had medium agroforestry knowledge,
130 27.21 percent had low and 11.75 had high knowledge on agroforestry respectively.

131 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			

132 **3.8 Socio-economic conditions of the respondents**
133 Data presented in Table 8 indicates that majority (85%) of the respondents had medium
134 socio economic condition where 8 percent had low and 7 percent had high condition with an
135 average of 17.1 having standard deviation of 4.36.

136 Table 8. Description of respondents' socio-economic conditions 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			

137

138 **3.9 Medicinal uses of plants**
139 Respondents of the studied area opinioned that some of the plants like neem, arjun, basok
140 grown in their homestead area for different medicinal purposes. Different plant parts are
141 used for different medicinal uses.

142 Table 9: Uses of some medicinal plants by the respondents.

Name of the plant	Used plant parts	Uses
Neem	Leaf, oil, seed	Skin problem, liver tonic, blood purifier
Arjun	Bark	Heart tonic
Thankuni	Whole plant	Memory booster, blood purifier
Basok	Leaf	Cough remover
Tulsi	Leaf, flower, seed	Good for heart, blood, lung, cough and flue cure, prevent tuberculosis
Lemon	Fruit, leaf	Reduce cholesterol, blood purifier, anti-vomiting
Pudina	Leaf	increase digestion, prevent tuberculosis
Kalomegh	Leaf mainly, root	Heal the liver, reduce hokeworm
Ginger	Rhizome, leaf	Reduces nausea, sickness and vomiting
Sajna	Fruit, leaf	Control blood pressure, prevent stroke
Nishinda	Leaf, root	Liver tonic
Nayantara	Leaf	Blood purifier, anti-cancer
Bael	Fruit, leaf, flower	Reduce diarrhoea, balance body temperature
Cucumber	Fruit	Reduce heart attack possibility, good for heart
Papaya	Fruit	Cure ulcer, prevent cancer
Horitoki	Seed	Cure liver and stomach disease

143 **3.10 Plants having multiple uses**
144 Plants having multiple uses as perceived by the respondents were given in Table 10.
145 According to the respondent's opinion jackfruit, coconut, olive, ipil-ipil and acasia are widely
146 used as multiple purpose tree than other trees grown in homestead agroforestry system.

147 Table 10. Some plants having multiple uses found in the study area

Name of plants	Uses
Jackfruit	Fruit, fodder, vegetable, fuel wood, timber, Shade
Acasia	Fodder, wood, timber, shade, N fixation
Olive	Fruit, medicine, shade, fuel wood
Akashmoni	Fodder, fuel, wood, timber, N fixation
Mango	fruit, shade, fuel wood, timber
Wood apple	Fruit, shade, fuel wood
Black berry	Fruit, shade, good timber
Banana	Fruit, vegetable, fodder
Chapalish	Wood, timber, shade
Papaya	Fruit, vegetable, medicine
Ipil ipil	Fodder, timber, Shade, N- fixation

148 **3.11 Gender participation in decision making**
149 The percentage of male and female on decision making in various activities such as tree
150 plantation, housing, family planning, schooling, savings and expenditure, participation in
151 training program, uses of agroforestry product presented in Table 11. In case of tree
152 plantation and housing, respondents opined that 47% and 44% decisions come from the
153 male, 30% and 32% from both male and female and rest 23% and 24% decisions comes
154 from female. For family planning both male and female decide in 59% cases. For uses of
155 agroforestry product and saving and expenditure the highest decisions comes from male
156 45% and 41% followed by male 38% and 39% respectively.

157 Table 11. Gender participation in decision making at Kamalganj Upazila of Moulvibazar
158 District

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

159 4. CONCLUSION

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

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