Farmers' perception towards the consequences of homestead Agroforestry in Dinajpur district

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Abstract: The present study was undertaken in two-selected upazila namely, Birganj and Kaharole of Dinajpur district. Data were obtained from 100 randomly selected homestead agroforestry practicing farmers with the help of interview schedule during 20 July to 15 September 2004. Appropriate scales were developed in order to measure the variables. The study was carried out to record different tree species and their relative prevalence in the homestead area. It also explored the relationships between the selected characteristics (Independent variables) namely, age, education, family size, farm size, homestead area, annual income, annual income from homestead, organization participation, socio-economic aspect, knowledge of homestead agroforestry, communication exposure and number of trees in homestead (dependent variable). The correlation co-efficient (r) were computed to determine the relationship between the independent and dependent variables. Correlation analysis indicates that all the characteristics of respondents and farm components with number of tree in homestead agroforestry were statistically significant. A total number of 55 tree species were recorded from the homestead of the study area of which 23 were fruit and 17 were timber 11 were medicinal and 4 were others species. Among the tree species the most prevalent species was Litchi (39.28) followed by Mango (15.35), Jackfruit (6.87), Sissoo (0.52) and Eucalyptus (0.24). The highest number of species (23) regardless of fruit species were found in the large farm categories where as the lowest number of species (4) was found in the land less farm category. It was observed that homestead size increased with the increase of farm size, while pond size was relatively bigger in large farm category than that of other category than that of small farm category. The rate of tree plantation in the higher homestead area was higher than that of smaller ones. Among the problems faced by the farmers, the most severe problems such as make quarrel with other landowner, densely planted tree obstructs sunlight and air in the homestead.

Key words: Farmers' perception, consequence and homestead agroforestry

Introduction

A country needs about 25 percent forest of its total area to maintain ecological balance (Abedin and Quddus, 1990). About 17 percent of the areas are designated forestland, including 2 percent contributed by homestead plantation. However, at present the actual tree covered area is estimated only about 6-7 percent of the country. There is no scope of horizontal expansion of forest area in Bangladesh. In this alarming situation, Agroforestry practices have become a blessing for the people of Bangladesh. Homestead is the most potential area for vertical expansion of tree in Bangladesh. There is about 14.32 million households of which 12.39 million exists in rural areas. The size of homestead area varies with the class of farmers and it ranges on an average from 0.004 to 0.08 hectare. But approximately 28.44 percent of the households have only homesteads but do not have cultivated land, 24.2 percent have

land up to 0.20 ha and 34.03 percent are small farmers owning up to 1 ha. (BBS, 2003). Homestead has special significance in the context of Bangladesh where about 62 percent farmers are landless. Homestead agriculture may be a lifeboat for their survival and existence because of secured supply of food, petty cash etc. (Akanda, 1994). The remainder may be achieved through raising suitable fruit and forest trees in the homestead and public places. Considering the above discussion, the present study was undertaken, with the following specific objectives; to investigate the farmer's response of Agroforestry practices in the homestead, to study the species richness and relative prevalence of trees in the homesteads, to find out the trend of increasing or decreasing plant population in the homesteads of the study area for a certain period, and to explore the relationship between the selected characteristics of farmers and number of trees in homesteads.

Methodology

Data were collected from two upazillas Birganj and Kaharole under Dinajpur district selected purposively from a total of 13 upazillas. Two Unions were selected from each of the upazilla using multistage sampling for the study. A sample of 100 farmers were selected, fifty (50) from each upazilla with equal probability to each farm category by stratified randomly sampling. In this study independent variables were age, education, family size, farm size, homestead area, annual income, annual income from homestead, organization participation, socio-economic aspect, knowledge of homestead agroforestry and communication exposure. The dependent variable was number of different trees in homestead. Existing number of trees (fruits, forest, medicinal and others) along with saplings and young trees observed in the study area. It was measured by number. After completion of data collection the responses were coded, tabulated and analysed according to the objectives of the study.

Results and Discussion

The research population

Farmers' perception towards the consequences of homestead agroforestry is influenced by a large number of personal characteristics. However, only eleven characteristics were included in this study (Table 1).

Tree species richness in homestead area

Al most the homestead area had mixer vegetation with various annual and perennial trees, and seasonal vegetables. The study revealed that a wide variety of plant species was found in the study areas. More than 55 useful species were identified in the homestead, area of Nijpara, Satair, Mukundapura and Targaon. Among them 41.81 percent were fruit (perennial and Annual), 30.90% were forest, 20% were medicinal and 7.27% were other plant species. Millate-E-Mustafa (1997) identified 92 perennial plant species at 4 sites of the country.

Fruit spices: It reveals from the study that higher number of fruit species was found to prevail in the homestead in all the regions. Abedin and Quddus (1990) and Millate-e-Mustafa (1997) also reported fruit as the prime component of homestead vegetation. Number of fruit species in the homestead, area of Satair were found maximum followed by, Nijpara, Targaon and Mukundapur.

Forest species: The study reveled that forest occupied the 2nd position on the basis of average number of tree species. Forest species is one of the major components of homestead vegetation. Number of forest species was found maximum in the homestead area of Nijpara followed by Satair,

Targaon and Mukundapur and species are the least ranked components.

Table 1. Characteristics profile of the farmers

Variables	Measur-ements	Possi-ble range	Obse-rved range	Categories	Respo-ndents (%)	Mean	SD
Age	**Years**	**-**	**20-59**	**Young (Up to 35)** **Middle (36-50)** **Old (>50)**	**38** **40** **22**	**37.96**	**11.73**
Education	**Year of schooling**	**-**	**0-16**	**No Schooling (0) Primary (1-5)** **Secondary (6-10)** **Above secondary (>10)**	**23** **37** **24** **16**	4.83	**4.56**
Family size	**Number of members**	**-**	**2-13**	Small (2-4) Medium (5-8) Large (>8)	55 34 11	4.89	2.67
Annual income	**Taka in thousand**	**Unkn-own**	**10-200**	Low (up to 24) Medium (24.1-80) High (>80)	32 48 20	51.35	36.09
Annual income from homestead	**Taka in thousand**	**Unkno wn**	**2-33**	Low (up to 6) Medium (6.1-15) High (>15)	51 38 11	8.95	6.38
Knowledge of homestead agroforestry	**Scaling**	**0-26**	**6-25**	Low (up to 12) Medium (13-20) High (> 20)	32 44 24	19.62	7.65
Organizatio-nal participation	Scaling	**0-48**	**1-22**	Low (1 to 7) Medium (8-15) High (>15)	46 39 15	8.31	5.16
Communica-tion exposure	Scaling	**0-45**	**3-26**	Low (up to 8) Medium (9-15) High (>15)	43 32 25	11.79	6.83
Socio-economic aspects	Scaling	**0-39**	**7-32**	Low (up to 15) Medium (15-20) High (>21)	34 35 31	18.09	7.22
Farm size	**Hectare**	**-**	.02-2.99	Land less (up to 0.2) Marginal (0.21-0.50) Small (0.51-1.0) Medium (1.01-2.0) Large (>2.0)	27 30 23 13 7	0.65	0.61
Homestead size	**Hectare**	**-**	.01-.72	Land less (Up to 0.05) Marginal (0.05-0.10) Small (0.11-0.20) Medium (0.21-0.50) Large (>0.50)	8 27 42 17 6	0.185	0.145

Table 2. Tree species richness of different plant group at 4 study area

Region	Fruit	Forest	Medicine	Others	Total
Nijpara	21	16	10	4	51
Satair	22	15	9	3	49
Mukundapur	20	14	7	4	45
Targaon	21	15	9	3	48
Average	21	15	75	3.50	48.25
All	23	17	11	4	55
(%)	(41.81%)	(30.90%)	(20%)	(7.27%)	

Table 3. Relative prevalence of some common tree species found in the homestead of study area

Common name	Scientific name	Relative prevalence
Litchi	*Lichi chinensis*	39.28
Mango	*Mengifera indica*	15.35
Jack fruit	*Artocarpus heterophyllus*	6.87
Lemon	*Citrus limon*	4.54
Betelnut	*Areca catechu*	3.10
Coconut	*Cocos nucifera*	2.78
Guava	*Psidium guajava*	1.71
Indian black berry	*Syzygium cumini*	1.44
Debdaru	*Polyalthia longifolia*	1.32
Pummelo	*Citrus grandis*	0.67
Palmyra palm	*Borassus flabellifer*	0.65
Jujube	*Zizyphus jujuba*	0.65
Gora neem	*Melia azedarach*	0.62
Date plam	*Phoenix sylvestries*	0.60
Mahogoni	*Swietenia mahogoni*	0.58
Sissoo	*Dalbergia sissoo*	0.52
Indian olive	*Elaeocarpus floribundus*	0.51
Wood apple	*Aegle mermelos*	0.47
Babla	*Acacia nilotica*	0.46
Koroi	*Albizia procera*	0.46
Rain tree	*Samanea saman*	0.41
Pomegranate	*Punica granatum*	0.39
Neem	*Azadirachta indica*	0.37
Krishna chura	*Delonix regia*	0.28
Eucalyptus	*Eucalyptus spp*	0.24
Tamarind	*Tamarindus indica*	0.23

Medicinal species: The study reveled that medicinal plant occupied the 3rd position on the basis of average number of tree species Medicinal plant is the important tree species in present situation. Number of medicinal plant was found maximam in the homestead, area of Nijpara followed by Satair, Targaon and Mukundapur.

Other species: The study reveled that species plant occupied the 4th position on the basis of average number of tree species. Fodder, fuel wood and living tense include here. Number of other plant was found maximum in the homestead,

area of Nijpara and Mukundapur followed by Satair and Targaon.

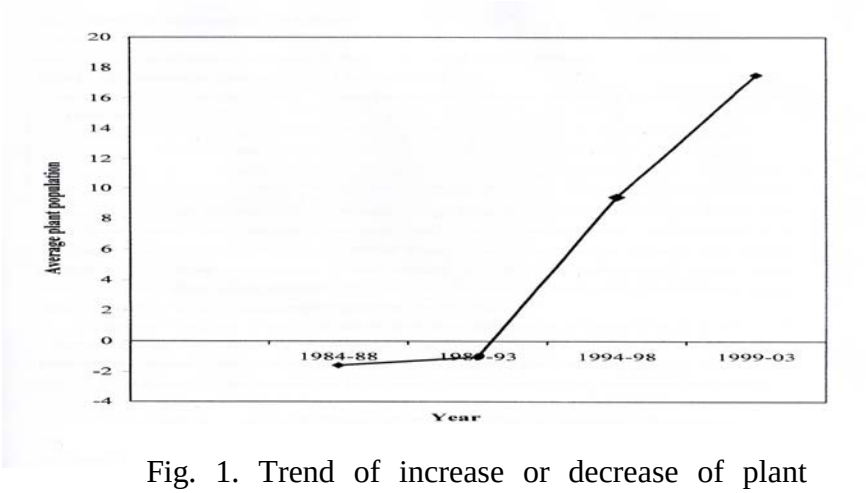

Fig. 1. Trend of increase or decrease of plant population in homestead area from 1984-03

Data presented in the Fig.1 show that first five years (1984-88) felling of trees (15.26) were higher than planting of trees/afforestation; that is the average decrease was 1.57. Similar trend was observed in second five years (1989-93). In third five years, it was found that afforestation was 23.37 and felling of trees were 13.94; i.e. the average increase was 9.43. In next five years (1999-03) the average increase was 17.53.

Relative prevalence of tree species grown in the homesteads

The highest prevalent species of homestead in the study area was Litchi (39.28) compared by Mango (15.35), Jackfruit (6.87), Lemon (3.10), Coconut (2.87) and Guava (1.71), Table 3, also indicates the dominance of Litchi Mango, Jack fruit in almost all the farm categories. There were minor differences in relative prevalence of less common species.

Relative prevalence = No. of trees/farm × % of farm with species

Trend of increase or decrease of plant population in the homestead of study area

During counting of trees available in the homestead area fruit, timber, fuel, bamboo and ornamental ones were countered. Average number of previous trees, afforestation, felling of trees, existing trees and increase or decrease in every five years from 1984 to 2003 are shown in Fig 1.

Table 4. Trend of increase or decrease of plant population in the homestead area

Years	Previous plant	Afforestation	Felling of trees	Existing trees	Increase	Decrease
1984-88	42.12	13.69	15.26	40.55	-	1.57
1989-93	40.55	16.39	17.42	39.52	-	1.03
1994-98	39.52	23.37	13.94	48.95	9.43	-
1999-03	48.95	31.12	13.59	66.48	17.53	-

Table 5. Correlation between the dependent and independent variables

Sl. No.	Independent variables	Dependent variable (number of trees)
1.	Age	0.409**
2.	Level of education	0.286*
3.	Family size	0.123^{ns}
4.	Farm size	0.362**
5.	Homestead area	0.695**
6.	Annual income	0.497**
7.	Annual income from homestead	0.373**
8.	Organizational participation	0.32**
9.	Communication exposure	0.410**
10.	Knowledge on homestead agroforestry	0.424**
11.	Socio- economic aspect	0.408**

*Correlation significant at the 0.05 level, ** Correlation significant at the 0.01 level, NS = not significant.

Table 6. Problem faced by the respondents in homestead agroforestry practices

Problem statement	Freq-uency	Rank order	Remarks
Make quarrel with other land owner	23	1	Benefit shearing with both land owner
Densely planted tree obstructs sunlight and air	17	2	Need proper knowledge about planting trees in homestead
Lack of good quality sapling for plantation	15	3	Providing good quality sapling in proper time
Lack of cash	11	4	Providing lone
Planted sapling hampered by dweller and domestic animal	10	5	Giving some money was lone to by buy bamboo to protect those sapling
High price of saplings	9	6	Providing subsidy to by sapling
Problems regarding infestation of pest and diseases	8	7	Providing training on pest and disease control
Death of trees after planting due to various causes	7	8	Providing training and lone to execute Govt. and non Govt. organization

Data presented in Table 6 indicated that the major problem of planting new trees on homestead makes quarrel with other landowner and densely planted tree obstructs sunlight and air. The findings also reveal that high price of sapling was also another common constraints some of the respondents reported that lack for good quality sapling, infestation of pest and diseases and lack of cash. However, this problem was reported as a major problem mostly by medium and large farmers.

CONCLUSION

Bangladesh is predominately a rural economy. A large number of rural people are absolutely or functionally landless and remain unemployed or under employed throughout the year. This landless and marginal farmers have very limited resources to invest for further production. Due to continuous increase of population, demand for food is increasing. Continuous increasing pressure on land for the production of cereals, scope of producing vegetables, fruits, livestock, poultry and fish is being reduced. Under the present socioeconomic condition, a homestead is just more than a dwelling unit. The additional spaces available in the homestead offers a wide scope of producing a variety of products. So homestead enterprises play a vital role in providing nutrition, extra income and employment as well as in poverty alleviation. The management practice of homestead agroforestry in the study area was found traditional system. Despite land constraint in the country, the rural homesteads are often under- utilized and can be made more productive through application of production technology. Well planned integrated homestead production systems of vegetables, fuel wood and timber production in accordance with the farmer's needs, goals and resource base can lead to viable farming systems towards sustainable livelihood in the coming years.

References

Abedin, M.Z., and Quddus, M.A. 1990. Household Fuel Availability and Homegardens in Some Selected Locations of Bangladesh. FAO/Regional Wood Energy Dev. Program, Bangkok. Thailand. p. 76.

Akanda, W. 1994. Participation of Rural Women in Different Farm and Non-farm Activities on two Selected Villages of Mymensingh District. M.S. Thesis, Dept. Ag. Ext. Ed., Bangladesh Agricultural University, Mymensingh.

BBS. 2003. Statistics Book of Bangladesh. Govt. of the People's Rep. Bangladesh, Dhaka.

Millat-E-Mustafa, M. 1997. Floristries and indigenous management techniques of home gardens in Bangladesh. *In*: Agroforestry: Bangladesh Perspective Alam *et al.* APAN-NAWG-BARC Pub. Dhaka, Bangladesh. pp. 34-63.