



Socio-Economic Improvement of Women: An Impact Evaluation of Women's Involvement with Integrated Farming Systems in Bangladesh

¹Nahid Anjuman, ²Md. Abdul Momen Miah, ³Rufiqunnessa Ali, ⁴Mohammed Nasir Uddin*

¹Former MS Student, Department of Rural Sociology, BAU, Mymensingh-2202, Bangladesh

²Professor, Department of Agricultural Extension Education, Bangladesh Agricultural University (BAU), Mymensingh-2202, Bangladesh.

³Professor (Retired), Department of Rural Sociology, Bangladesh Agricultural University (BAU), Mymensingh-2202, Bangladesh.

⁴Associate Professor, Department of Agricultural Extension Education, Bangladesh Agricultural University (BAU), Mymensingh-2202, Bangladesh. * Corresponding Author email: nasirbau@gmail.com

Abstract

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Socio-economic improvement of rural people especially women is one of the challenges in Bangladesh. While integrated farming system is the potential area of working opportunity of the women to improve their socio-economic conditions. Considering this issue, this paper was to examine the improvement of socio-economic status of women with increased participation in so-called "Integrated Farming Systems (IFS)". Using a structured interview methodology, 100 women in the REGION involved with IFS practices were surveyed. Descriptive statistics and student's t-test were used to analyze and interpret the collected data. A significant improvement of different socio-economic indicators like income, food consumption, housing, source of drinking water, sanitation, family asset, education and access to health facilities of women have found due to farming system involvement. This improvement may be significantly influenced to reduce the rural poverty and this finding might be good example for another region. Less extension contact by SAAOs of DAE regarding involvement with integrated farming system was the most severe problem while non-cooperation of family members was the least problem of involvement with integrated farming system. These results may provide policy makers and development service providers with important insight, which can be used for sound policy generations for better women's socioeconomic improvement.

1. Introduction

The role of farming systems and practices has been playing an increasingly prominent role in debates on development, sustainability and food security, both in the developed and developing world. In Bangladesh, decisions about the type of farming system and agricultural practices to be encouraged by government authorities and other agencies implementing development interventions plays an important role in the general economic development of the country and its large agricultural sector. With 160 million people (51.15% male and 48.85% female), and a growth rate of 1.39 percent per annum, the nation's population density is approaching 1,000

people per km² making it the most densely populated nation in the world (World Bank, 2012; BBS, 2009). In Bangladesh, a major portion of the women (80%) live in rural areas (Agriculture Diary, 2007) while 43% are involved in the agricultural sector, and 70% are unpaid family labor (Khan et al., 2004). Surprisingly, most of the rural women have scarce opportunity to take part in intra-household, socio-economic and political decision-making processes and even limited interaction with outsiders (Shekh, 2003; Praveen, 2005). Low paying irregular labor, less or lack of productive assets, deprive from other services may result elevate poverty, hunger and food

insecurity of the women (Halder and Mosley, 2004; Matin et al., 2008).

Bangladesh is agro-based and agriculture constitutes the largest segment of the economy but food deficiency and poverty has not been yet removed and therefore, still 31.5 per cent of the country's population lies under poverty [World Bank, 2012]. So, farming system can create opportunity to produce more food and improve the socioeconomic conditions of women as income generating activities in Bangladesh (Rahaman and Halcyan, 2012) In this regards, women in farming activities are the vital issue for their development while they comprise 43 per cent agricultural labour force globally and in developing countries like Bangladesh (FAO, 2011). Different categories of farms have been developing under the agriculture sector in Bangladesh while crop based farming, fisheries farming; livestock farming, forest farming are the important which contributes 17 percent GDP to national economy (Uddin, 2015). Moreover, farming system also helps to increase land and labor productivity of poor farmers, landless and distressed women" (Uddin, 2009).

Agricultural farming system as well as Integrated Farming System (IFS) is driving to change the socioeconomic conditions of the farmers and enhancing food security of the developing countries like Bangladesh. While, Bangladesh is becoming popular days by days because of profitability and optimize resources allocations (Uddin, 2009; Mamun, 2011). Moreover, IFS reduces cost of production, increases production efficiency and environmental conservation as well (Mamun, 2011; Ahmed and Garnett, 2011). Research shows that both men and women are involved with and can benefit from this type of farming system (Parveen, 2005; Sheheli 2011). Greater involvement in integrated farming systems (IFS) especially those which integrate small livestock such as poultry or fish farming, or which provide opportunities to grow high-value and nutrient-rich crops- has been identified as a strategy to improve women's opportunities to engage in income generating activities and to produce more and better food for their household, thus improving their socioeconomic conditions (Rahaman, and Halcyan, 2012).

Therefore, it comes as no surprise that international and domestic governmental organizations, foreign aid programs, and NGOs have been working in Bangladesh to improve the role of women's involvement in integrated farming systems. The Bangladesh Agricultural University Extension Center (BAUEC) is the organization primarily providing extension education services to farmers (both men and women) in an effort to improve their socio-economic conditions in the selected region of

Bangladesh. BAUEC services provide informational resources and, at times, small-scale technologies to promote farming activities which increase agricultural yields. As BAUEC is working on socio-economic development of women through farming system especially integrated farming system, so it is necessary to estimates the improvement of women conditions due to involve in farming systems. Therefore, the paper mainly tries to focus on how much improved women's socioeconomic conditions due to involve with integrated farming system.

1.1 Theoretical Background: Common Farming Systems in Bangladesh

Agricultural production in Bangladesh is highly diverse, including commodity and cash crops, livestock, and aquaculture. Vegetative crop production includes staples (rice, jute, wheat, maize and potato), pulse farming, vegetables (bean, brinjal, cauliflower, cabbage), and fruits (such as mango, banana, papaya, jackfruit). In terms of the livestock sub-sector, poultry, waterfowl and dairy are the most popular, but fish farming is also a highly promising activity in the country. This type of farming can bring a lot of foreign currency through exporting its products. Different farming system which is commonly practiced by the farmers in Bangladesh briefly mentioned below:

Rice farming

About 81 percent of total cropped land area is occupied by rice production while its alone shares 96 percent of the total cereal food supply. Moreover, rice alone contributes about 9.5 percent of the agricultural GDP in the country (Alam and Islam, 2013; BBS, 2016). Typically grown in vast monocultures while now a days, diversification is a major concern in the country (World Bank. 2000). The production of rice in Fiscal Year (FY) 2008-09 was 32.90 million metric tons, which is almost double compared to levels in 1971, when Bangladesh began independence (BBS, 2009) Rather than men, women have been also playing important role in rice farming activities.

Homestead vegetable gardening

In Bangladesh, women are often involved in vegetable gardening at their farmhouse as part of their household subsistence agricultural activities. This activity improves socio-economic and ecological conditions, standards living, and aspects of household sustainability (Khan et al., 2009). Vegetable farming is also a crucial part of livelihoods for other resource-poor farmers (Ali et al., 2008). This type of farming plays an important role in the provision of familial nutrient requirements as most of the vegetables are consumed within the household, with any residual products sold at market as an income supplement (HKI, 2008). In Bangladesh,

women generally site household vegetable gardens, typically choosing backyards, pond sites, and around the livestock shed (Millat-E-Mustafa, 2000).

Fish farming (aquaculture)

Bangladesh has extensive waterways, primarily in the form of ponds, canals, haors & beels (relatively large wetland ecosystem), lakes, rivers and tributaries covering an area of 4.43 million hectares. Fish production of the country in the year of 2008-09 was above 2.70 million tons (DoF. 2009). This makes Bangladesh the sixth-largest fish producing country in the world. About 4.90 percent of total export earnings come from this sub-sector (DoF. 2008). Fish provides approximately 60 percent of animal protein in the nation; it is estimated that 1.4 million people are engaged in the fisheries sector and that about 11 million people's lives depend on activities indirectly related to fisheries. Given the predominance of aquatic animal products in the culture, carp-pond polyculture and shrimp-farming models have been well developed in Bangladesh, playing an especially predominate role in integrated farming systems. Because of the advantage of having saline water while shrimp farming has been developed from 20, 000 ha in 1980 to 203, 000 ha in the period of 2004 (DoF. 2005) while farmers (Men and Women) have been involving in fish farming more because of higher economic return (Ahmed, 2009).

Livestock farming

Livestock production accounts for 2.73 percent of the national GDP and about US 500 million dollar which is 3 percent of total export value from Bangladeshi leather and leather goods in 2010-11 (BBS, 2008). Further, livestock-borne tillage practices account for 30 percent of total tillage operations. (Paul et al., 2013). Importantly, the government of Bangladesh has emphasized the development of the livestock sector as a key strategy for reducing poverty in order to achieve the Millennium Development Goals (DLS, 2009). Dairy and poultry farming in Bangladesh is popular as it offers improved economic returns and creates more employment opportunities, contributing to the national economy in ways which might have a significant role in poverty alleviation (Uddin et al., 2010; Uddin et al., 2012). Both Poultry and dairy production has been identified as an avenue to boost household income, nutrition, and food security as it has a high rate of return (Nielsen et al., 2003 ; Sonaiya, 2007).

Integrated farming system

It is already well-know that integrated agriculture-aquaculture farming systems are experienced in South and South East Asia, for example in Bangladesh, China, India, Indonesia, Malaysia, Thailand and Vietnam (Prein, M.2002;

Karim, 2006). Integrated farming has been developed with the integration of fish and livestock components of the farm. In Asia especially Bangladesh, many farmers have been practicing integrated farming through their experience over generations as it can play a substantial role in increasing manifold production, income, and nutrition and employment opportunities of rural people especially farmers (Alam et al., 2003; Uddin and Takeya, 2005). Traditionally, small farmers in the Asia have been practiced this model for their livelihoods. An integrated farming system is very much popular because of having more profitability (Ugwumba et al., 2010) and established as best farming system considering resource utilization, diversity, productivity, production efficiency and food availability (Ahmed et al., 2011). The integrated farming models are divided in the following categories: (i) Duck-cum-fish farming, (ii) Layer-cum-fish farming, (iii) Broiler-cum-fish farming, (iv) Goat cum-fish farming (v) Rice-cum-fish farming and (vi) Rice-cum duck farming. Almost all types of integrated farming have the potentiality to provide more economic benefit while rice-prawn (traditional fish farming methods where area impounded by dikes) farming system is a cost-saving concept for modern varieties of paddy production (Barmon et al., 2006).

2. Materials and methods

This study focuses on the Mymensingh sadar upazila in Mymensingh district where BAUEC's work with women's groups on integrated farming systems. These women are from three villages under the *sadar upazila* (sub-district) of Mymensingh district. Mr. Saidur Rahman, (Deputy Director of BAUEC), provided the list of 1000 women who were involved in farming systems and working with BAUEC. Out of these women, 100 women were selected randomly as sample of the study. Each woman is interviewed to collect data using pre-tested questionnaire and focused on the different socioeconomic attributes of the women and the farming systems activities. Data from questionnaire interviews were coded and entered into the database system by using the Microsoft Office Excel software. A statistical analysis software, SPSS (Statistical Package for Social Science), descriptive statistics were used to analyze and interpret the data. Besides, student t-test was used to compare the before and after conditions of the women due to involvement with farming systems (Uddin, et al. 2004).

Important measurements

To measure level of involvement by respondents in agricultural activities a 4-point rating scale was developed upon which study participants

indicated their adherence to a series of statements about farming system regimes. For each criterion, respondents were asked to identify their position along the continuum running from high, to medium, low and not at all. Scores assigned to responses were 3, 2, 1 and 0 respectively. The socio-economic conditions of before and after Women's involvement in farming system were compared to measure impact of women involvement in farming system. In this regards, Five years were considered as involvement of Women's in farming system. Using the same 4-point rating scale, respondents were also asked to rate their perceptions of the incidence of common problems faced by the women in implementing IFS practices. Applying a Problem Confrontation Index methodology described in short, a rank order was created for the implementation problem items presented to the respondents in the questionnaire. The rank ordering was completed for the aggregated group of respondents by ranking PCI values in descending order (rank and PCI values are reported later, in Table 4), those PCI values calculated using the following formula (Hossain et al. 2011, Alam and Rashid, 2010):

$$PCI = P_n \times 0 + P_l \times 1 + P_m \times 2 + P_h \times 3$$

Where PCI= Problem Confrontation Index

P_n = Frequency of the farmers having not at all problem.

P_l = Frequency of the farmers having low problem.

P_m = Frequency of the farmers having medium problem.

P_h = Frequency of the farmers having high problem.

3. Results and discussion

3.1 Selected socio-economic attributes of the women

There are several socio-economic attributes of women but this study came to focus only eight while findings of those eight selected socioeconomic attributes of the respondents have been presented in Table 1. The average age of the respondent was 38.5 years which is belonging to middle aged while the average education of the respondents was 4.51 which is very low. But 63 per cent of the women had either primary or secondary and higher education that indicates literacy rate of the study area was higher than the national average of 55.08 per cent (BBS, 2011). Average family size of the respondents was 6.28 which is also larger than national average of 4.50 (HIES, 2010). The average farm size (0.865 ha) of the women of study area is little bit higher than national average of 0.6ha (World Bank, 2007) The average annual income of the respondents of study area of 139,047.95 BDT (1 BDT=0.012\$) which is

more than national average of 109,434 BDT (1 BDT=0.012\$) (BBS, 2016). The average farming experiences, training exposures and knowledge of farming system were 19.81 years, 13.23 days and 18.43, respectively. It can be said that the present women's situation of the study area was better off as compared to national average that may be result of different interventions were taken by the various organizations for women's improvement. More important issue is that incomes of the women in the study area were more than double of national average which encouraged them to go forward with the current jobs and lead their standard livelihoods.

Involvement of women in farming system:

In response to women in the study area who were engaged with farming system, about more than half (70 per cent) of the women had medium and high involvement in farming system while 30 per cent had low involvement respectively (Figure 1). This information indicating the most of the women were actively involved with farming activities especially income earning activities that might be increased their economic conditions (Sharmin et al, 2012). A large portion of the women was involved with farming system, may be because of development efforts undertaken by both GOs and NGOs especially BAUEC and also high economic return of the farming involvement. Women become aware by acquiring knowledge through education, group discussion and result demonstration when come in contact with different organizations. These factors increase their skill, awareness, mental alertness, familiarity or acquaintance with facts, objects, practices etc.

Changes of socio-economic attributes of women due to involvement in farming system:

Involvement in farming system by the women has played an important role in changing the socioeconomic status of the family. After involving in farming system, the socioeconomic conditions of the women were changed significantly. The change occurred in different socioeconomic attributes due to involvement in farming system has been shown in Table 2, while the change is expressed in percentage.

The findings indicate that the average yearly income of the women increased from BDT 104.38 thousand to BDT 138.95 thousand after involvements of women in farming system resulting 33.12 percent income increased due to involvement in farming system. Detailed change in income before and after involvement of women in farming system is presented in Appendix-A. On an average 34.24 percent expenditure of the women has been increased while average yearly food consumption expenditure of the women were increased from TK 89.45 thousand to TK 120.08 thousand after women

involvement in farming system. Detailed information regarding this issue has been placed in Appendix-B.

Result explained that 30 per cent of the women had mud floor with straw roof and 13 per cent mud floor with tile roof before involvement in farming system while it has been reduced to zero per cent after involvement for the same in both cases. Mud floor with tin roof, tin shed, and building of the women had been increased from 49 to 60 per cent, 7 to 32 per cent and 1 to 8 per cent respectively after involvement in farming system. Therefore, finding concluded that the housing of the women had improved due to increase of their income after involvement in farming system.

About 55 per cent of the women collected drinking water from others tube well before involvement in farming system while after involvement the number of the drinking water collectors have been reduced to 27 per cent. Similarly, the numbers of tube well owners have been increased from 37 to 73 due to involvement for the same. In the study area, no body was found to drink river/pond water after involvement in farming system but before only 8 per cent women families used to collect drinking water from river/pond used river or pond. Considering the findings, it can be said that women's involvement in farming system significant influence the improvement of the source of drinking water.

The information indicates that 24 per cent and 42 per cent of the women families had been used bamboo or open places and katcha (made by without concrete) latrine respectively but after involvement it reduced to zero per cent and 8 per cent respectively for the same. On the other hand, the number of half sanitary latrine and pucca (made by without concrete) latrine users had been increased from 28 to 57 and 6 to 35 respectively due to involvement in farming system. It can be concluded that women become more aware about their health and sanitation due to increase their income after involvement in farming system.

About 66.24 per cent (from 26.45 to 43.96) of the family assets of the women have been increased, while detail finding regarding family assets of the women before and after involvement in farming system activities have been shown in Appendix-C. Family education of the respondents was significantly changed both at secondary and above secondary level which is the result of involvement with farming system. Because, income of the women has been increased, so that, they provides education expense of their Childs. Finding also explained that access to health facilities has been dramatically change and it was maximum 2800 per cent increased. Reason behind of this, income had

increased and they become more aware about the health care facilities.

Means difference of socio-economic attributes of women's between before and after involving in farming system:

The significant changes relation to the socio-economic attributes of the women after involvement in farming system activities has been found and result is presented in the Table 3. The percent change of attributes of women after involving in farming system activities is also presented in Figure 2.

The findings explained that a dramatically changed of housing (82.4%), sanitation (95.7%), family assets (66.2%) and access to health facilities (95.5%) of the women has been observed because of farming system involvement, while others attributes have also changed for the same. On the other hand, the findings also explained that yearly income of the women has increased, while calculated 't' value was 2.48, which is indicating positive and significant at 0.05 level of probability. But, it is interesting that all attributes like food consumptions, housing, drinking water sources, sanitation, family assets, education and access to health facilities have been positive and highly significantly changed at 0.01 level of probability. Therefore, it can be concluded that farming system involvement is one of the key issues to improve the women's socio-economic conditions.

The similar findings found by others studies, while explained that fish farming has the potentiality to provide higher economic returns and social benefit and easy access to a range of livelihoods assets (Ahmed, 2009). On the other hand, poultry farming improve the farmers' status in respect to clothing, toilet condition, medical facilities drinking water and housing (Rahaman and Halcyan, 2012). Different farming activities e.g. poultry rearing, dairy farming, vegetables gardening etc conducted by rural women would improve their livelihoods by earning more income (Ahmed et al. 2007; Ullah et al. 2007). Thus, participating different farming activities by rural women in Bangladesh have been substantial contributing to the economy although it is unacknowledged (ADB. 2004). Income is the more crucial factor for all cases while women's income is very important for the economic growth of the Bangladesh and thus, their contribution should be emphasized in policy generations (Kabeer, 2003) Therefore, farming activities would help them to increase their income at substantial rate. In this connection, not only BAUEC but also other governmental and non-governmental organizations have been working with women on farming activities throughout the country. The potentiality of the organizations is not a big problem while responsibility of the personnel of these organizations

is a very big challenge. Considering this issue, every organization should ensure their employees' accountability so that farmers especially women would be received good service on time resulting more farming return and uplifting their life. It can also be concluded that socioeconomic characteristics of the women such as level of education, family size, farm size, annual family income, farming experience, training exposure and knowledge of farming system etc. were the influential factors to involve in farming system activities.

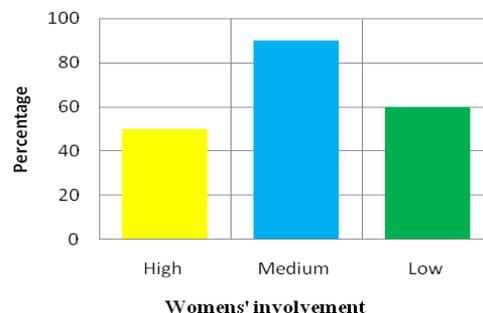


Figure 1. Involvement of women in farming system

Table 1. Salient features of the selected characteristics of the women (N = 100).

Characteristics	Unit of measurement	Range of scoring		Mean	Standard deviation
		Possible score	Observed score		
Age	Years	Unknown	20-60	38.51	9.86
Level of education	Years of schooling	Unknown	0-14	4.51	4.02
Family size	Number	-	2-30	6.28	3.25
Farm size	Hectares	-	0.04-7.63	0.87	1.17
Annual family income (1 BDT=0.012\$)	Taka	-	40000.00-900000.00	139047.95	113953.04
Farming experience	Years	-	2-40	19.81	9.13
Training exposure	Days	-	0-180	13.23	33.23
Knowledge of farming system	Score	0-30	7-30	18.43	5.74

Table 2. Distribution of women according to change in socio-economic attributes of women

Changing attributes	Items	BDT*/No/Score		Percent		Percent change
		Before	After	Before	After	
Income (BDT Thousand)	Mean of the income	104.38	138.95	-	-	33.12
Food consumption expenditure (BDT thousand)	Mean of the Food consumption expenditure	89.45	120.08	-	-	34.24
Housing (No.)	Mud floor with straw roof	30	0	30	0	-100
	Mud floor with tile roof	13	0	13	0	-100
	Mud floor with tin roof	49	60	49	60	22.44
	Tin shed	7	32	7	32	357.14
	Full building	1	8	1	8	700
Source of drinking water (No.)	Water from river and pond	8	0	8	0	-800
	Tube well of other's people	55	27	55	27	-50.91
	Tube well of own	37	73	37	73	97.30
Sanitation (No.)	Bamboo or open places	24	0	24	0	-100
	Katcha latrine	42	8	42	8	-80.95
	Half sanitary latrine	28	57	28	57	103.57
	Pucca (made with concret) latrine	6	35	6	35	483.33
Family assets (score)	Mean of the family assets	26.45	43.96	-	-	66.24
Family education (No.)	Illiterate	139	90	27.42	17.75	-35.27
	Primary level	119	112	23.47	22.09	-5.88
	Secondary level	198	216	39.05	42.60	9.09
	Above secondary	51	89	10.06	17.55	74.45
Access to health facilities (No.)	Upazila health centre	2	58	2	58	2800
	Community clinic	11	28	11	28	154.55
	Village doctor	61	14	61	14	-73.44
	Quacks	13	0	13	0	-100
	Homeopathic	13	0	13	0	-100

*(1BDT= 0.012\$)

Table 3. Means difference of attributes of livelihoods during 'before' and 'after' involvement in farming system activities

Selected factors	Mean (Before involvement)	Mean (After involvement)	Mean difference	% change	t value
Income (thousand)	104.38	138.95	34.58	33.1	2.48*
Food consumption(thousand)	89.45	120.08	30.62	34.3	3.82**
Housing	1.36	2.48	1.12	82.4	9.29**
Source of Drinking water	1.29	1.73	0.44	32.1	5.84**
Sanitation	1.16	2.27	1.11	95.7	10.57**
Family asset	26.45	43.96	17.51	66.2	4.72**
Education	5.50	6.35	0.85	15.5	2.81**
Access to health facilities	1.76	3.44	1.68	95.5	14.61**

** Significant at 0.01 level of probability , * Significant at 0.05 level of probability

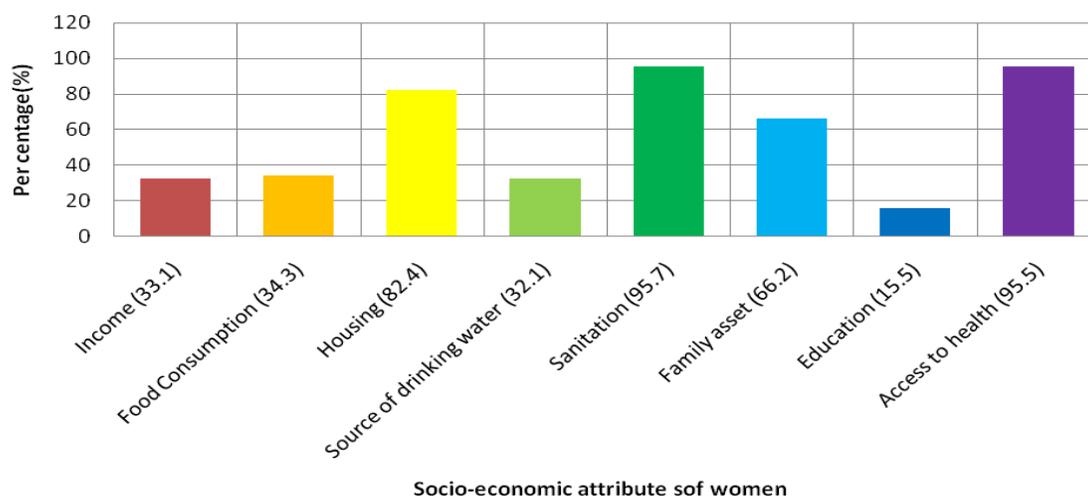


Figure 2. Percent change of attributes of women after involving in farming system activities

Table 4. Rank order of the problem confronted by the women

Problems	Extent of opinion				PCI	Rank
	High	Medium	Low	Not at all		
Less extension contact by SAAOs of DAE regarding farming system	64	22	7	7	243	1
Lack of training facilities	54	28	15	3	233	2
Lack of knowledge about farming system	34	42	22	2	208	3
Unavailability of capital for farming system	36	39	17	8	203	4
Unavailability of farming inputs	16	56	22	6	182	5
Lack of marketing facilities	31	27	30	12	177	6
Lack of coordination and consciousness among women regarding farming system	13	39	30	18	147	7
Adverse weather condition	3	44	34	19	131	8
Social barriers (norms, values etc.)	9	28	34	29	117	9
None cooperation of family members (specially husband)	6	14	34	46	80	10

Problems confronted by the women in practicing farming system:

Problems faced by the women in practicing farming system along with rank order of those problems have been presented in Table 4. According to PCI score, "Less extension contact by SAAOs of

DAE regarding farming system" with a score of 243 was the severe (ranked 1st) problem of farming system while "Lack of training facility" was the next severe ranked 2nd problem with the PCI 233. Department of Agricultural Extension (DAE) is a large extension government organization in Bangladesh while Sub-

Assistant Agricultural Officer (SAAO) is a grass root extension worker who has primary task to assist the farmers for their farming improvement by providing information.

In this study, it is identified that women farmers did not get enough meaningful farming information. May be, it was happened due to lack of accountability of the SAAO or lack of adequate number of SAAOs in DAE or may be others reasons. Currently, one SAAO is responsible to provide services for 1100-1500 farm families (Sheheli, 2011) which is really difficult to go door-to-door of the farmers within the required time. On the other hand, training makes skilled person for the particular job but women of the study area were deprived training facility which might affect the farming activities. Although, different GOs and NGOs in Bangladesh has been arranging a variety of training facility to the farmers but may be training for women were less in the study area or others. Respective training organizations would not only take special training programs for women but also ensure their participation as well. Besides, problems of practicing farming activities might be solved or minimized by collaboration between women's and responsible organizations (e.g. DAE, BAUEC, NGOs etc.) for their sustainable involvement in farming system.

4 Conclusion and recommendations

Involvement in integrated farming system by the women is one of the key issues to improve the women's socio-economic conditions which might have significant influence to reduce the rural poverty. Thus, it can be recommended that this type of interventions might be continued to keep their contribution to the national and international economy significantly. Less extension contact by SAAOs of DAE regarding farming system and Lack of training facility to be the major problems women encounter in involving integrated farming activities. Therefore, collaboration between women's or their associations and responsible organizations (e.g. DAE, BAUEC, NGOs etc.) for their sustainable involvement in farming system should be strengthened. The same study with same methodology would be applicable to the other areas in Bangladesh or abroad. Thus, we could able to get total scenario of the women's involvement in farming system. Then, result might be more influential to policy makers to take effective policy measures for better women's socio-economic improvement.

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Appendix-A

Change in income before and after involvement of women in farming system activities.

Attributes	Income sources	Before involvement (TK.)	After involvement (TK.)	Per cent Change
Income	Agriculture	44280.00	65230.00	47.31
	Livestock	8680.00	11020.00	26.96
	Fisheries	8170.00	10600.00	29.74
	Forestry	5850.00	7200.00	23.08
	Business	21900.00	23900.00	9.13
	Others	15500.00	21000.00	35.48

Appendix-B

Change in food consumption expenditure before and after involvement of women in farming system activities.

Attributes	Food items	Before involvement (TK.)	After involvement (TK.)	Per cent Change
Food expenditure experience	Rice	16000.00	18000.00	12.5
	Bread	5500.00	5051.00	-8.16
	Vegetables	11505.00	17540.00	52.46
	Pulse	4510.00	7250.00	60.75
	Fish	15500.00	20350.00	31.29
	Meat	10000.00	15820.00	58.2
	Milk	6032.00	7650.00	26.82
	Egg	3120.00	4135.00	32.53
	Others	17283.00	24284.00	40.51

Appendix-C

Change in family assets before and after involvement of women in farming system activities.

Attribute	Items of assets	Number		Percentage		Percent change
		Before involvement	After involvement	Before involvement	After involvement	
Family Assets	Lamp	65	18	65	18	-72.31
	Chair	85	100	85	100	17.65
	Cot	75	50	75	50	-33.33
	Bench	90	75	90	75	-16.67
	Fishing net	25	45	25	45	80
	Goat	80	90	80	90	12.5
	Wooden cabinet	25	65	25	65	160
	Radio	21	20	21	20	-4.76
	Two -in-one	40	65	40	65	44.44
	Black & White TV	32	75	32	75	134.38
	Wrist watch	45	80	45	80	77.78
	Fan	30	50	30	50	66.67
	Wall clock	24	40	24	40	66.67
	Bi-cycle	29	51	29	51	75.86
	Torch	12	38	12	38	216.67
	Sewing machine	2	25	2	25	1150
	Modern cot	40	75	40	75	87.5
	Show case	15	31	15	31	106.67
Cow	60	90	60	90	50	
Alna	26	44	26	44	69.23	