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Economic feasibility of integrated farming system in Kashiani upazila of Gopalganj district

Md. Sefaur Rahman*, A.B.M. Shafiul Alam, Md. Al Arafat Topu, Abdur Rakib and Md. Shahidul Islam

Bangladesh Institute of Nuclear Agriculture (BINA), Mymensingh-2202, Bangladesh

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Corresponding Author
Md. Sefaur Rahman
Email: sefa.entom@gmail.com

ABSTRACT

An investigation was carried out to determine the economic importance of integrated farming system in the remote cultivated areas of Gopalganj District, as well as the prosperous feasibilities in implementation of sustainable integrated farming for rural development. The whole analysis is based on primary and secondary data. The primary data gathered from field observation during 2015-2016 from 75 local farmers randomly in 6 different villages of Kashiani Upazila. Out of total 75 farmers, 15 were found practicing basic integrated farming. These randomized samples help in calculating income gap and taking decision towards better opportunities of integrated farming. Related Governmental statistics and relevant literatures were considered as secondary data source. The analysis shows a profit gap between traditional mono/double crop cultivation and integrated farming and the gap benchmarking indicates that integrated farming has greater income feasibilities than present cultivation system. The result found that the farmers in study area are more prefer their existing system of cultivation although there are high risk of economic losses due to increase in price of chemical fertilizer, High Yielding Varieties seeds (HYVs), modernization and concomitantly repeated crop damage and decrease market value of produced goods, leading farmers to face a serious challenge in terms of profit. In this regards, with some practical instances and successful application of model integrated farming, it is recommended that it can surely overcome such faced problems and help in reduce input cost, increase agricultural outputs, enhance consistency in income and provide better economic feasibility for decent livelihood and rural development.

Introduction

Integrated farming system or integrated agriculture is a commonly and broadly used term to explain a more integrated approach to farming as compared to monoculture approaches (MH 1986). It refers to agricultural systems that integrate livestock and crop production or integrate fish and livestock.

Continuous land degradation is endangering household food security in Bangladesh. To stop land degradation and regain productivity integrated farming system (IFS) can be the solution. This type of farming modifies the commercial farming system (CFS), which relies on rice-based monocropping, by adopting production of vegetables, trees, livestock and fish.

Farmers of Bangladesh generally practice subsistence farming where they need to produce a continuous, reliable and balanced supply of foods, as well as cash for basic needs and recurrent farm expenditure. Therefore, there is a need to develop suitable integrated farming systems for such farmers.
Integration of various agricultural enterprises viz., cropping, animal husbandry, fishery, forestry etc. in the farming system has great potentialities in agricultural economy. These enterprises not only supplement the income of the farmers but also help in increasing the family labor employment throughout the year (Singh et al., 1993 and Singh et al., 1997).

Agriculture has almost turned into a non-profitable occupation in the study area because of low market price and repeated invasion of natural calamities, although more than 75% people depend on it (Ahamed 1999). The Kashiani Upazila of Gopalganj District is bounded by Boalmari Upazila of Faridpur district on the north, Alfadanga on the East, Gopalganj sadar on the south. It has total area 299.14 km^2. Kashiani has a population of 271783 where Males constituted 143981 of the population and females 127802. Muslims formed 95.27% of the population, Hindus 2.46%, Christians 0.18% and others 0.10%. Kashiani has a literacy rate of 40% (MNU 2003). Kashiani has 14 Unions/ Wards, 153 Mauzas/Mahallas. The Kashiani Upazila of Gopalganj district was selected for the study area in order to assess the feasibility to set-up and implement in Integrated Farming System. The objectives of the IFS are multiple: to enhance food production for the household, to maintain the natural resource base that contributes to food security and the well-being of the rural people, to contribute to income generation, and to be accepted by local communities.

Materials and Methods

Description of study area (Physio-socio-economic aspect)

The Kashiani Upazila of Gopalganj District is bounded by Boalmari Upazila of Faridpur district on the north, Alfadanga on the East, Gopalganj sadar on the south. It has total area 299.14 km^2 Kashiani has a population of 271783 where Males constituted 143981 of the population and females 127802. Muslims formed 95.27% of the population, Hindus 2.46%, Christians 0.18% and others 0.10% (AM 1982). Kashiani has a

literacy rate of 40%. Kashiani has 14 Unions/Wards, 153 Mauzas/Mahallas. The Kashiani Upazila of Gopalganj district was selected for the study area. Gopalganj is the most commencing district of West Bengal in both industrially and agriculturally (Azucena 2001). Eastern part of the district is enriched by most productive agricultural regions. It is estimated that more than 60% of its total population belongs to the agricultural population i.e. engaged in agricultural and allied activities and maximum of them belongs to rural area (Chambers 1992). The remaining 40% are counts as non- agricultural population. Excluding the eastern and south-eastern part of the district, many industries and factories are scattered here.

Data collection

The present study was an attempt to emphasize on advantages aspects on applying integrated farming in an agriculturally domain district of Gopalganj. The study was based on both primary as well as secondary sources of data (Elish 2001). Primary data were collected through random sampling method from selected farmers in 5 blocks from Kashiani upazila of the district. Primary data was collected by direct observation from the agricultural field and interview with the local farmers.

Sampling procedure

Preliminary observation was carried out in pre-sampling process in order to select the most cultivated blocks from Gopalganj district during 2015-16. After selecting the blocks, the more accessible villages were chosen. Simple random sampling method was used. Sampling procedure involved selection of blocks, selection villages and selection of respondents. Aged farmers were chosen to get responses and their views were taken into consideration for their more experiences. Thus, a total 75 respondents were taken from 5 villages of each block.

Result and discussion

Age distribution, literacy level and farm category of selected farmers

The result of the baseline survey showed that the average age of landless (52 years) higher than others farmer (Table 1). It is observed that farmers of all categories were not highly educated. Most of them were educated up to class V. The landless and medium farmers have comparatively higher family size than other categories of the farmers and average farm size of the landless farmers was 0 decimal and large farmers average farm size was 720.00 decimal.

Farming systems practiced by respondents

Most of the farmers (30%) practiced the farming system integrated with crop + livestock + poultry + fisheries followed by crop + fisheries. There were no farmers who practiced only agro-forestry, orchard and nursery (Table 2).

Table 1: Average age, educational level, family composition and farm size

Farmer category	Age (year)	Educational level (%)					Family size (no.)	Farm size (decimal)	Number of sample farmers
		Illiterate	Class V	S.S.C	H.S.C	> H.S.C			
Landless	52	32.33	65.67	-	-	-	7.3	0	10
Marginal	41	14.29	75.71	-	-	-	4.7	44.28	15
Small	42	18.18	68.18	4.55	9.09	-	4.6	147.27	15
Medium	47	-	38.58	52.14	7.14	8.14	5.3	346.07	20
Large	55	-	40.00	52.00	-	-	5.2	710.00	15

Table 2: Major farming systems of the farmers in the study area

Major Farming Systems	No. of Households	Percentage (%)
Crops	5	2
Crop + Livestock + Fisheries + Poultry	11	30
Crop + Livestock + Poultry	4	6
Crop + Livestock	7	4
Crop + Livestock + Fisheries	13	10
Crop + Fisheries + Poultry	3	6
Crop + Poultry	1	2
Crop + Fisheries	10	22
Livestock + Fisheries + Poultry	4	4
Livestock + Poultry	2	2
Fisheries + Poultry	8	6
Livestock + Fisheries	7	6
Total	75	100

Table 3: Major crops grown by the respondents

Crops		HYV		Local		Sowing/Planting time	Harvesting time
		Area (ha)	Yield (kg/ha)	Area (ha)	Yield (kg/ha)		
Rice	DSR (Aus)	3	120	2	75	-	-
	T. Aus	4	70	3	60	-	-
	T. Aman	6	160	45.427	2964	July-August	November-December
	Boro	42.42	5000	2	80	November-December	March-April
Potato		1.5	30-35 ton			November-December	February-March

Major crops produced by respondents

Rice and potato are the two major crop produced by the farmers of the study area. Among rice varieties local Aman was mostly cultivated (45.427 ha) with 2964 kg/ha yield followed by hybrid Boro (42.42) with higher yield 5000 kg/ha (Table 3).

Cropping patterns practiced by the respondents

The respondent farmers grow mainly Aman and Boro rice. Mukta and BR 21 were the common variety of Aman rice which the farmer grows. Main variety of Boro rice which farmer grows was BRRIdhan 28, BRRIdhan 29, Gazi and hybrid rice.

Cost input by farmers

The average per farm input cost for crop production of the respondent farmers is shown in Table 5. The cost for production of Aman was 13843 Tk whereas the cost for production of Boro was much higher (34243 Tk.) with cost of tillage @ 4446 Tk.

Fruit production

Average per farm homestead fruit production is shown in table 6. Banana was the most common fruit production in the study area with the average production value of 4800 Tk per farm followed by Mango and Papaya @ 400 Tk per farm.

Table 4
Major cropping patterns practiced by the farmers.

Cropping patterns	Cropping patterns and variety in different seasons			
	Kharif		Robi	
	Crop	Variety	Crop	Variety
Boro-Fallow-T. Aman	T. Aman	Kironmala,Mukta, BR 21	Boro.Rice	BRRIdhan 28,BRRIdhan 29
Fallow- Fallow- T. Aman	T. Aman	Kironmala,Mukta, BR 21		
Vegetable-Fallow-T. Aman	T. Aman	Kironmala,Mukta, BR 21	Potato, Bottle gourd, Bean, Cauliflower, Cabbage	Local, Imported

Table 5
Average per farm input use for crop production of the sample farmers.

Name of crops	Input use (no. or kg/ha)											Total input cost (Tk/ha)	Tillage cost (Tk/ha)
	Labor	(Male+ Female)	Seed	Urea	TSP	MP	$ZnSO_4$	Gypsum	Cow dung	Insecticide (Tk)	Irrigation (Tk)		
Aman	20		40	98	50	50	-	-	-	1482	1235	13843	4446
Boro	15		33	296	74	74	-	74	-	4446	11115	34243	4446
Potato	30		1200	250	120	220	8	120	10	1318	1235	22581	1300

Table 6
Average per farm homestead fruit production and disposal pattern.

Name of fruits	Total fruits produced (no. or kg)	Fruits consumed (no. or kg)	Fruits sold (no. or kg)	Value of fruit (Tk/fruit /kg)	Market price of fruit at harvest (Tk./ pice/kg)	Total value of fruits (Tk.)
Banana	110	40	80	40	40	4800
Jackfruit	5	5	3	60	60	240
Mango	120	40	60	4	4	400
Papaya	20	15	8	20	20	400
Guava	15	10	2	40	4	160
Total	270	110	153	164	128	6000

Cost and return of livestock and poultry

The return for Ox, Goat, Calf per farm were 5415, 1115, 3440 Tk. Respectively (Table 7). Among the poultry the highest return of 210 Tk was obtained from hen followed by duck and chicken.

Cost and return of fish culture

Fish culture was also an age old practice in the site where baseline survey was conducted. About 100 percent of the households who had pond engaged with fish culture. Fish culture was profitable in the site where baseline survey was conducted. Tilapia was the most commonly cultured fish with net return of 37574.5 Tk. Per farm (Table 8).

Cost and return of major cropping patterns

Among the cropping pattern highest net return was observed in Vegetable-Fallow-T. Aman (70800.8 Tk/ha) followed by Boro-Fallow-T. Aman (55635 Tk./ha).

Household livestock and poultry assets

The average per household livestock and poultry assets of farmers varied according to their economic condition. Poor or small farmers have more livestock to rear than the large farmers (Table 10).

Table 7: Average per farm cost and return of livestock and poultry.

Livestock/ poultry	Average Number (present)	Original value (Tk./animal)(1)	Feed cost (Tk./animal)(2)	Present value (Tk./animal)(3)	Total cost (Tk./animal)(1+2)=4	Net Return (Tk./animal)(3-4)
Livestock						
Ox	0.57	20100	3185	22300	13585	5415
Goat	0.95	3115	855	5155	4010	1115
Calf	0.69	6300	1560	12200	8160	3440
Total	2.21	29515	5600	39655	25755	9970
Poultry						
Chicken	2.78	50	75	220	155	125
Duck	4.34	180	87	390	235	155
Hen	3.27	300	150	620	430	210
Pigeon	0.42	110	66	250	166	84
Total	10.81	640	378	1480	986	574

Table 8: Per farm cost and return of fish culture

Name of fish	Number of fishes	Area (decimal)	Production (kg)	Production cost (Tk.)	Gross return (Tk.)	Net return (Tk.)
Tilapia	5260	23	470	20115.5	57610	37574.5
Others (Native sp.)	6112	31	620	30100	75000	47850
Total	11372	54	1090	50215.5	132610	85424.5

*****Farm gate price of fish: 120 (Tk./kg)

Table 9: Cost and return of major existing cropping patterns

Cropping Patterns	Total cost (TC) (Tk./ha)	Gross Return (GR) (Tk./ha)	Net Return (NR) (Tk./ha)	BCR (GR/TC)
Boro-Fallow-T. Aman	53810	147445	55635	1.69
Fallow- Fallow- T. Aman	18279.2	35345	15165.8	2.83
Vegetable-Fallow-T. Aman	72089.2	182790	70800.8	4.52

Table 10: Average per household livestock and poultry assets (no.) of farmers

Assets	Landless	Marginal	Small	Medium	Large
Ox	2	3	1	1	1
Cow	1	1	2	1	2
Calf	1	2	1	2	1
Goat	3	1	2	1	3
Chicken	11	8	3	2	4
Duck	2	4	1	4	2
Total	20	19	10	11	13

Table 11: Average per farm income (Tk.) of the sample farmers

Item	Landless	Marginal	Small	Medium	Large
Crop	0	2500	23011.36	85053.57	215375
Livestock	20100	18400	15700	16680	25600
Fisheries	3000	42942	93352.4	83128.57	73000
Poultry	4000	5500	3400	6450	2540
Off-farm	26080	30720	22050	25000	15000
Non-farm	15000	15000	10475	1050	2000
Total	68180	115062	167988.76	217362.14	333515

Average per farm income of farmers

The average per farm income of the farmers depends on the size of the farm. The highest average per farm income of 215375 Tk. was from large crop farms followed by fisheries and livestock (Table 11).

Farm expenditure of the farmers

The landless farmers spent their maximum on food. Small, medium and large categories of the farmers spent their maximum for farming practices. Medium and large farmers spent a good amount for the education of their children (Table 12).

Problem faced by the farmers

Farmers of the study area faced various types of problems on their farming practices. Majority of the farmers (95%) suggested to have problems on lack of transportation facilities followed by lack of knowledge about vaccination, de worming, feed of livestock and poultry (Table 13). Lack of knowledge about fish feed and pond management and lack of medical treatment of livestock also considerable problem faced by the respondent farmers.

Table 12: Average per farm expenditure (Tk.) of the sample farmers

Particulars	Landless	Marginal	Small	Medium	Large
Food	31050.6	42056	50400	38054	52230
Cloth	1500	2500	4000	6700	10000
Shelter	5200	4500	3450	10000	14000
Education	23000	24000	24000	47000	60000
Medicine	4500	3000	4500	5000	5600
Others(farming)	3500	22121	51334.7	90484.6	93253.4
Total	68750.6	98177	137684.7	197238.6	235083.4

Table 13: Problems faced by the farmers in the study areas

Problems	% farmers suggested	Solution(s)
Lack of knowledge about new crop variety/technology	40	Providing Training facilities
Lack of quality seeds / fingerlings / duck links	64	supply of quality seed/fingerlings
Lack of credit facilities	62	Providing credit facilities
Lack of knowledge about fish feed and pond management	86	Providing training facilities
Lack of knowledge about vaccination, de worming, feed of livestock and poultry	92	Providing training facilities
Lack of knowledge about homestead vegetables production	82	Providing training facilities
Lack of transportation facilities	95	should improve transportation facilities
Cultivated lands are not sufficient	35	Require Lease in , Lease out land facilities.
lack of medical facilities for livestock	83	need veterinary clinic

Conclusion

The PRA was conducted in the Kashiani upazila under Gopalganj district during 2015 to 2016 to know the existing cropping system of Plain land areas and adoption techniques due to increase production. The people of PRA sites were very much interested to cultivate different crops but they faced various problems and lack of irrigation facilities Agriculture in Bangladesh is at a stage where there is a need for research priority setting. Given the physical, financial and human resource base, there is a need for proper allocation of these resources for higher and sustainable growth in production and productivity. On the other hand, resource allocation is needed to be distributed based on the commodity and regional importance. The study generates indices of research priorities for the crop sector of Bangladesh in terms of commodities and regions keeping in view the national developmental goals.

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