

Comparative Economic Return from Shrimp-Boro rice Cropping System and Aman rice- Boro rice Cropping Systems in Coastal Area of Bangladesh

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Introduction

Shrimp (*Penaeus monodon*) farming contributes significantly to the national economy of Bangladesh. Bangladesh earned about US\$ 322 million during 2000-2001 exporting fish and shrimp, 80% of which was from the export of shrimp alone (DoF, 2001). Initially, the cropping pattern for brackish water shrimp was dry month (December-July), followed by transplanted *Aman* rice (monsoon season rice) during July through December. With the course of time the cropping pattern has been changed from *Aman* rice- Shrimp to Shrimp-*Boro* rice (winter season rice) system. In the present study area, the original cropping system was only rice based and now the system has been changed to shrimp-*Boro* rice in the medium lowland and *Aman* rice-*Boro* rice in the medium highland. However, there is not enough evidence why this changes of cropping pattern has been occurred by the rural farmers. Probably the economic aspect is one of the major causes. So, the present study aimed to find out the comparative economic performance between above mentioned cropping systems.

Materials and method

The study site is located in Shuktia village of Satkhira district in Bangladesh. Out of 227 households 65 sample households were directly interviewed with semi structured questionnaire. The data were collected from September-October, 2011 and January-February, 2012. The Benefit Cost Ratio (BCR) has been calculated by dividing the net income with the total cost of production.

Results and Discussion

There are two types of rice cropping systems are maintained in the study area namely shrimp-*Boro* rice system (maintaining in medium lowland) and *Aman* rice-*Boro* rice system (maintaining in medium highland). Cost analysis has been done for the both of the system in one ha of land.

Table 1: Operating cost and material cost for one hectare of *Boro* rice and *Aman* rice cultivation

Activities	Average cost (Taka/ha)				
	<i>Boro</i> rice	<i>Aman</i> rice	Items	<i>Boro</i> rice	<i>Aman</i> rice
Ploughing	2882 (±485)	3061 (±517)	Seed	3506 (±839)	3391 (±851)
Laddering	1475 (±91)	1547 (±77)	Fuel for Irrigation	5604 (±1596)	0
Seedling uprooting	896 (±166)	0	Fertilizer		
Transplanting	6303 (±449)	6216 (±477)	Urea	5359 (±615)	4669 (±746)
Weeding	4498 (±402)	3321 (±583)	TSP	2017 (±300)	1750 (±232)
Harvesting and bundling	5882 (±1238)	5267 (±752)	MP	1114 (±255)	1026 (±311)
Carrying	8187 (±1657)	6485 (±2251)	Zinc sulfate	1207 (±365)	1021 (±148)
Threshing	2225 (±383)	1500 (±139)	Pesticide	3256 (±364)	3095 (±383)
Total operating cost (a)	32348 (±2670)	30165 (±2820)	Total material cost (b)	22063 (±2135)	14951 (±2030)
Total Cost of Production (a+b)				54411 (±3995)	42416 (±3794)

Parentheses indicate the standard deviation from the mean

(Source: Author's survey, 2011-2012)

The Table 1 indicates that the operating cost is higher for *Boro* rice (32348 taka/ha, 82 taka = 1 US\$) than *Aman* rice (30165 taka/ha) as it needs an extra activities namely seedling uprooting. In case of

material cost, the *Boro* rice needs irrigation and thus material cost become higher (22063 taka/ha) than *Aman* rice (14951 taka/ha) due to the fuel cost for irrigation. Hence the total cost of production become always higher (54411 taka/ha) in *Boro* rice cultivation than in *Aman* rice cultivation (42416 taka/ha). Considering the income, the yield of *Boro* rice is more (average 4.8 ton/ha) and thus net income also more than that of *Aman* rice and the Benefit Cost Ratio (BCR) of *Boro* rice become 1.38 (Table 2) than that of *Aman* rice having the BCR of only 0.92.

Table 2: Income and Benefit Cost Ratio (BCR) for one hectare of *Boro* rice and *Aman* rice cultivation

Head of income	Average income (Taka/ha)	
	<i>Boro</i> rice	<i>Aman</i> rice
Product (rice grain)	99160 (±10398)	60411 (±4912)
By product (straw)	29600 (±1850)	26707 (±2968)
Gross income	128760 (±10542)	87118 (±6528)
Net income	74349 (±11932)	44702 (±7704)
BCR	1.38 (±0.31)	0.92 (±0.23)

Source: Author's survey, 2011-2012

Table 4: Income and BCR for one hectare of shrimp cultivation

Head of income	Average income
Yield (kg/ha)	268 (±64)
Price (tk/kg)	566 (±68)
Gross Income (Tk/ha)	149476 (±29409)
Net income	105623 (±25862)
BCR	2.67 (±1.05)

* 1US\$ = 82 Taka on February, 2012

Source: Author's survey, 2011-2012

Regarding shrimp cultivation, the total cost of cultivation for one ha land is higher than that of *Boro* rice cultivation and the different head of expenses has been presented in the Table 3. In this case the main expense goes for PL stocking (around 27000 taka/ha out of total cost of 43853 taka/ha). The interview with the semi structured questionnaire with the local farmers revealed that less labor is required for the shrimp cultivation than in rice cultivation and thus the total cost of production (43853 taka/ha) become lower.

However, though the total cost of production in shrimp cultivation is lower than that of *Boro* rice but the total gross income and net income from this sector is higher (Table 4) compared to *Boro* rice cultivation and the BCR (2.67) also become higher than that of *Boro* and *Aman* rice. However, considering the whole cropping system in yearly sequence, it has been found that the shrimp-*Boro* rice system is more profitable (about 1.5 times more) than that of *Aman* rice-*Boro* rice system (Figure 1).

Table 3: Cost of production for one hectare of Shrimp cultivation

Items	Average cost (Taka/ha)	
Dyke preparation	1924	(±743)
Ca carbonate	687	(±370)
Fertilizer and medicine	1351	(±761)
Fuel for water	2913	(±1605)
PL Stocking	26886	(±9698)
Feeding	9046	(±5838)
Harvesting	1046	(±902)
Total Cost	43853	(±15277)

Source: Author's survey, 2011-2012

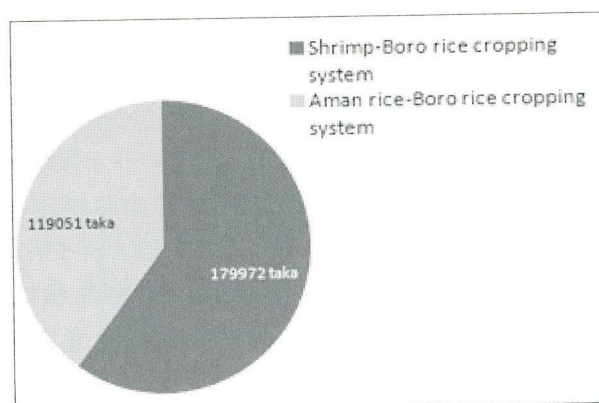


Fig. 1 Comparative economic return from the system
Source: Author's survey, 2011-2012

Conclusion

The comparative economic return is always higher in shrimp-*Boro* rice system than that of *Aman* rice-*Boro* rice system. Though the income from rice has been presented as in cash here, but in reality, the local farmers mostly consume this rice for their livelihood maintenance whereas, the shrimp is used for the hard cash. Thus, the shrimp became the most important source of the hard cash of the local farmers and they are very much willing to continue the shrimp-*Boro* rice system.