THE BUSINESS AGE
(An International Peer Reviewed Refereed Journal of Business, Commerce and Management)
ISSN : 2455 - 9423 (Online) Frequency : Biannual

LAND LEASING ARRANGEMENTS OF BORO RICE PRODUCTION IN A SELECTED AREA OF BANGLADESH

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https://doi.org/10.47211/tba.2025.v10i01.005

ABSTRACT

Land leasing arrangements are a crucial need for farmers in Bangladesh. The study was conducted to identify the socio-economic characteristics, analyse the existing leasing arrangements, investigate the profitability of Boro rice cultivation, and identify the problems and constraints of leasing arrangements by randomly selecting 100 farmers in the Mymensingh district of Bangladesh. Primary data were collected through a field survey using an interview schedule. Some statistical measures, like average percentages and ratios, were calculated. Profitability analysis was also applied. Three types of leasing arrangements were selected: cash agreements, input-output share arrangements and only output-sharing arrangements. About 90% of the respondents belonged to the age group of 30-64 years, 38% belonged to a medium family size, 58% of the respondents' education level was secondary, and 57% of the respondents' primary occupation was agriculture. Per-hectare average total costs, total return, and net return were Tk. 134141, 131304, and 133152; Tk. 181561, 194097, and 196590; and Tk. 47420, 62793, and 63438; the benefit-cost ratio (BCR) was 1.35, 1.48, and 1.47 for cash sharing leasing, input-output sharing leasing, and output sharing leasing, respectively. For the lessee perspective, the benefit-cost ratio was 1.35, 2.07, and 1.42. High prices of inputs, low prices of output, a lack of good-quality seed, and a lack of irrigation water were the main problems and constraints faced by the tenant farmers. The government and other agencies should come forward to provide agricultural machinery, labour supply during the harvesting period, agricultural extension, and credit services to create profit for farmers.

KEY WORDS: *Bangladesh, Boro rice, Leasing arrangement, Profitability, Tenant farmers.*

INDRODUCTION

In any economy, real estate and land are typically the most valuable assets. Land may make up between half and three-quarters of the national wealth in the majority of nations. Land is a fundamental factor for agricultural production. For vulnerable populations like the impoverished, women, orphans, displaced people, and ethnic minority groups, securing land rights is very important. In most societies, there are many competing demands on land, including development, agriculture, pasture, forestry, industry, infrastructure, urbanisation, biodiversity, customary rights, and ecological and environmental protection. Many countries have great difficulty balancing the needs of these competing demands. Conflict over land still arises on social, ethnic, cultural, and religious levels. Land is a major investment of capital and human resources and requires strong and consistent leadership in order to achieve effective, sustainable outcomes (Bell, 2006). Therefore, land distribution and land leasing systems may significantly affect farm households land management, which ultimately affects land profitability. Bangladesh is an agro-based country. The majority of the inhabitants are directly or indirectly involved in agricultural activities for their livelihood. There is a paramount importance of the agriculture sector and rural areas in Bangladesh to meet its diverse development challenges. There is a direct link between the agriculture sector and rural areas. The agriculture sector is very important because most people in the country live in rural areas and there is a direct link between rural development and the development of our national economy (BBS, 2022).

This study covers issues such as land leasing arrangements and their effects on profitability in Boro rice production. As land is a limited resource, its proper distribution is important to the nation's development strategy. About two-thirds of Bangladesh's land is privately owned, while the rest is owned or claimed by the government. Much of the privately owned land is owned by just a few people, as 89 percent of private owners own less than 1 ha (about 2.2 acres) of land each. Land is the most significant source of survival, the most important natural asset, and is central to the majority population's livelihood. More than 70% of the population of this country is directly related to agricultural production. Bangladesh has very unequal land distribution, even with the legislated land reforms that have been implemented since the country's independence in 1971. Fifty-two percent of the rural population, which

accounts for almost 75% of the country's population, is landless or holds less than 1.5 acres of land. Over the past five decades, there has been a significant improvement in agricultural productivity due to the application of new technology and more intensive land usage. However, the number of households without access to land is increasing while the amount of land available for cultivation by each household is decreasing. Inequitable access to land has a long history in Bangladesh. In rural areas, one percent of landowners own more than 7.5 acres. Ten percent of landowners own between 2.5 and 7.5 acres. About 89% of landowners do not possess more than 2.5 acres. Thirty-nine percent have less than.5 acres. Despite a number of land reforms implemented in the 1950s and 1960s, including tenancy reforms, landholding ceilings, and public land transfer to landless people, this inequality still persists (GoB, 2008; Uddin and Haque, 2009).

In Bangladesh's rural areas, 13% of households do not own any land at all, not even for homes, and this percentage is rising. The primary source of income for 31% of rural households is labour from agriculture. Land is a prerequisite for social, economic, and political power in Bangladesh. Because land is scarce, establishing ownership rights is highly competitive and can lead to violence (GoB, 2008).

Out of 2748004 households, 63.11% are farm households and 36.89% are non-farm households. On an average, a household owns 0.80 acres and operates with 0.82 acres of land. Out of 0.65 acres of cultivated land (temporary crops land and temporary fallow land), 0.18 acres are single crops, 0.38 acres are double crops, and the rest, 0.09 acres, are triple or more crops land. It is reported that out of total (rural Bangladesh) households, 18286644 have no ownership of land for female members (66.65%), 8790973 have such ownership of their female members (31.66%), and 359303 reported "not known" (1.31%) (BBS, 2017).

Land leasing systems affect agricultural productivity by influencing the efficient use of inputs and the adoption of modern technology. Land leasing and property rights affect the application for agricultural and natural resource management. Insecure land leasing or the lack of land ownership also restricts the farmer's access to credit that is required for improved land practices. Even though they are willing to change, their inability to obtain finance encourages them to stick to outdated land use methods. Thus, national policies influence land use systems by influencing institutional arrangements such as credit and marketing facilities and infrastructure development (Hossain, 2012).

A land lease agreement is a written contract between two parties—lessor and lessee—in which the lessor grants the lessee the right to use a property owned or managed by the lessor for a predetermined amount of time in return for regular rental payments. Under the terms of the lease, the tenant is not entitled to ownership. Conversely, the lessor may grant the lessee the right to alter or adapt the property to his needs. During the lease period, the lessee is responsible for the property's condition.

On rare occasions, the parties will agree to a long-term land lease, which would allow for the building of a structure on the property. Except that the lessee and not the lessor is allowed to extend the lease, a perpetual lease is comparable to a regular lease. When compared to land with a longer lease, any lease of fewer than 70 years might have a considerable impact on the value of the land. Even if land values in a certain region are growing, a land lease agreement with an excessively short duration might have a substantial impact on the land.

According to the Bangladesh Bureau of Statistics (BBS) Agriculture Census 2019, there have been 9.33 lakh fewer landless households in rural Bangladesh over the last 11 years. In 2019, the number of landless households in rural areas has come down to 23.23 lakh, an over 28 percent decrease from 2008. The BBS census also said landless households presently constitute 7.84 percent in rural areas, down from 12.84 percent 11 years ago.

In the agricultural census of 2019, BBS found that the number of farming households increased by 11 percent to 1.68 crore from 1.5 crore in 2008. Meanwhile, the number of agricultural labour households also rose marginally to 92 lakh. It also found that the net cultivable land declined by 2 percent or 4.16 lakh acres. The BBS study estimates that there are 67.63 lakh tenant farmer households nationwide, with 2.29 lakh of them in urban areas and 65.34 lakh of them in rural areas. With 26.83 percent of all homes, Rangpur Division has the highest percentage of these households, followed by Rajshahi (24.83%) and Sylhet (23.5%). Land transactions or exchanges pass through two channels: the credit market and the tenancy market. Transactions through the credit market are in evidence mostly among credit-constrained farmers who are deprived of access to the formal channel of credit. In this instance, their desperation pushes them to knock on the doors of the village's "lender of last resort," the big farmers and "mohajons," or money lenders. They engage in the struggle for livelihood by placing their land as collateral in exchange for loans at an exorbitant interest rate. It should be mentioned that although similar methods exist in formal marketplaces as well, they are not the same. For example, the informal lender cultivates the land until the borrower repays the whole amount. And, in case of failure to repay the loan after the specified period, the lender reserves the right to purchase the parcel. It is being alleged that such a transaction takes place often at

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ISSN : 2455 - 9423 (Online) Frequency : Biannual

a price below the market price. This is called the Dai-Shudi system and is assumed to be one of the main land transfer systems in Bangladesh.

For ages, share-cropping had been the predominant leasing system in Bangladesh. In economic discourse, the system is generally criticised for its inherent exploitative and anti-incentive syndromes. It is because the owner of the land shares half of the output without paying a penny for the inputs that the tenant uses. However, certain variations in contractual agreements may be observed in various regions of Bangladesh as a result of the expansion of contemporary high-yield wheat and paddy farming. For instance, in many regions, landowners now share some input costs in addition to harvests. Conversely, agreements such as a fixed-rate lease, upfront cash rent payments, etc. have increasingly stepped into the tenancy market as substitutes for the traditional share-cropping system.

With the growing need to enhance agricultural productivity, the economics of land leasing arrangements have become an agrarian issue in recent years. However, the landholding system in Bangladesh, like most developing countries, is not purely an economic affair. It has a strong connection to people's identities and cultures. The size of land they own, the feeling of security that they have in their holdings, and the process through which land disputes are adjudicated all affect the household's income, their drive to labour and make investments, their intention to use their land sustainably, and even their standing socially and economically in their local communities. All these elements work together to influence the productivity and output of agriculture in civilisations that are predominately agrarian. Furthermore, it affects the socio-economic welfare of its citizens (Ahmed, 2012).

Leasing systems in agricultural farms are common in Bangladesh. This helps the small farmers increase their cropping areas. Also, it allows the big land owners to lease out their fallow lands, which remain uncultivated and which they fail to operate efficiently on. Different types of land leasing systems affect the production and use of resources with different degrees of incentives and disincentives. The above-mentioned aspects reveal the necessity of studying and evaluating the leasing system from an economic point of view. The present study proposes to indicate the land leasing system and its effect on the profitability of Boro rice production. The overall objective of this research is to estimate the profitability of different land leasing arrangements. The specific objectives of this research are: (i) to identify the socio-economic conditions of tenant farmers; (ii) to analyse the existing leasing arrangements in Boro rice production; (iii) to estimate the profitability of Boro rice production in different leasing arrangements of land; and (iv) to assess the problems and constraints faced by the tenant farmers.

MATERIALS AND METHODS

A sample of 100 farmers in Muktagachha Upazila in Mymensingh district of Bangladesh was selected randomly. Primary data were collected through a field survey using an interview schedule. Focus group discussions (FGDs) and observation techniques were also used to get relevant information. Some statistical measures, like average percentages and ratios, were calculated because they were simple to understand and easy to calculate. To determine the net return of Boro rice production, profitability analysis was applied. Three types of leasing arrangements were selected: cash agreements, input-output share arrangements and only output-sharing arrangements.

Functional Analysis

Gross Return

Gross return was calculated by multiplying the total volume of output of an enterprise by the average price during the harvesting period (Dillon and Hardaker, 1993). The gross return (GR) was estimated using the following formula: —

$$GR_i = \sum_{i=1}^{n} Q_i P_i \quad \text{..... (i)}$$

Where —

GR_i= Gross return from i^{th} product (Tk./ha);

Q_i =Quantity of i^{th} product (Kg/ha);

P_i=Average price of the i^{th} product (Tk./Kg);

i=1, 2, 3....., n.

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Gross Margin

Gross margin gives an estimate of the difference between total return and variable costs.

That is,

GM=TR-VC .....(ii)

Where —

GM=Gross Margin

TR=Total Return

VC= Variable Costs

Net Return

The net return was calculated by deducting all costs (variable and fixed) from the gross return. To determine the net return of rice and fish production, the following equation was used in the present study: —

$$\pi = P_y Y - \sum_{i=1}^{n} (P_{xi} X) - TFC \quad \text{.....(iii)}$$

Where —

π = net return (Tk./ha);

Py = per unit price of the product (Tk/kg);

Y = quantity of production per hectare (kg);

Pxi = per unit price of its inputs (Tk.);

X_i = quantity of the i^{th} inputs per hectare (kg);

TFC = total fixed cost (Tk.);

i = 1, 2, 3..., n (number of inputs).

RESULTS AND DISCUSSION

Age distribution of the respondents

A farmer's age plays an important role in farming activities and management. According to farmers ages and experiences, he or she becomes more productive with improved managerial abilities. Some researchers think that the older farmers are more experienced. They are more familiar with production practices and more able to manage their inputs in a more efficient way, and they are more risk-averse than their younger counterparts. Some of the researchers believe that younger farmers adopt new technology more rapidly than their older counterparts. In the present study, the family members of the sampled farmers were classified into four groups according to age: 20 to 34 years, 35 to 50 years, 51 to 60 years, and above 60 years. The following table reveals that about 2 percent of the farmers were between 20 and 34 years old. About 53% were between 35 and 50 years old, about 32% were between 51 and 60 years old, and the rest of the percentage belonged to the above-60-year age group. It is evident that the major farmers were in the most productive age group, which was 35 to 50 years old (Table 1).

Table 1: Age distribution of the respondents

Age category	Number of the respondents	Percentage (%)
15-29 years	1	1
30-64 years	90	90
65 years and above	9	9
Total	100	100

Source: Field Survey, 2023

Family size of the respondents

A family size has been defined as the total number of persons of either sex living together and having meals from the same kitchen under the administration of a single head of the family. The farm family includes husband, wife, sons, unmarried daughters, parents, brothers, etc. The national average family size in Bangladesh is 4.26 members (HIES, 2022). Based on family size, the farmers were classified into three categories: i) 3–4 members; ii) 5–6 members; and iii) more than 6 members. Table 2 represents the family size of the Boro rice farmers. About 33% of the respondents belong to a small family size, 38% belong to a medium family size, and 29% belong to a large family size. It shows that the average family size in the small group was 3.72 people. In the medium group, the average family size was 5.44 people. In a large group, the average family size was 8.62 people. The overall average family size in the study area was 5.8 people in a family.

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Table 2: Family size of the respondents

Family Size	No. of households	Percentage %	Total members	Average family size
Small family (3 to 4)	33	33	123	3.72
Medium family (5 to 6)	38	38	207	5.44
Large family (above 6)	29	29	250	8.62
Total	**100**	**100**	**580**	**5.80**

Source: Field Survey, 2023

Educational level of the respondents

In all development processes of a country, education is of main importance. Bangladesh is a developing country and agriculture being its foundation, the agriculture sector can be effectively modernised by properly educating the rural people. One of the main obstacles towards upgrading of the agricultural production is the illiteracy of the rural people. Literacy level was classified into four categories as (1) Primary (1-5) (2) Secondary (6-10) (3) Higher secondary (11-12) (4) Graduate and above, to examine the extent of literacy level of the respondents. Illiterate is termed as those who can neither read nor write (Table 3).

Table 3: Level of education of the respondents (in percentage)

Category	Cash sharing type lease	Input and output share type lease	Only output share type lease	Total
Primary (1-5)	18	6	13	37
Secondary (6-10)	27	24	7	58
Higher secondary (11-12)	5	0	0	5
Total	**50**	**30**	**20**	**100**

Source: Field Survey, 2023

Occupational status of the respondents

In the study area, the selected farmers were engaged in various types of occupations. Besides agriculture, some farmers had chosen occupations such as fishing, service, farming, teaching, business and others. Out of 100 farmers, 57% were engaged in agriculture as their main occupation, while 13% were engaged in fish farming, 10% and 12% were engaged in service and business, respectively, and 8% were engaged in other occupations (Table 4). Some farmers choose fishing as their secondary occupation. Out of 100 farmers, 43% chose agriculture as their secondary occupation, of which only 17% chose fish farming, 12% chose service, and 23% chose business, respectively. 5% of farmers chose other occupations as their secondary occupation. There are 15% of farmers who do not have any secondary occupations.

Table 4: Occupational status of the respondents

Category	Main occupation		Secondary occupation	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Agriculture	57	57	43	43
Fish Farming	13	3	17	17
Service	10	10	12	12
Business	12	12	23	23
Others	8	8	5	5
Total	**100**	**100**	**100**	**100**

Source: Field Survey, 2023

Credit received by the respondents

Agricultural credit is one of the most important ingredients for raising agricultural enterprises and income. At present, many banks and NGOs are providing credit, and farmers avail agricultural credit from these banks and NGOs. But landless farmers do not have access to get loans from banks; they obtain loans from NGOs. From the survey, we can see that there are a few farmers who take crop loans. It was found that only 3% of farmers received credit, but the rest 97% didn't receive any credit (Table 5).

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Table 5: Credit received, extension service received, involvement with land leasing system, Boro rice cultivated land area of the respondents and leasing arrangements in Boro rice production

Items	No. of respondents	Percentage (%)
Credit received by the respondents		
Credit non receiving farmers	97	97
Credit receiving farmers	3	3
Total	**100**	**100**
Extension service received by respondents		
Received extension service	5	5
Not-received extension service	95	95
Total	**100**	**100**
Involvement with land leasing system (years)		
Up to 10 years	22	22
11-20 years	36	36
21-30 years	27	27
Above 30 years	15	15
Total	**100**	**100**
Boro rice cultivated land area of the respondents (in decimal)		
15 - 40	55	55
41 - 60	25	25
61 - 80	15	15
81-100	5	5
Above 100	0	0
Total	**100**	**100**
Average = 4337/10 = 43.37		
Leasing arrangements in Boro rice production		
Cash Rent Leases	20	50
Crop Share Lease (only output sharing)	30	20
Fifty-Fifty Share Lease (input-output sharing)	100	30
Total		**100**

Source: Field Survey, 2023 /////

Extension service received by sample farmers

Extension services improve the knowledge and skills of farmers. Different government and non-government institutions provide extension services to farmers for the improvement of their crops' cultivation practices. In the study area, only 5% of farmers received extension services, and the rest did not **(Table 5**).

Time of involvement with the land leasing system

In the survey area, there were three types of leasing systems. These are the cash share, input-output share/ fifty-fifty share, and only output sharing systems. Out of 100 farmers from the table below, we can see that there were about 22% of farmers who were involved with the leasing system for less than or equal to 10 years, whereas 36% were involved for 11–20 years, 27% were involved with the leasing system for 21–30 years, and about 15% were involved for more than 30 years **(Table 5).**

Boro rice-cultivated land area of respondents

Rice farm size may vary in different locations based on physical and socio-economic conditions. A suitable rice farm size is required to minimise the production cost and maximise production. **Table 5** shows the distribution of areas. The majority of Boro rice farm sizes were in the 15–40 decimal range, which represents about 55% of rice farms. About 25% of Boro rice farms belonged to 41–60 decimals sizes. About 15% of Boro rice farms belonged to 61–80 decimals sizes. About 5 percent of Boro rice farms belonged to 81–100 decimals sizes. The average Boro rice farm size was 43.37 decimals in the study area.

Existing leasing arrangements for Boro rice production

There are three types of leasing arrangement systems observed in the study area. Those were the (i) cash sharing arrangement, (ii) input-output sharing arrangement, and (iii) output sharing arrangement (Table 5).

Profitability of Boro rice cultivation under different land leasing arrangements

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The main purpose of this section is to assess the per-hectare cost, return, and profitability of Boro rice production on the basis of a leasing system. The cost of inputs used for producing a crop plays an important role in a farmer's decision-making. In the study area, farmers used both purchased and home-supplied inputs for cultivating Boro rice. During the survey period, the farm gate price was used to value both inputs and outputs. It was easier for farmers to determine the cost of the purchased inputs like seed, fertiliser, insecticides, etc., but it was not so easy to determine the cost of home-supplied inputs like family labour, animal labour, etc. for which no payment was actually made.

For the purpose of estimation, the cost items were discussed under the following headings:

1. Cost of seed
2. Cost of fertiliser
3. Cost of human labour
4. Cost of irrigation
5. Cost of insecticides and pesticides
6. Cost of machinery

All the inputs mentioned above were taken into account in calculating the per-hectare Boro rice cultivation costs. For estimating total costs, both variable and fixed input costs were considered. In fact, all the above-mentioned costs are variable costs (Tables 6, 7 and 9)).

Production Cost: —

Cost of seed

The cost of seed is one of the basic items for Boro rice cultivation. In the study area, the average seed cost was found to be Tk. 6255, Tk. 6249, and Tk. 6097 per hectare for cash sharing, 50/ 50 leasing arrangements, and only output (one-third to landowner) share type leasing, respectively.

Cost of fertiliser

In the study area, farmers mainly used four types of fertilisers, namely urea, triple superphosphate (TSP), muriate of potash (MP), and gypsum, for Boro rice cultivation. Fertiliser costs were determined by the actual market prices paid by the farmers. Thus, the respective total average cost of fertiliser per hectare stood at Tk. 18783, Tk. 17807 and Tk. 17454 for cash sharing, 50/ 50 share type leasing, and only output (one-third to landowner) share type leasing.

Cost of human labour

Human labour was the most important and one of the largest inputs used for Boro rice production. There were broadly two different categories of human labour: family labour and hired labour. It is required for different farm operations like land preparation, sowing, mulching, weeding, irrigation, insecticide application, application of fertiliser, harvesting, carrying, etc. In the study area, the rate of human labour on an average was Tk. 400 per man-day. The total average costs of labour were Tk. 30000, Tk. 29600, and Tk. 28000 per hectare for cash sharing, 50/50 share type leasing, and only output sharing type leasing arrangements, respectively. Per hectare, labour costs are high for the cash tenant and low for the only output (one-third to landowner) sharing type of leasing.

Cost of machinery

Power tillers and power threshers are the machines used in Boro rice cultivation. Machines are used in lieu of animal labour. It is a time-saving modern tillage technology. Per hectare, the average machinery cost was Tk. 11890, Tk. 11630, and Tk. 11485 for cash sharing, 50/ 50 share type leasing, and only output (one-third to landowner) sharing type leasing arrangements, respectively.

Cost of irrigation

Farmers in all the villages used irrigation water in the Boro rice fields during the cultivation period. It may be noted that the majority of the selected farmers had to buy water from the owners of shallow tube wells (STWs), and a few of them had their own STWs. Irrigation cost was found to be the highest for cash sharing (Tk.13367), and it was almost the same for 50/ 50 sharing type leasing and only output (one-third to landowner) sharing leasing arrangements.

Cost of insecticides and pesticides

All sample farmers were observed to have used insecticides, namely Basudin, Diazinon, Dimecron, Azodrin, etc. The cost of the pesticides differed significantly between brands. The actual costs of the insecticide were used. The total average costs of insecticides and pesticides per hectare were Tk. 8190, Tk. 7914, and Tk. 7795 for cash sharing, 50/ 50 share type leasing, and only output (one-third to landowner) sharing type leasing arrangements, respectively.

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Total variable cost

The total cost was worked out for each type of farmer. The average total variable cost per hectare for Boro rice cultivation was estimated at Tk. 91396 for cash sharing; Tk. 89307 for input-output sharing and Tk.87622 for the only output (one-third to landowner) sharing type of leasing arrangement. So, cash-sharing-type lessees incurred the highest variable cost for Boro rice production.

Interest on operating capital

The interest was charged at a rate of 10 percent per year. Six months were considered for rice production. The period considered for rice production ranged from the time of land preparation to the harvesting of the crop. The average total cost of the interest on operating capital per hectare for cash sharing arrangements was Tk. 4570; for input-output sharing arrangements, it was Tk. 4465; and for only output (one-third to landowner) sharing arrangements, it was Tk. 4381.

Land use costs

Some of the sample farmers leased land for one year, and they had to pay a certain amount of money per hectare of land. Other farmers who had taken the land as a lease and did not have to give money, instead shared paddy and cash; if they have to pay, they would also give that certain amount of money for their cultivated land. So, this money is called the land use cost. In the present study, in computing land use cost, the average leased value of land per hectare for the particular season was considered on the basis of the reports of the farmers in the study area. The land use cost was estimated for the cropping period covering around 6 months in the study area. The land use cost was Tk. 38175, 37532, and 41149 for cash sharing, 50/ 50 share type leasing, and only output (one-third to landowner) sharing type leasing arrangements, respectively.

Total cost

The total cost was calculated for all types of leasing arrangements and is presented in the table. The average total cost per hectare for Boro rice production was estimated at Tk. 134141 for cash sharing, Tk. 131304 for input-output sharing and Tk. 133152 for the only output (one-third to landowner) sharing type of leasing arrangement. So, cash-sharing-type lessees incurred the highest cost for Boro rice production.

Total return on Boro rice cultivation

The total return per hectare was calculated by multiplying the total yield of Boro rice produced by the market price during the harvesting time. The farmers sold their Boro rice at different markets and at different prices. The average unit price of Boro rice per kg considered in the present study was Tk.26.79, and the straw price was Tk.5.00 per kg. The average total return per hectare for cash sharing leasing was Tk. 181561; for input-output sharing leasing, it was Tk. 194097; and Tk. 196590 for only output (one-third to landowner) sharing leasing arrangements. The input-output share type lessee gets half of the total return, so the average total return for the input-output share type lessee was Tk. 97048.50. Only output share type lessee gets two-third of the total return, and the average total return for only output share type lessee was Tk. 131060. Cash-sharing-type lessees get all the return because they give a fixed amount of cash to the lessor instead of giving paddy and straw.

Net Return

The net return was calculated by deducting the total cost from the total return. It is evident that net returns for cash sharing, input-output share type leasing, and only output (one-third to landowner) sharing type leasing were Tk. 47420, Tk. 62793, and Tk. 63438, respectively. But, for the lessee's perspective; the net returns were Tk. 47420, 50162.50, and 39057 for cash sharing, 50/50 share type leasing, and only output (one-third to landowner) sharing type leasing arrangements, respectively (Table 11). Kiron (2023), Sujon *et al.* (2017), Shamim (2022), and Rasha (2018) also found that Boro rice cultivation was profitable.

Benefit Cost Ratio (BCR)

An undiscounted benefit-cost ratio (BCR) is a relative measure that is used to compare benefits per unit of cost. The BCR of three types of farmers was calculated, and it was 1.35, 1.48, and 1.47, but for the lessee's perspective, the benefit-cost ratio was 1.35, 2.07, and 1.42 for cash sharing, input-output sharing, and only output (one-third to landowner) sharing type leasing, respectively. We can see that it was highest for input-output sharing. And we can also see that Boro rice cultivation is profitable for all kinds of farmers (Table 11).

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Table 6: Per-hectare average cost and return of Boro rice cultivation (in the case of cash-sharing leasing)

Items	Cash sharing leasing			
	Unit	Quantity (Kg/ha)	Price /unit	Total Cost (Tk./ha)
Variable cost:				
1. Seed	Kg	75.36	83	6255
2. Human Labour	Man-days	75	400	30000
3. Machinery cost	Tk.			11890
4. Irrigation cost	Tk.			13367
5. Fertiliser cost	Tk.			
Urea		231.21	27	6243
TSP		112.59	22	2477
MoP		123.74	20	2475
Gypsum		74.13	45	3336
Zinc		10.64	260	2766
Boron		10.11	147	1486
1. Manure	Tk.			2911
2. Insecticides and pesticides cost	Tk.			8190
Total Variable cost (Tk.)		91396		
Fixed cost (Tk.)				
Interest on operating capital (Tk.)		4570		
Land use cost) (Tk.)		38175		
Total fixed cost (Tk.)		42745		
Total cost (Fixed cost+ variable cost) (Tk.)		134141		
Total return (Tk.)		181561		
Net return (Tk.)		47420		
BCR (Undiscounted)		1.35		

Source: Authors' estimation

Table 7: Per-hectare average cost and return of Boro rice cultivation (in case of Input-output sharing leasing)

Items	Cash sharing leasing			
	Unit	Quantity (Kg/ha)	Price /unit	Total Cost (Tk./ha)
Variable cost:				
Seed	Kg	74.39	84	6249
Human Labour	Man-days	74	400	29600
Machinery cost	Tk.			11630
Irrigation cost	Tk.			13367
Fertiliser cost	Tk.			
Urea		226.72	27	6121
TSP		89.53	26.50	2373
MoP		118.87	20	2377
Gypsum		70.84	45	3188
Zinc		10.46	218.36	2284
Boron		10.46	140	1464
Manure	Tk.			2740
Insecticides and pesticides cost	Tk.			7914
Total Variable cost (Tk.)		89307		
Fixed cost (Tk.)				
Interest on operating capital (Tk.)		4465		
Land use cost) (Tk.)		37532		
Total fixed cost (Tk.)		41997		
Total cost (Fixed cost+ variable cost) (Tk.)		131304		

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Total return (Tk.)		194097
Net return (Tk.)		62793
BCR (Undiscounted)		1.48

Source: Authors' estimation

Table 8: Costs, return, and benefit-cost ratio (BCR) for lessee in input-output sharing arrangement

Total cost for lessee (Tk.) (no land use cost, half of the variable cost, and half of interest on operating capital)	46886.00
Total return for lessee (Tk.) (half of the total return)	97048.50
Net return for lessee	50162.50
BCR (Undiscounted)	2.07

Source: Authors' estimation

Table 9: Per hectare average cost and return of Boro Rice cultivation (in case of only output sharing leasing)

Items	Cash sharing leasing			
	Unit	Quantity (Kg/ha)	Price /unit	Total Cost (Tk./ha)
Variable cost:				
Seed	Kg	72.98	83.55	6097
Human Labour	Man-days	72	400	28800
Machinery cost	Tk.			11485
Irrigation cost	Tk.			13367
Fertiliser cost	Tk.			
Urea		283.22	20.87	5911
TSP		100.93	22	2220
MoP		109.31	20	2186
Gypsum		66.14	45	2976
Zinc		10.40	260.09	2705
Boron		10.40	140	1456
Manure	Tk.			2624
Insecticides and pesticides cost	Tk.			7795
Total Variable cost (Tk.)		87622		
Fixed cost (Tk.)				
Interest on operating capital (Tk.)		4381		
Land use cost) (Tk.)		41149		
Total fixed cost (Tk.)		45530		
Total cost (Fixed cost+ variable cost) (Tk.)		133152		
Total return (Tk.)		196590		
Net return (Tk.)		63438		
BCR		1.47		

Source: Authors' estimation

Table 10: Costs, return, and benefit-cost ratio (BCR) for lessee in only output sharing arrangement

Total cost for lessee (without land use cost) (Tk.)	92003
Total return for lessee (Tk.) (two-third of the total revenue)	131060
Net return (Tk.)	39057
BCR (Undiscounted)	1.42

Source: Authors' estimation

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Table 11: Cost and return comparison for different leasing arrangement and for lessee

Item	Cash sharing arrangement	Input-output sharing arrangement	Output sharing arrangement
Total cost (Tk.)	134141	131304	133152
Total return (Tk.)	181561	194097	196590
Net return (Tk.)	47420	62793	63438
BCR (Undiscounted)	1.35	1.48	1.47
Cost and return for lessee in different leasing arrangements			
Total cost for lessee (Tk.)	134141	46886.00	92003
Total return for lessee (Tk.)	181561	97048.50	131060
Net return (Tk.)	47420	50162.50	39057
BCR (Undiscounted)	1.35	2.07	1.42

Source: Authors' estimation

Problems and constraints faced by the tenant farmers

Some problems and constraints affect the Boro rice cultivation in the study area. The sample farmers were asked to mention their major problems and constraints they are facing in conducting Boro rice cultivation. It was revealed that the Boro rice farmers were facing a lot of crucial problems and constraints related to Boro rice farming. The most common and acute problems and constraints in Boro rice production, which the farmers emphasised, have been discussed below:

Table 12: Problems and constraints faced by the tenant farmers (Percentages are in parentheses)

Problems and constraints	**Number of times problem was ranked**				
	First	**Second**	**Third**	**Fourth**	**Total (n = 100)**
High prices of inputs	14	26	25	13	78 (78)
Low price of output	27	14	08	16	65 (65)
Lack of good quality seed	11	17	10	06	44 (44)
Lack of irrigation water	05	12	18	04	39 (39)
Scarcity of labour during the harvesting period	23	15	06	03	47 (47)
Lack of technical knowledge	10	13	04	03	30 (30)
Pests and diseases problems	09	08	11	14	42 (42)
Lack of agricultural credit	13	18	24	15	70 (70)
Lack of agricultural extension services	14	07	15	13	49 (49)

Source: Field Survey, 2023

High prices of inputs

Table 12 shows that 78% of the farmers reported the unavailability of fertiliser and pesticides on time and high prices were a crucial problem in Boro rice cultivation. They stated that they had to purchase fertilisers and pesticides from the traders at a high price.

Low price of output

The low price of Boro rice, particularly just after harvesting, caused disincentives for the farmers to produce the crop. About 65% of the Boro rice farmers reported that they did not get a reasonable price for their product **(Table 12)**.

Lack of good-quality seed

Lack of good-quality seeds was one of the major constraints in increasing Boro rice production in the study areas. From the survey, it can be seen that about 44% of the farmers reported that this is one of the main problems. They purchased hybrid Boro seeds, but they opined that in many cases the seeds were not of good quality and the prices of seeds were high during the sowing time **(Table 12)**.

Lack of irrigation water

Irrigation water is one of the most important inputs for producing Boro rice. The yield of Boro rice varied with the application of irrigation water. Most of the farmers did not have their own STWs. They had to irrigate their Boro rice plots by purchasing water from hired STWs and had to pay a higher charge for irrigation water. About 39% of the sample farmers reported this problem **(Table 12)**.

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Scarcity of labour during the harvesting period

Lack of human labour during the peak periods of cultivation was one of the major constraints for growing Boro rice. From the survey, it can be seen that about 47% of farmers faced the problem of a shortage of human labour during the Boro rice harvesting period **(Table 12)**.

Lack of technical knowledge

The low yield of Boro rice was a constraint, and it was mostly because of farmers' low level of technical knowledge. About 30% of Boro rice growers reported a lack of technical knowledge regarding Boro rice production **(Table 12)**.

Pests and disease problems

Pest and disease infection was another problem with Boro rice production. About 42% of the Boro rice farmers face this problem, and they reported about it **(Table 12)**.

Lack of agricultural credit

According to the study, the sampled farmers are poor and do not have an adequate amount of operating capital. Credit is an important input for their cultivation. But they do not get credit from the government banks because they are landless and they cultivate other people's land. Sometimes they take credit from the NGOs, and sometimes they take money from money lenders in the village with high interest rates. From the study of the sampled farmers, about 70% reported credit problems. This problem adversely affected the timely agricultural operation of Boro rice **(Table 12)**. These constraints were not uniform or identical and varied from farm to farm. A short overview of this section indicates that the farmers were facing a number of constraints of economic, technical, and marketing nature.

Lack of agricultural extension services

Most of the farmers are very experienced and informally educated in Boro rice production. But sometimes they are not able to identify some biological problems. At that time, they are looking for professional expertise, like an agricultural extension officer. About 49% of the farmers reported a lack of agricultural extension services as a problem **(Table 12)**.

CONCLUSION

From the above discussion, it can be said that Boro rice cultivation is profitable. But profitability varies with different leasing arrangements. The profitability of 'input-output sharing leasing' is higher than that of 'cash-sharing leasing' and 'only output-sharing leasing'. In all kinds of leasing, the owner gets the benefit and is the ultimate profit maker, but somehow our farmers do not get their actual value. Measures should be taken to ensure a more equitable distribution of resources among crop-sharing farmers. As we know, the 1984 Land Ordinance gives the sharecropper the right to come to a written contract for five years with the landlord for sharecropping. That also entails the sale of land to someone other than the family member of the sharecroppers. However, the law remains on paper so far and has not been implemented yet. This law should come into force immediately. The need for tenancy reforms is essential for Bangladesh. Special attention should be given to protecting the rights of sharecroppers. Therefore, the existing sharing system between landowner and lessee should be uniform and modified throughout the study areas. To ensure leasing security, informal settlements must be integrated into the formal land market and thereby prevent changes in land values, which could produce distortions in land markets and displace a large number of the poorest social groups who rent in informal settlements.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

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