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Agricultural Labor Market Dynamics and Interlocking Arrangements: Evidence from Rural Dinajpur, Bangladesh

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Abstract

The present study aims to examine the performance of the agricultural labor market in Birampur Upazila, Dinajpur district. A cluster of three villages (Katla, Shibpur, and Catra) in Birampur Upazila, Dinajpur district, was randomly selected for the study. Thirty respondents from each village were randomly selected from the cluster of villages. The pre-tested schedules were used to collect primary data from the selected agricultural labor households during 2022-23. The collected data were processed and analyzed by using various statistical and mathematical tools. The frequency of labor-credit interlocking was much higher than that of labor-land

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interlocking. More than half of the laborers had borrowed money from their employers. There was no definite rate of interest on the money loaned by the employers. However, the employers recovered a very high implicit rate of interest through a large number of small jobs. The labor-land interlocking, however, was yet another form of wage labor, since all the inputs were provided by the landowners. It ranged from 13 to 17 percent. However, the average wage/day earned in this system was slightly higher (TK. 480-500) than the average wage rate in the casual labor system. Family size, family income, family socioeconomic status, and age significantly affected the probability that an agricultural labor household entered into interlocked arrangements.

Keywords: *agricultural labor market · labor credit interlocking · labor-land interlocking · casual labor system*

1. Introduction

Labor is the most important input in increasing production in traditional agriculture. In the early stages of development, when land was plentiful, an increase in the labor supply led to the clearing of more land for cultivation. The labor market in Bangladesh consists of three types: formal, rural informal, and urban informal. A small portion of the total labor force, however, works under the formal labor market framework.

Close to 50 percent of Bangladesh's population is employed in agriculture, and more than 70 percent of its land is dedicated to crop production (BBS 2019). The rural labor market in Bangladesh, as in many developing countries, is usually characterized by peculiarities that make a straightforward application of the conventional definitions of the labor force, unemployment, etc., rather unsatisfactory. These 'peculiarities' of the rural labor market significantly affect labor availability and efficiency. Therefore, it is important to understand some of the peculiarities in order to put the subsequent discussion on a proper footing.

First, the seasonal nature of agricultural production in these economies causes labor demand to vary considerably over time, resulting in labor shortages at certain times of year and significant unemployment at others. Second, primarily due to seasonality and its implications for fluctuations in earnings and poverty levels over time, the size of the rural labor force varies considerably, with frequent entries and exits. A person who, at certain periods of the year, is neither employed nor actively looking for work (because of the non-availability of jobs, personalized nature of rural labor markets, etc.) may seek and get employed at peak periods of demand. Third, the rural labor market is characterized by considerable variability in work hours, both over time and over activities. In peak periods, a day's work may extend to 12 hours of intensive fieldwork, whereas in slack periods it may fall to about 6 hours a day, with reduced work intensity. Fourth, rural workers (both self-employed and wage laborers) often engage in multiple economic activities each day. As a result, accounting for time spent on different economic activities is difficult unless one can closely observe switches between activities and use a time unit for work much smaller than the conventional accounting unit of a labor day.

The above-mentioned 'peculiarities' of the rural labor market significantly affect labor availability. Consequently, the concept of interlocked transactions is rising as a significant issue in this sector. The unequal distribution of land holdings is one of the distinguishing factors in a poor socio-economic culture in agriculture. This disproportionate distribution of land holdings encourages leasing land to optimize land use. Therefore, those who have spare land either lease it or hire labor to make the most of their land resources. Correspondingly, those who do not have sufficient land either lease-in land or hire out labor services to earn a livelihood. This circumstance promotes labor markets in agriculture; thus, the two labor markets may be complementary, functioning independently and simultaneously.

Therefore, the concept of interlocked transactions is rising as a significant issue in this sector. Consequently, the need for a comprehensive, strategic framework to consolidate the rural labor market

has emerged as an important issue within the wider policy community. To address this need, schoolwork could help guide policymakers in developing effective policies to advance Bangladesh sustainably and financially. With that in view, this study was conducted to present a detailed examination of the extent of interlinkage in the labor-land and labor-credit markets, the explicit and implicit costs of these contracts, and the factors affecting the interlocking of factor markets.

In this investigation, Birampur Upazilla of Dinajpur district has been purposively selected, as it is an area of promising development. Then, three villages have been randomly selected for the detailed study. The pre-tested schedules were used for face-to-face interviews with agricultural laborers to collect primary data over two consecutive seasons of the 2022-23 agricultural year. The collected data was processed and analyzed using various statistical and mathematical tools in Microsoft Excel to achieve objective-oriented results.

2. Problem Statement

An agricultural laborer can be defined as the involvement of any person in connection with cultivating the soil, or in connection with raising or harvesting any agricultural or horticultural commodity, management of livestock, bees, poultry, etc. Agricultural laborers face unemployment and underemployment. For a substantial part of the year, they have to remain unemployed because there is no work on the farms and no other sources of employment exist.

In Bangladesh, the agricultural and rural labor markets are the same, depending on how they function. Although there is no conventional definition that provides an exact description of the term, the rural dimension is usually defined by comparison with its opposite, the urban dimension. The latter is usually characterized by superior access to financial, physical, human, and social capital, which implies lower rates of labor productivity in the rural sector. As Wiggins and Proctor (2001) point out, the term ‘rural’ refers to things of the countryside: “rural areas constitute the space where human settlement and infrastructure occupy only small patches of the landscape, most of which is dominated by fields and pastures, woods and forests, water, mountains, and desert”. A

few formalized facts are commonly acknowledged in describing rural areas:

(i) relative abundance of land and other natural resources, which are immobile; hence, rural areas are usually the location for farming;
(ii) distance between rural settlements and cities, which implies high costs of movement;
(iii) relative poverty of many of the inhabitants, as average incomes are lower in rural areas than in towns and cities, with the exception of some rural areas in Bangladesh.

In this situation, the linked transaction is preferred because such interlinking of markets reduces the stronger party's control, as partial operations in any one market may occur due to tradition, custom, or fiscal factors. Again, the interpenetration of markets allows them to submit applications across diverse markets and phase out operations over time. Interlocked transactions are used, among other things, to enforce contracts, reduce transaction costs in labor recruitment, and form labor unions. The incidence of interlocking between the labor-credit and labor-land markets is not only low but also less exploitative, given the explicit and implicit interest and wage rates. Factors such as land ownership, family size, dependency ratio, non-farm sources of income, farm assets (including livestock), age, literacy, etc., affect the probability that an agricultural labor household enters into interlocked arrangements.

3. Rationale of the Study

Labor is one of the most important inputs in agricultural production. How it is measured and valued is critical to establishing the cost of producing agricultural commodities and accurately portraying labor's relative share of total production costs. The problems of agricultural labor in Bangladesh are as follows:

- Marginalization of agricultural workers
- Wages and income issues

- Employment and working conditions
- Indebtedness and
- Low wages for women in agricultural labor. Female agricultural workers are generally forced to work harder and paid less than their male counterparts.

Many economies are characterized by imperfect rural labor markets, due to transaction costs and structural impediments, which result in a sub-optimal allocation of labor, lower worker incomes, and thus constrained rural development. To the extent that rural development is the key objective for improving people's living conditions and their income, well-functioning rural labor markets are an essential prerequisite for rural agricultural economies. Therefore, it is crucial to gain insights into the functioning of rural labor markets by examining the interlinkages between the labor-land and labor-credit markets, the explicit and implicit costs of these contracts, and the factors that affect the interlocking of factor markets.

To understand and describe the functioning of the labor market in rural areas, it is crucial to define the nature of interlinkages in the labor-land and labor-credit markets, the explicit and implicit costs of these contracts, the factors affecting the interlocking of factor markets, and thus recognize the main variables of interest.

The results will provide insights into the functioning of the agricultural labor market and the policy environment. This information will be useful for subsequent labor development strategies and will provide valuable insights for policies aimed at improving structural and financial development in the agricultural/rural labor sector.

Since the goal of this study is a comprehensive assessment of the rural labor market, a number of methodological challenges had to be met simultaneously. Knowing the details of this aspect would facilitate the planning and implementation of effective rural labor policy in the future.

4. Objectives of the Study

To study the extent of incidence of inter-linkage in the labor-land and labor-credit markets, explicit and implicit costs of these contracts and the factors affecting interlocking of factor markets is necessary to know. The aim of the present research work was to study of micro-evidences for agricultural labor market functioning in agriculturally developed Birampur upazilla of Dinajpur district.
The objectives which have been placed within the horizon of this study are as follows:

i. To identify the incidence of interlocking among casual agricultural labor households

ii. To identify and quantify the cost of labor-credit interlocking in the study area

iii. To measure the cost of labor-land interlocking in the study area

Therefore, for a wide-ranging and strategic framework for consolidating the rural labor market, it is necessary to pay policy attention in this regard. To discuss such a requirement, the exercise might help facilitate the managerial principle to policy-makers so that they may initiate effective policies for the sustainable, commercially feasible advancement of Bangladesh.

5. A Brief Review of the Literature

A literature review is a piece of academic writing demonstrating knowledge and understanding of the academic literature on a specific topic placed in context. A literature review also includes a critical evaluation of the material; hence, it is called a literature review rather than a literature report.

This section reviews the literature related to the study. Khan *et. al.* (1981) found that the labor days expended in non-farm activities were about 1.5 times higher than those in farm activities. Even though non-activities usually subsume non-agricultural activities, the shares of non-

agricultural activities in the two study villages are likely to be higher than those of agricultural activities. Khuda (1982) found that seasonal variation in productive employment is less pronounced for females than for males. It is hard to see why the females should have more stable employment than males unless he has picked up in his sample only the regularly employed females, many of whom are primarily engaged as domestic help. Bhaduri (1984) on rural labor markets dealt with the issues of interlocked factor markets and captive labor, focusing on the personalized nature of the labor market as well as bonds, sanctions, and the interlocked nature of different markets, which can, and often do, create captive labor. Though labor is primarily unskilled and less differentiated than in urban areas, education and skill barriers, and the lumpy character of certain jobs create differentiation and allow only restricted labor mobility. Muqtada and Alam (1983) found that workers from small farm households were more likely to be employed than those from other household groups in both low- and rapid-growth agricultural areas. Only in the industrial center area do landless workers have higher employment than other workers. Large farmers are generally found to have lower employment. The BIDS study (1985), on the other hand, found the highest employment among landless and near-landless workers. The large farmers were found to have more employment than other households, a phenomenon explained by the greater availability of non-farm activities among larger farmers.

Rahman & Islam (1986) noted that women workers spend a substantial part of their time on other agricultural activities, such as livestock rearing and vegetable gardening. Second, a large share of women's labor time is devoted to post-harvest activities. In fact, post-harvest activities and other agricultural operations account for more than four-fifths of the total labor time female workers devote to agriculture. Third, junior workers spend more time than female workers in field activities, but like the females, they also concentrate more on post-harvest and other agricultural activities, mostly in animal rearing. The analysis by Rahman & Islam (1986) shows that land ownership, on the whole, has a rather negative impact on labor use, particularly after income reaches a certain level. Education is also found to have a negative impact on agricultural

labor use but a positive impact on non-agricultural labor use. Productive labor use by female workers is negatively affected by both the proportion of children in the family and the total land area. Both kitchen gardening and the number of livestock per household are found to positively affect female labor use. The impact of education on female labor is found to be rather indeterminate.

Fiendeis et al. (1991) argued that the institutionalized perspective provides the rationale for minimum wage policies to counter exploitation by ensuring all workers receive a fair wage and, more generally, as an anti-poverty policy. This view sees minimum wages both in a rights-based framework and as a social policy. While distortionists argue that, if set above the competitive equilibrium wage, a minimum wage can price low-productivity workers out of the (formal) labor market, hurting exactly those people the policy was meant to benefit. Moreover, it questions minimum wages as an effective anti-poverty tool, arguing that they are poorly targeted to poor households, which may be unlikely to have covered workers. Brown (1999), in a frequently cited review, concludes that the minimum wage effect is small (and zero is often hard to reject). In its reexamination of the Job Strategy, the OECD (2006) reached a similar conclusion, basing its policy advice on the considerable body of studies that have found the adverse impact of minimum wages on employment to be modest or non-existent.

The above review leads us to conclude that the literature on the rural labor market in many developing countries, particularly Bangladesh, has raised and sustained interesting debates on various aspects of the market.

6. Approaches or Methodologies of the Study

A. Proposed Area and Sample Selection

In this investigation, Birampur Upazilla of Dinajpur district was purposively selected, as it is an area of promising development. Then, three villages, namely Katla, Shibpur, and Catra, were randomly selected for the detailed study. A cluster of three villages was randomly selected. Using probability-proportional-to-size sampling, 30 respondents from each village were randomly selected, and

primary data were collected from the selected agricultural labor households.

B. Data Collection Methods

The pre-tested schedules were used for face-to-face interviews with agricultural laborers to collect primary data over two consecutive seasons of the 2022-23 agricultural year. The collected data were processed and analyzed using various statistical and mathematical tools in Microsoft Excel to achieve objective-oriented results.

C. Targeting Methodology

Explicit cost = wage of hired labor, value of seed, manure, fertilizer, irrigation charges, etc.

Implicit cost = interest on loan.

The cost (both explicit and implicit) of interlinkages of labor-credit and labor-land markets was worked out by following the procedure given below:

Explicit interest = the amount of interest paid on the loans

Implicit interest= L (Mw - Aw) + (N x Mw)

Where

L = is the total number of days worked for the landlord creditor on a wage less than the

prevailing market wage

Mw = the market wage rate

Aw = the actual wage received

N = the number of days worked without wages for the landlord creditor.

The total interest = explicit interest + implicit interest

The rate of interest = (i/p) x 100

Where

I = the explicit + implicit interest and

P = the total amount borrowed

Likewise, the cost of labor-land inter-linkages will be computed

The explicit rent = the amount of rent paid

The implicit rent = L (Mw-Aw) + (N + Mw)

Total rent = explicit rent + implicit rent

Where

L = the number of days worked for the landlord on wages less than the market wage

Mw = the market wage rate

Aw = the actual wage that he gets and

N = number of days worked for the landlord without wages.

7. Results and Discussion

7. 1 Incidence of Interlocking among Casual Agricultural Labor Households

Some of the relevant indications establish the empirical importance of interlinking. Generally, a discussion of the reasons for interlinking and the principal-agent and bargaining theoretical approaches is presented, compared, and contrasted in the context of resource allocation, innovation, and welfare. The discussion refers to rural life and its principal actors: farmers, laborers, landlords, tenants, moneylenders, and traders.

The percent of households involved in labor-credit and labor-land interlocking was very high in all selected villages (Table 1). The table shows that more than 82% of the selected households were observed

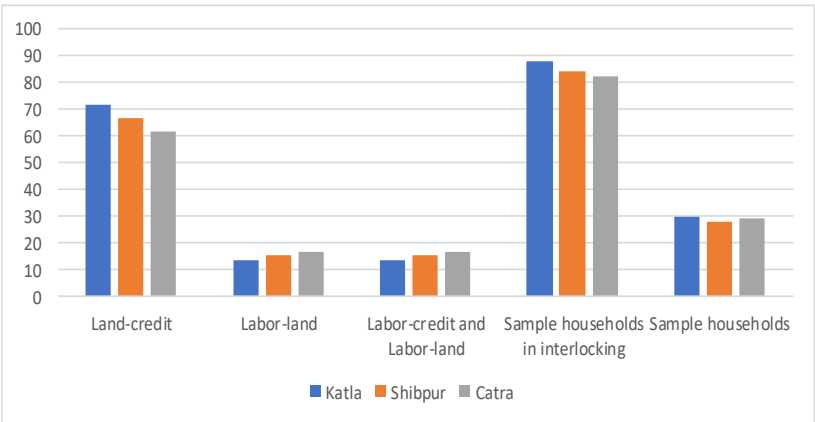
to be either borrowing or leasing land from their employers in the study area. Additionally, labor-credit interlocking was reported to be more prominent than labor-land interlocking.

Table 1: Incidence of interlocking among casual agricultural labor households

Sl. No.	Particulars	Villages			All
		Katla	Shibpur	Catra	
1.	Land – credit	72	67	62	67.0
2.	Labor-land	13.9	15.8	16.7	15.47
3.	Labor-credit and labor land	13.9	15.8	16.7	15.47
4.	Sample households in interlocking	87.7	83.9	82.01	84.54
5.	Sample households	30	28	29	87

Source: Field Survey, 2022-23

Figure 1. Incidence of interlocking among casual agricultural labor households



7. 2 Causes of Interlocking of Agricultural Markets

Interlocking often acts as a security against risk. The reason is that one can recover their loan from the tenants' share of the crop. Thus, the risk of default is reduced through the interlocking of the land (lease) and the credit market. Similarly, if there is crop failure due to adverse weather or a natural calamity, the landowner can recover his rent by compelling the tenant to

provide his labor services free of charge in the next agricultural season. This is possible because the land (lease) market and the labor market are interlinked. About 79.67 percent replied regarding this issue.

Another reason for such interlocking is to derive some economies or advantages. During peak season, wages rise due to high labor demand. But due to inter-market contractual relations (in this case, between the credit and labor markets), the landowner can obtain labor services from tied laborers at lower wage rates. In this way, the wage cost of the landowner becomes much less than it would be in the absence of interrelation between these two markets. On average, 33.01 percent responded to this issue.

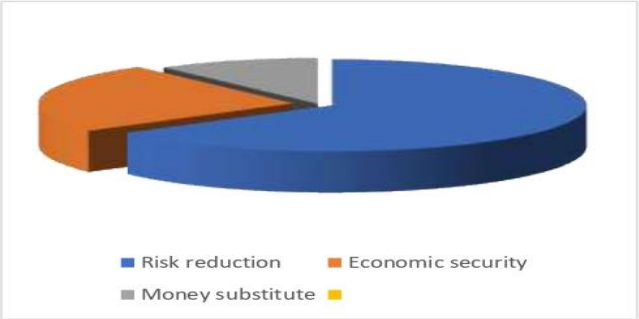
Finally, the interlocking of different markets serves as a substitute for money. In some parts of the area, the exchange system still exists. Commodities are directly exchanged for commodities. But the success of this system requires double coincidence of wants, which is created through the interlocking of different markets in agriculture. On average, 15.47 percent answered relating to this issue.

Table 2: Causes of Interlocking of Agricultural Markets

Sl. No.	Particulars	Villages			All
		Katla	Shibpur	Catra	
1.	Risk reduction	81	79	79	79.67
2.	Economic security	31	34	32	33.01
3.	Money substitute	13	15	16	15.47

Source: Field Survey, 2022-23

Figure 2. Causes of Interlocking of Agricultural Markets



7. 3 Cost of Labor-Credit Interlocking

Two factors were identified that significantly influence the analysis. First, in terms of information, there is the distinction between not knowing what sort of being one is dealing with, which may lead to adverse selection. Second, the problems of contractual enforcement and determination, or avoidance by borrowers, are given a prominent place. Again, a third theme arises from these exits from the framework of complete and competitive markets—namely, how the scope for strategic behavior is balanced.

The amount borrowed in the interlocked transactions varied from Tk. 2690 in Katla to Tk. Tk. 2410 in Catra (Table 2). The frequency of borrowing ranged from 2.00 in Katla to 3.00 in Shibpur. No sample household reported paying the interest rate on the amount borrowed from their employers. The employers, however, charge an implicit rate of interest by requiring extra work without payment and by paying lower wages to those who had borrowed money from them. The data at our disposal showed that the number of days worked on poorer pay per annum varied from 79 (Catra) to 62 (Katla). This covered additional hours of work on routine working days and the performance of many small works like leaving the message or other things to the relatives of the employers, help in irrigating the field, bringing inputs from the market, delivering some small goods etc. without getting any extra wage taking into account the number of hours put for performing those unusual jobs and the extra hours without wage, the average difference in the wage, which they ought to

have received and what they actually received varied between Tk. 6.50 to Tk. 11.00 in the sample villages.

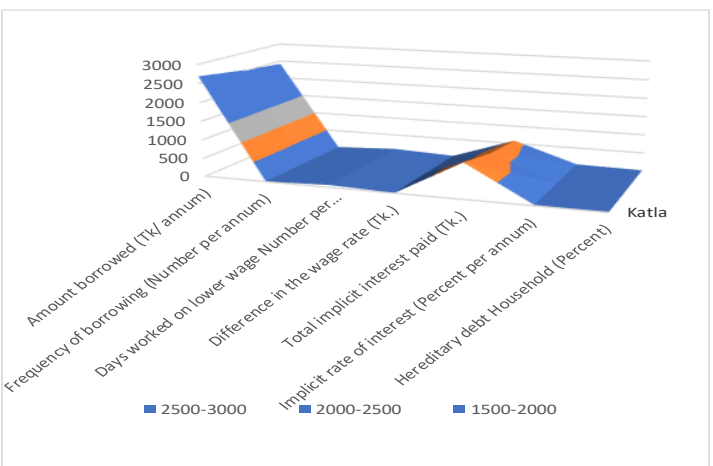
Considering the number of days worked for lower pay and the difference between the wage rate and the average amount borrowed, the interest rate ranged from 35 to 23 percent. Traditional debt was observed in only one village in Tk. 11,900 in Catra. It is, however, important to note that, since both employers and laborers belonged to the same nearby villages and knew one another, the degree of market imperfections arising from asymmetrical information, moral hazard, and adverse selection was very low.

Table 3: Cost of labor-credit interlocking

Sl. No.	Particulars	Villages			All
		Katla	Shibpur	Catra	
1.	Amount borrowed (Tk/ annum)	2690	2530	2410	2543.33
2.	Frequency of borrowing (Number per annum)	2.0	3.0	2.50	2.52
3.	Explicit rate of interest	-	-	-	-
4.	Days worked on lower wage Number per annum)	62	73	79	71.33
5.	Difference in the wage rate (Tk.)	8	11	6.5	8.5
6.	Total implicit interest paid (Tk.)	642	698	581	640.33
7.	Implicit rate of interest (Percent per annum)	23	31	35	29.67
8.	Hereditary debt				
8 (i).	Household (Percent)	-	-	7.0	2.38
8 (ii).	Amount (Tk.)	-	-	11,900	4110.01

Source: Field Survey, 2022-23

Figure 3. Cost of labor-credit interlocking



7. 4 Cost of Labor-Land Interlocking

An interlinked transaction is one in which the parties trade in at least two markets on the condition that the terms of all trade between them are jointly determined. According to their definition, two or more parties and more than one market are involved in the interlocked factor market. Interlocking of the agricultural factor market is possible due to the interlocking of the land (lease) market and the *labor market*. This interlocking of different agricultural markets reduces risk.

The low frequency of labor-land interlocking ranged from 13 to 17 percent of sample households involved in such interlocking (Table 3). The low frequency of labor-land interlocking was primarily because most agricultural labor households lacked the supporting inputs required for farming. They also lacked farming skills. In the villages of the study areas, land was leased for both Kharif and Rabi seasons to grow wheat and maize. The average amount of land leased per household was 3-6 hectares. Since the employer-landlords provided all inputs except labor, three-fourths of total production was paid to the landlords as rent for leased-in land. The remaining one-fourth of the total production was given as the reward for the labor.

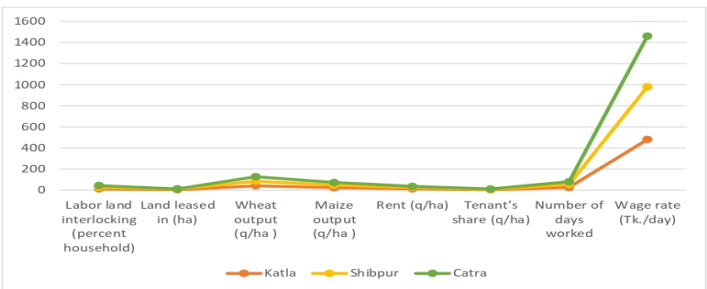
The system was thus yet another form of wage labor. The average daily wage rate in this system varied from as high as Tk. 500 in Shibpur to Tk. 480 in Catra, which was higher than the average wage under the casual labor system. As mentioned above, agricultural labor households are thankful to borrow from their landlord-employers for purposes such as illness, social ceremonies, and buying food grains. Similarly, in a recent investigation, the low incidence of labor-land interlocking was primarily due to the fact that most agricultural labor households lacked the supporting inputs, such as bullocks and other farm implements, which are essentially required for farming.

Table 4: Cost of labor-land interlocking

Sl. No.	Particulars	Villages			All
		Katla	Shibpur	Catra	
1.	Labor land interlocking (percent household)	13	15	17	15.01
2.	Land leased in (ha)	4	6	3	4.35
3.	Total output of (q/ha)				
	(i) Wheat	42	44	43	43.10
	(ii) Maize	24	25	24.5	
4.	Rent (q/ha)	14	12	11	12.31
5.	Tenant's share (q/ha)	4.00	3.50	5.00	4.18
6.	Number of days worked	27	28	26	27.01
7.	Total value of tenant's share (Tk.)	9600	8400	10200	9400.02
8.	Wage rate (Tk./day)	481	500	480	487.12

Source: Field Survey, 2022-23

Figure 4. Cost of labor-land interlocking



8. Conclusion

The study reveals that, in most cases, the frequency of labor credit interlocking was higher than that of labor-land interlocking; more than half of the laborers had borrowed money from their employers. There was no explicit interest rate on the funds borrowed from the employers. On the other hand, the employers recovered a very high intrinsic rate of interest in terms of the number of small jobs owed. The labor-land interlocking, however, was yet another form of wage labor, since all the inputs were provided by the landlords. However, the average wage/day earned in this system was higher than the average wage rate in the casual labor system.

Family size, family income, family socio-economic status, and age had a significant effect on the probability that an agricultural labor household entered into interlocked arrangements.

In order to strengthen rural labor markets, a few policy preparations have been encouraged in different literatures, such as creating jobs in rural areas, especially those complementary with agricultural activities in terms of skill requirements and seasonal labor demand, and supporting education through extensive programs to address low levels of human capital in rural areas. Therefore, investments in education and human capital would improve the quality of the labor-credit and labor-land interlocking system and would increase its flexibility, reducing labor-credit and labor-land interlocking mismatch and facilitating the move towards a more efficient labor adjustment. At the same time, it is fundamental to support rural infrastructure to encourage rural businesses, increase the user-friendliness of jobs for rural residents, and provide job-specific training programs for rural inhabitants.

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