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Labor Demand for Rice-Prawn Gher Farming in Bangladesh : A Case Study of Khulna District

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Summary

This paper aims to examine labor demand for rice-prawn gher farming as well as modern variety (MV) *boro* and local *aman* paddy/rice production in Southwest Bangladesh. The research was conducted in two contrasting villages-Bilpabla village for rice-prawn gher farming and Kuloti village for MV *boro* and local *aman* paddy under Dumuria *Thana* in Khulna District. The primary data was collected through a cross sectional farm survey during November and December in 2003. A total of 40 rice -prawn gher farmers from Bilpabla village and 10 paddy / rice farmers from Kuloti village were randomly selected. Secondary data were also used in this study. The findings of the study indicate that rice-prawn gher farming has increased labor demand compared to MV *boro* and local *aman* paddy/rice production. The permanent hired labor was found to have highly significant impact on family supplied male and female labor in rice-prawn gher farming. The gher farming system was found to have created highly seasonal demand for labor during the paddy production and this high demand for labor was found to have increased agricultural wage compared to the wage rate of other activities of gher farming system. However, the wage rate of hired labor in MV *boro* and *local* aman paddy production is similar to the wage rate of boro paddy production in gher farming system.

1. Introduction

Bangladesh is basically an agricultural country. A majority of rural population nearly 85% of them are dependent on agriculture for their employment and income (BBS, 2002). With so much dependence on agriculture, the income, employment, and consumption of the rural people are directly or indirectly determined by the ownership and access to agricultural land. Employment in rural Bangladesh consists mainly of self-employment, and most of the agricultural workers are hired on a daily basis. Workers change jobs from one day to another, from self-employment to wage employment and from agriculture to other forms of employment. Their income depends on conditions in the labor markets, that is, duration of employment and wage rate (Hossain, 1988).

Rice-prawn culture in the southwest Bangladesh is an indigenous technique developed solely by farmers. In Bangladesh, two types of gher farming are operated; one is brackish water based shrimp culture and another is fresh water based rice-prawn culture. Shrimp gher farming is large in size and scale, and needs saline water, whereas prawn gher farming is comparatively small in size and scale, and need fresh water.

The landholding patterns, cropping patterns, and land tenant system have changed after the introduction of rice-prawn gher farming in southwest Bangladesh in late 1980s. These changing landholding and cropping patterns

have changed the agricultural labor market in the southwest Bangladesh. Recently some research works have focused on benefit-cost analysis of rice-prawn gher farming, and environmental and ecological impact of shrimp gher farming (Abedin, J. and Kabir, 1999 ; Abedin, Sarkerand Hena, 1997 ; Alim et al, 1998 ; Asaduzamman et al, 1988 ; Bhattacharya, et al, 1999 ; Habib 1998 ; Nijera Kori 1996 ; Nabi et al, 1999 ; Rahman et al, 1995 ; Datta 2001 ; and Sobhan 1995). However, the impact of rice-prawn gher farming on labor demand has received less attention. The objective of the study is to evaluate the impact of rice-prawn gher farming on labor demand in the southwestern part of Bangladesh.

This paper investigates the actual labor demand for rice-prawn gher farming, and MV *boro* and local *aman* paddy production in the southwest Bangladesh. Following the introduction, the paper discusses the present sector-wise labor market in Bangladesh. Labor demand data of gher farming, and MV *boro* and *aman* paddy are discussed in methodology section. The gher crops and management, and paddy farming system are briefly discussed in section four, whereas description of the study village, types of gher farmers and land holding patterns are discussed in section five. Labor demand for gher farming, MV *boro* and local *aman* paddy, and comparison of the wage rate of male and female labor based on different types the gher farming activities as well as paddy production are presented in section six. In this section, a case study is also presented. Finally conclusions are drawn based on the results and discussions.

2. Sector-wise Labor Market in Bangladesh

Bangladesh is one of the most densely populated countries in the world. The present population is about 130 millions which make it the eighth populous country of the world. The average density of population is about 875 people per square kilometers (2,267 people per sq mile) (BBS, 2002). The labor force in Bangladesh increased rapidly from 51.1 million in 1991 to 60.3 million in 2000 and its an annual growth rate was 1.9 percent. In other words, around 1 million people are entering into the labor force annually.

The employment pattern of Bangladesh is shown in table 1. The sectoral pattern of employment reveals the dominance of agriculture. The changes in the distribution of activities in the non-agricultural sector reveal two striking developments : (i) decline in the share of employment in the manufacturing sector ; and (ii) shift of labor force to non-agricultural activities mostly in the service sectors. The changes in the employment pattern are also characterized by a very high level of informal sector employment, employing more than 80 percent of the employed population over 15 years. In other words, almost 42 million people were engaged in the informal sector in 2000 (Labor Force Survey, 2002).

The employment status is presented in table 2. The distribution of the working labor force by status reflects the dominance of informal arrangements. In 2000, more than 32 percent were self-employed compared with less than 27 percent in 1991 largely due to rapid increase sector. The number of unpaid family helpers was around 21 million in 2000 with its share declining from 47 percent in 1991 to 37 percent in 2000. A major change, however, is the significant increase in the number of people receiving a wage (either daily or salaried). The proportion of regular employees in the labor force remains modest at 13 percent while the share of day labors is nearly 18 percent (compared with less than 14 percent in 1991). The employment status of women differs significantly from that of men with nearly three-quarters of employed women working as unpaid family members.

Table 1. Employed Persons by Major Industry.

	1989	1990/91	1995/96	1999/00
Total (million)	50.1	50.2	54.6	58.1
		Share in percent		
Agriculture	65.1	66.5	63.2	62.3
Manufacturing	14.0	11.8	7.5	7.4
Construction	1.2	1.0	1.8	2.1
Transport, storage, and communication	2.5	3.2	4.2	4.6
Trade, hotel, and restaurent	8.2	8.6	11.2	12.0
Community, and personal services	3.6	3.8	9.3	7.4
Household sector	4.8	4.6	2.2	2.6
Other industries	0.6	0.5	0.6	1.6
Total	100	100	100	100

Source : Labor Force Surveys, Various Issues of BBS.

Note : 1) Other industries including mining, gas and water, finance and business services.

2) For this study, employed person is considered as who is enagaged in full time in economic activities receiving direct or idirect payments.

Table 2. Employement Status of the Labor Force, 2000.

	Both Sexes		Male		Female	
	No. (million)	Share (%)	No. (million)	Share (%)	No. (million)	Share (%)
Self-employed	18.8	32.3	16.5	45.6	2.3	10.4
Employer	0.1	0.2	0.1	0.3	0.0	0.1
Employee	7.7	13.3	5.6	15.4	2.2	9.8
Unpaid family member	21.3	36.6	5.3	14.7	15.9	72.6
Day labor	10.2	17.6	8.7	24.0	1.6	7.1
Total	58.1	100	36.1	100	21.9	100

Source : BBS, 2002.

Despite the overall increase in the level of employment during the period, significant imbalance in the labor market exists. The total labor force increased from 51.2 million in 1991 to 61.3 million in 2000 (that is, by nearly 18 percent). Over the same period, the number of employed persons increased by about 16 percent-from 50.2 million to 58.1 million. This indicates that the unemployment rate nearly doubled during the period from 1.9 percent to 3.7 percent. A more serious concern, however, is the high rate of underemployment. The problem of the underemployment reflects the fact that more than 35 percent of the employed labor work less than 35 hours a week, a low level for a developing country such as Bangladesh. At the end of the 1990s, around 39 percent of the total labor force was either employed or underemployed. Moreover, the rural labor and the female workers suffer more than underemployment.

In the rural areas, the underemployment rate was nearly 39 percent in 2000 compared with 21 percent in urban areas. Similarly, the underemployment rate was estimated at 72 percent for the female workers whereas it was only 13 percent for the male labor force. The educated people suffer less than the others do from underemployment since they are seldom employed as unpaid family members which category faces the highest underemployment rate (74.6 percent) compared with self-employed

Table 3. Underemployment Rate by Major Sectors, 2000.

Particulars	Underemployment (Percent)
Agriculture	46.0
Mining	54.8
Manufacturing	20.7
Energy	11.9
Construction	6.6
Trade, hotel and restaurant	15.6
Transport	7.6
Finance	6.6
Community, and personal services	22.3
Household services	27.5
Total	35.4

Source : BBS, 2002.

Note : For this study, underemployment is considered as a situation in which a worker is employed, but not in the desired capacity, whether in terms of compensation, hours, or level of skill and experience. An underemployment rate is calculated by expressing the number of underemployed as a proportion of the total labour force.

(16.4 percent), employer (7.8 percent), and day laborers (9.5 percent). As a result, the underemployment rate is relatively high in agriculture and for the female workers in contrast with manufacturing and service sectors (table 3). The existence of significant underemployment, along with the relatively low female participation rate (the female participation rate for persons aged 10 and above, as per the usual definition, was only 22.8 percent compared with 73.5 percent for the males in 2000), suggests that there exists significant 'surplus labor' in the country.

3. Methodology

The data for this study were from a farm household survey of two contrasting villages-Bilpabla and Kuloti, located in Khulna district of Bangladesh. The climate in Khulna District is suitable for rice-prawn production. The families and communities of Khulna District have some experience on rice-prawn cultivation as well as *boro* and local *aman* paddy production. Khulna District was purposively selected for the study as it is the leading rice-prawn producing district of Bangladesh. Bilpabla village was also selected purposively because Bilpabla is one of the typical villages in prawn production of the Khulna district. A large number of people are engaged in prawn culture and their socio-economic conditions have changed within the last decade. In Bilpabla village, the survey consisted of two stages. First, all households in the village were identified. Second, a detailed survey of 40 randomly selected gher farmers from this village was conducted.

Kuloti village is not far from Bilpabla village and most of the farmers of this village cultivate *boro* and local *aman* paddy. Kuloti village is also selected purposively and 10 farmers were randomly selected from this village. The level of paddy field of Kuloti village is slightly higher in altitude compared to gher farming land of Bilpabla village. Therefore, the farmers in Kuloti village can not convert their paddy field into gher farm. The primary information is collected through a comprehensive cross-sectional field survey. The survey is conducted from November to December 2003 which covered the 2002 crop calendar year. Secondary data are also used in this study and these data are collected from various government secondary sources.

Gher farming system, and modern variety (MV) *boro* and local *aman* paddy are two adopted technology in Bilpabla and Kuloti village in Khulna district. However, gher farming is newer as compared to MV *boro* and *aman* rice/paddy production. Before the gher farming had started, the farmers in Bilpabla village produced only local *aus* and local *aman* paddy. On the other hand, the farmers in Kuloti village now cultivate MV *boro* and local *aman* instead of the traditional local aus and local *aman* paddy. Due to unfavorable conditions of gher farming system, the farmers in Kuloti village have not been able to adopt gher farming. The

agricultural system of these villages is completely different, and requires different level of agricultural inputs, including hired and family supplied male and female labor.

Since the average number of hours of work per day may vary across the gher farmers, and a worker may be engaged in a number of activities in a day, the information on duration of employment was collected in the survey by hours, by activity, for each of the workers in the sample gher farmers. The estimate of total employment at the household and worker levels has been built up from the data and is measured in average monthly employment hours for a year of the survey. The information can be converted to standard eight-hour days of employment for the year 2002. Only tabular technique is used in this study.

4. Gher and Paddy Farming System

4.1 Gher Crops and Management

Gher is the physical construction used for freshwater prawn (*Macrobrachium rosenbergii*) farming. A gher is a modified rice field having high wide dikes and a canal inside the periphery of the dikes that retains water during the dry season. At the early stage of gher farming most of the farmers cultivated prawn in monoculture ponds, but recently the farmers commonly grow fish with prawn. In addition to this, rice, vegetables and fruit trees are also grown under the integrated gher farming.

The gher cycle begins in May/June when the farmers release prawn post larvae (PL) into gher. Before this, farmers repair the gher dikes and trenches. This repair work is done almost every year. Farmers use lime during gher preparation to reduce soil acidity. During the grow-out period, the farmers give supplementary feeds to the prawn. Traditionally, only snail meat was used as a prawn feed, but nowadays in addition to snail, farmers use wide range of homemade and commercial supplementary feeds.

Carp fish fingerlings are released into gher in May / June and cultured for nine months as long as sufficient water is retained in gher. Usually, no specific supplementary feeds are provided for fish. Fish share the feeds that are supplied for prawn. Usually farmers grow vegetables in gher during both winter and summer seasons. Some farmers grow vine-type vegetables up trellises inside the gher.

In gher farming system, farmers usually grow *boro* rice on gher *chatal* (the land inside the gher) during the winter season between January and April. Farmers irrigate the paddy field from canal using indigenous hand made tools such as *don*, and basket. Some large farmers use pump sets. Some times farmers do not irrigate to paddy field. Usually the gher farmers do not use any types of organic fertilizer for *boro* paddy production. Farmers give different types of feed in the gher unit during the prawn and carp fish production in rainy season. But the prawn and carp fishes do not eat completely these supplied feed. These remain unused feeds make the paddy field fertile and the paddy crop takes necessary nutrients from the fertile field. After *boro* paddy, the gher is used predominantly for prawn and fish cultivation.

4.2 *Boro* and Local *Aman* Paddy Production

Rice in Bangladesh is grown in three distinct seasons: *boro* (January to April), *aus* (April to August), and *aman* (August to December). But farmers mainly grow *boro* and local *aman* paddy once a year in the study village Kuloti. Farmers transplant MV *boro* seedling is from mid-January to mid-February, and harvest paddy from mid-April to mid-May. Farmers usually use different types of chemical fertilizers, pesticides, and irrigation like other *boro* paddy producing areas in Bangladesh. The transplanting and harvesting time of local *aman* paddy is

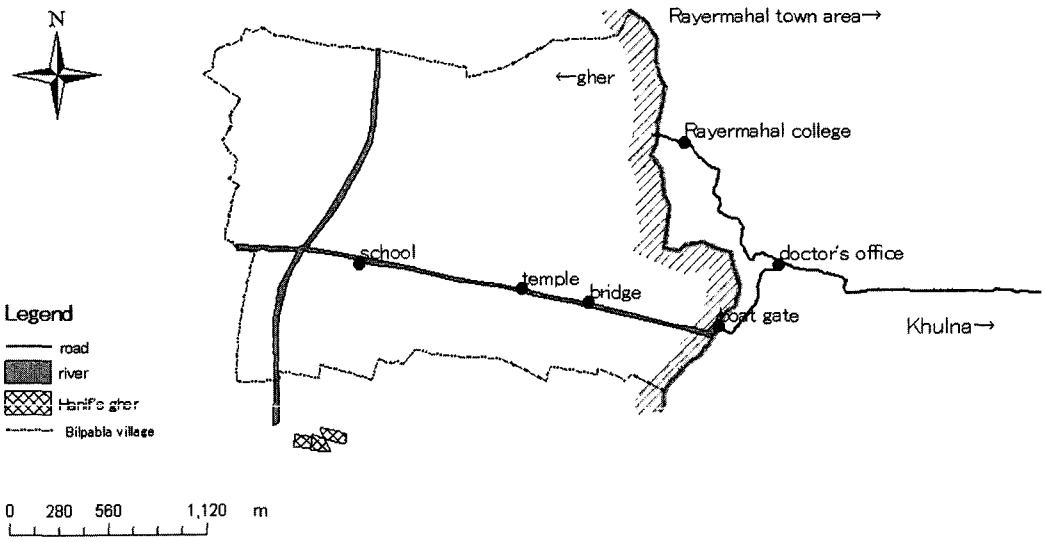


Figure 1. Map of Bilpabla village

from mid-July to mid-August and full December month, respectively. Farmers do not use any types of chemical fertilizers, pesticides, and does not give any irrigation for local *aman* paddy production. Along with paddy crops, farmers also cultivate some winter crops such as oil seeds, potato, and vegetables in the comparatively high land in winter season.

Before gher farming had started in Khulna district, the farmers in Kuloti village cultivated only local *aus* and local *aman* paddy in the swampland. Oil crops-rape, mustard and til (one kind of oil seed crop) were produced along with local *aus* and *aman* in the comparatively high land. The life cycle of local *aman* was longer than local *aus* even though the sowing time was same for the both types of paddy. The sowing time of *aus* and *aman* paddy was in April/May and harvesting time was August for local *aus* and November for local *aman*. Therefore, before the gher farming had started in Khulna district, the cropping patterns of Bilpabla village were similar to Kuloti village.

5. Situation of the Study Village

5.1 Description of the Study Village

Bilpabla is one of the typical villages in Dumuria Thana in Khulna District and is located about 7 kilometers west of the district headquarter of Khulna, and about 310 kilometers south from the capital Dhaka. Bilpabla village is divided by a small river and the households of this village are mainly living in the both sides of the river (Figure 1). The land of this village area is defined as medium high land, and the soil quality is alluvial, loamy and sandy. The demographic characteristics of the village are similar to any other prawn farming village.

Gher farming is the main occupation in this village. Along with gher farming the people are also engaged in the several activities such as prawn business, integrated culture, van pulling, boating, mud snail crashing for prawn feed, and other formal and informal activities both inside and outside of village. Before the gher farming had started, the villagers were mainly farmers, day labors, and fishermen.

There are no recreational instruments or organized play ground in the study area. Televi-

sion and radio are the main means of recreation. Only 54 (14%) households have Black and White televisions (B&W), and 238 households (about 59%) have radio and tape recorders for recreation (Field Survey, 2003). But this number is increasing almost every year. Although most of the villagers are able to afford color television, they view only B&W televisions by using rechargeable Alternate Current (A/C) batteries. It is due to lack of electric facilities in the village. This, however, requires the villagers to go town only to recharge battery regularly. The peoples enjoy some selected prime-time TV program to save battery. Before gher farming, there was not any television in this village.

The people use kerosene oil lamp or hurricane lantern in the night time and usually finish dinner by 9.00 pm and go to bed early. The students usually study in day time. Some times the intellectual students prepare their homework in night. The villagers do not have good toilet or safe drinking water facilities. Only 77 families (20%) have brick made toilet facilities. The others have semi brick made toilets or no hygienic toilets. There are only 12 tube-wells in this village but the villagers mainly use this water for cooking purposes because the water contains lot of iron. The people bring safe drinking water from nearby villages (Field Survey, 2003).

In this study, family is defined as a group of persons living together and taking meals jointly in one kitchen and under one family head. Permanent hired labors are not included as a member of the family. Bilpabla village has a total of 401 households with a total population of 1893 people with 53 percent male and 47 percent female. Most of the people (about 98%) of this village are Hindu. The people of this village send their children only to primary and high schools because of the limited access to higher education facilities. There is only one government primary school in this village. Some educated farmers usually send only their sons to the high school of nearby villages. The households are not interested to send their daughters to high school due to social problems and also as these high schools are far from this village. The literacy rate of the village is increasing up to the high school level, but after completing high school (i.e. 5 to 10 year schooling) parents stop sending children for higher studies.

5.2 Types of Gher Farmers

Gher farmers can be classified into three types depending on the land holding patterns in Bilpabla village and these are-rented, own, and own and rented. Rented farmers, who rent in gher farm(s) from landlords, manage gher farms on their own or at times hire permanent labor. Some rented farmers' gher farming area is comparatively larger than own gher farmers, and these types of rented farmers usually hire permanent hired labor in annual basis. Before gher farming had started, most of the rented farmers were sharecroppers, or agricultural day labors or fishermen in the study area (Field survey, 2003). The economical conditions of the rented farmers are better than prior to gher farming system in this village. The own farmers cultivate their gher farm on their own. Besides cultivating own land, some farmers also rent in land from landlords.

5.3 Land Holding Patterns

Land is a principal source of income and employment for majority of households in this study area. Many gher farmers rely heavily on rented land in their farming operations. The rental arrangements between landlords and producers can significantly affect risk-bearing and profitability. The land tenure system is completely different between before and after the introduction of the gher farming. Before gher farming had started, the land tenure system was a typical "sharecropping contract",

Table 4. Land holding status of sampled farmers depends on permanent hired labor.

Particulars	Farmers (No.)	Gher area		Paddy field (Bigha)
		Own (Bigha)	Rented in (Bigha)	
No permanent hired labor	29	47.3 (59)	67.0 (56)	67.6 (56)
Permanent hired labor	11	33.0 (41)	53.4 (44)	53.0 (44)
Total	40	80.3 (100)	120.4 (100)	120.6 (100)

Source : Field Survey, 2003.
Note : 1) The figures in parentheses indicate percentage.
2) One Bigha is equivalent to about 0.5 acres in the locality.

where the tenant carries all production costs and the output was equally split into landlord and tenant. Moreover, the landlord influenced the tenant's decision on which crop to produce among many types of *aus* and *aman* paddy.

In the gher farming system, the land tenure system is "rental contracts", where the tenant pays a fixed rent to landlord for per year basis. Consequently, the landlords have no influence on tenants over their crop choice as long as they receive rent. Since the gher farming system is very capital intensive and risk-bearing business as compared to other agricultural crops such as local *aus* and *aman* paddy, the landowners are likely to be more interested in "rental contract" rather than "sharecropping system" to avoid risk. The land holding pattern of sample gher farmers is presented in table 4. Table 4 shows that among the 40 sampled farmers the own farmers have 40% land (80.26 Bigha),and remaining 60% land (120.20 Bigha) is rented in from landlord. In gher farming system, about 60% land of total gher farm is allocated for paddy production (table 4). Among 40 sampled farmers, 40% farmers (16 farmers) rented in their land from landlords, 30% farmers (12 farmers) operate their own land, and rest of the 30% farmers (12 farmers) also

Figure 2. Gher farmers' scale by number of permanent hired labor.

rented in their gher farms from landlord in addition to their own land (Field Survey, 2003).

The gher farming area which had permanent hired labor, and which did not have permanent hired labor in the sampled gher farmer in Bilpabla village is shown in figure 2. The average gher farming area which had permanent hired labor was 7.86 bigha, but the sizes varied from a small farm of 4 bigha to the large one of 15 bigha. On the other hand, the average gher farming area which did not have permanent hired labor was 3.94 bigha, varied between only

0.8 bigha to 10 bigha. This indicates that the gher farming area, which had permanent hired labor, was about 2 times bigger than those which did not have permanent hired labor in the study village (Field Survey, 2003). The reason for employing permanent hired labor is because the gher farming is a very risk-bearing enterprise, which requires good management to ensure good prawn production. If the gher farming area is larger it is impossible to take care of prawn production alone. So, the gher farmers who have comparatively larger gher farm are very likely to hire a permanent hired labor for gher farming operation.

6. Results and Discussions

6.1 Labor Demand for Gher Farming

In earlier periods when paddy fields were being converted to gher, employment opportunities temporarily increased for the landless poor, due to strong demands for labor in trench excavation, levee construction, etc. However, such employment opportunities have disappeared once all the available land had been converted into gher. Rutherford (1994) and Kendrick (1994) made separately similar conclusions about gher farming of Bagerhat district. Now most of the paddy fields of the Bilpabla village have been converted into gher farming. During the gher making period almost all labors came from outside of Bilpabla village because the people of this village were not used to such types of works.

The rice-prawn gher farming has created a lot of employment opportunities in the study area. Some activities are directly related to gher farming such as repairing and maintenance of gher dike, mud snail crashing, harvesting of prawn, and planting, weeding, and harvesting of MV *boro* paddy. In addition, the gher farming has indirectly created many factories such as ice factory, prawn feed factory, depot etc., where a lot of people are working part time or full time of the whole year.

Usually the demand for agricultural labor depends upon cropping pattern. The gher farming system has changed the cropping system in the study area. Prior to rice-prawn gher farming system, only local *aus* and local *aman* paddy were produced once a year in this study area. Local *aus* and *aman* paddy that require much lesser labor on per bigha basis are being replaced by more productive and labor-intensive high yielding MV *boro* rice-prawn crops in Khulna as well as the southern part of Bangladesh.

The gher farmers usually harvest prawn from gher using cast-net or draw-net four to five times from October to end of December in one production cycle. At least six labors are required at a time to harvest prawn. The acreage of gher farming determines the type of net used for prawn harvesting. The type of net eventually determines the number of harvesting labors to be employed. The farmers use draw-net for the larger gher farms and cast-net for comparatively small gher farms. The gher farmers hire four to five temporary hired labors in harvesting time, depending upon the number of permanent hired labor as well as the family supplied labors.

The demand for hired male and female labors per bigha for gher farming activities based on the permanent hired labor are presented in table 5. Among 40 sampled farmers, only 11 gher farmers had permanent hired male labor, whereas 29 farmers had no permanent hired labor for gher farming operation in 2002. The table shows that per bigha hired male and female labor for dike repairing and maintenance, weeding, prawn catching, and mud snail crashing are almost same for the both types of farmers who had permanent hired male labor and who had no permanent hired labor. But the family supplied male and female labors are significantly different between the two groups. The family

Table 5. Number of hired employed per Bigha in different gher activities and paddy production based on permanent hired labor.

Types of activities	No permanent labor (29)		Permanent labor (11)	
	Male	Female	Male	Female
Gher farming				
Dike repair and weeding	13	5	13	6
Prawn harvesting	12	–	13	–
Mud snail crashing	–	10	–	13
Sub total	25	15	26	19
Paddy production	16	4	17	6
Total	41	19	43	25

Source : Field Survey, 2003.
Note : Eight hours / day is equivalent to one man-day.

Table 6. Number of family labor per Bigha in different gher activities, and paddy production based on permanent hired labor.

Types of activities	No permanent labor (29)		Permanent labor (11)	
	Male	Female	Male	Female
Prawn production	64	10	23	4
Paddy production	4	2	2	1
Total	68	12	25	5

Source : Field Survey, 2003.
Note : Eight hours / day is equivalent to one man-day.

supplied male and female labors who had no permanent hired labor were significantly higher than their counterparts who had permanent hired labor (table 6), indicating that the family supplied labors have been substituted by the family labors. Another reason was that the family members of the farmer who had permanent hired labor did not spend any time in feeding to prawn production, and watching gher in the night time or any other times. It may be assumed that the family members enjoyed more leisure time or the family members were engaged in other off-farm activities compared to their counterpart who did not have permanent hired male labor. Therefore, the permanent hired labor has significant role on family supplied labors as well as prawn production. One of the main criteria for good prawn production is the monitoring and proper managements.

In the rice-prawn gher farming system, hired labors are not equally required for the whole year. The temporary hired labors are required for gher repairing and maintenance, mud snail crashing for prawn feed, prawn harvesting, transplanting, weeding, and harvesting of paddy. The month-wise hired labors of rice-prawn gher farming are presented in figure 3. It is appeared from the figures that the farmers do not use any hired labor from April to June because this is the prawn fingerling releasing time and usually this time the farm owner or permanent hired labor takes care of the gher farming. The strong demand for temporary hired labors is felt during the period from January to April because along with dike repairing and maintenance, the temporary hired labors are required for paddy production. During August to mid-December, the temporary hired labors are required for prawn harvesting. The gher farmers usually hire temporary hired labors for paddy production from outside the village and for prawn production from the village.

Table 7. Per Bigha labor demand in *boro* and local *aman* production in Kuloti village.

Types of rice / paddy	Hired labor		Family labor	
	Male	Female	Male	Female
Boro	10	5	13	4
	(59)	(72)	(45)	(50)
Local aman	7	2	16	4
	(41)	(28)	(55)	(50)
Total	17	7	29	8
	(100)	(100)	(100)	(100)

Source : Field Survey, 2003.
Note : 1) The figures in parentheses indicate percentage.
2) One Bigha is equivalent to about 0.5 acres in the locality.
3) Eight hours/day is equivalent to one man-day.

Table 8. Comparison of per Bigha hired and family supplied labor use of gher farming, and *boro* and local *aman* paddy production.

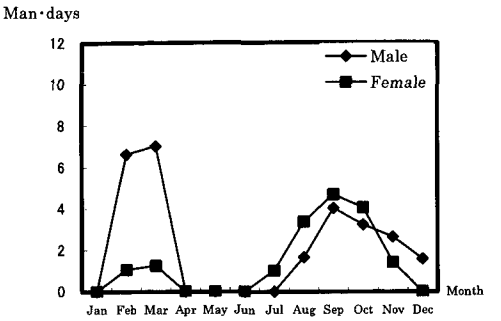
Types of labor	Rice-prawn gher farming		*Boro* and local *aman* paddy
	No permanent hired labor	Permanent hired labor	Farmers
No. of farm household	29	11	10
Hired labor	41	43	17
Male			
Female	19	25	7
Family labor			
Male	68	25	29
Female	12	5	8
Total labor			
Male	109	68	46
Female	31	30	15

Source : Field Survey, 2003.
Note : One Bigha is equivalent to about 0.5 acres in the locality.

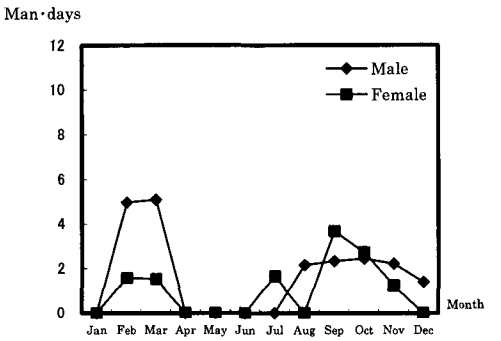
6.2 Labor Demand for *Boro* and Local *Aman* Paddy Production

There are two categories of labors for *boro* and local *aman* paddy cultivation : family supplied labors, and temporary hired labors. Temporary hired labors are employed on a daily basis at the prevailing market wage at the time of employment. Even marginal cultivators sometimes employ temporary laborers because of the highly seasonal demand for labor in rice production. Hossain, et al, (1988) found the same situation in paddy production of the other areas of Bangladesh.

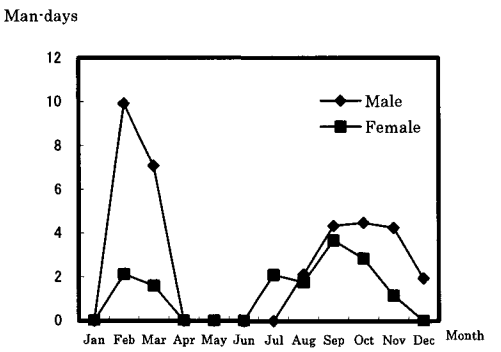
The demand of per bigha hired labors and family supplied labors for *boro* and local *aman* paddy production of Kuloti village is presented in table 7. The table shows that number of hired male and female labors was comparatively higher in per bigha *boro* rice production than local *aman* paddy production. But the number of family supplied male labors for local *aman* production was higher than *boro* paddy production. Among the total labors, the number of family supplied labors was comparatively higher than temporary hired labors, which are almost similar to the labor use of per bigha *boro* and lo-



(a) Rented farmer



(b) Own and rented farmer



(c) Own farmer

Figure 3. Monthwise per bigha hired labor in rice-prawn gher farming.

cal *aman* paddy production in Bangladesh.

6.3 Comparison of Labor Demand

The gher farming system and the paddy production are completely different enterprise. Therefore, per unit labor use is also different in two types of agricultural system. Per bigha labor use in gher farming system, and *boro* and local *aman* paddy per year is shown in table 8. Table 8 reveals that per bigha hired male labors use in gher farming system in Bilpabla village was more than two times higher than *boro* and local *aman* paddy production in Kuloti village. The gher farmers used more family male and female labors compared to *boro* and local *aman* paddy production. The sampled paddy farmers in Kuloti village did not hire any permanent hired labor for paddy cultivation. The gher farmers who had no permanent hired labor used more family labor compared to another type of gher farmers who had permanent hired labor, and *boro* and local *aman* rice production. The gher farmers who had no permanent hired labor used 109 male labors, and who had permanent hired labor used 68 male labors. The gher farmers used female labors about two times higher than rice production. So it may be concluded from the table that the gher farming system has created high labor demand compared to rice production.

6.4 Agricultural Wage Rate

The employment, unemployment and wage rate are primarily determined by the demand for labor and supply of labor. In the study area, the agricultural wage is also determined by the demand for labor and supply of labor. Moreover, the agricultural wage depends upon the different gher farming activities and varies with month. The agricultural wage rate also varies between male and female labor. The agricultural wage rate of male and female labor of gher farming activities and local *aus* and *aman* is presented in table 9.

It is evident from table 9 that the wage rate of male labor was 80 taka per working day for the repairing and maintenance of gher dike, and prawn harvesting activities, whereas the wage rate was 100 taka for male labor of paddy production of gher farming. One of the main

Table 9. Labor wage of different gher farming activities, and *boro* and local *aman* production.

Particulars	Wage rate/day	
	Male (Taka)	Female (Taka)
Gher farming activities		
Repair of gher dike	80	70
Prawn catching	80	NA
Mud snail crashing	NA	40
Gher paddy production	100	60
Paddy production		
Boro	100	60
Local aman	100	60

Source : Field Survey, 2003.
Note : 1) NA-Not Applicable.
2) 1 US $ = 58.50 Taka, October, 2003.

reasons was that the people of the study area are not interested to work in paddy production activities such as seedling planting, weeding and harvesting. In addition, at the same time the local farmers usually engage themselves in gher farming activities such as dike repair, and maintenance activities. The gher farmers usually buy this temporary hired labor from local labor market on weekly basis. These hired labors come from the nearby *thana* and district, where employment is not available or sometimes wage rate is cheaper. This type of temporary hired labors temporarily live at gher farm with the owners or sometimes temporarily hire a room for cooking meals and sleeping in night time. On the other side, the wage rate of female labor differs significantly among the gher farming operations. Because the female labors are engaged in dike repairing and maintenance, mud snail crashing, and weeding of *boro* paddy and the wage rate depends upon these above activities. The wage rate of male and female labors for *boro* and local *aman* rice cultivation is similar to that of *boro* rice production of gher farming system. The main reason is that the Kuloti village is very near to Bilpabla village and the male and female labor easily migrate this gher farming area from their village. In other words, the gher farming system has also significant impact on wage rate of nearby villages or *thanas*.

6.5 A Case Study

Shekh Abdul Hanif is a fully rented gher farmer, living in Bilpabla village. Before gher farming had started, he was a typical sharecropper in this village and he cultivated more than 50 bigha land where he carried all production costs and gave half of the output to the landlord. He produced only local *aus* and local *aman* once a year. Inspite of cultivating 50 bigha paddy land his living conditions were not good. Some times his production cost was higher than output cost.

But when the gher farming was introduced in this village, at first he observed the gher farming system carefully, and gathered information about gher and feed management system. He took two years for observing and training purpose. He leased in 4 bigha land on fixed rent basis and began rice-prawn gher farming from 1992. In 1996 he rented in additional 6 bigha land due to higher profit compared to sharecropping system. Now he is doing gher farming in 10 bigha land. He has hired a permanent hired labor to monitor the gher on yearly basis. He is also thinking of renting in 8 bigha additional land from next year. In addition, he has planned to buy some gher land within few months from his gher farming fixed capital.

Mr. Hanif built brick made house and bought lots of furniture, television and cassette player after the gher farming. Before gher farming he had neither tube-well and nor hygienic toilet. Now he has tube-well for safe drinking water and has a hygienic toilet. When his family members fall sick, he can afford private clinic or private good hospital instead of village doctors or *kobiraj*. His brother goes to college and son to primary school. Now he wants his

Table10. Family composition of rented farmer Shekh Abdul Hanif.

Family members	Age (Years)	Education (Years)	Occupation
1. Shekh Abdul Hanif	45	10	Farmer
2. Wife	32	8	Housewife
3. 1 st Son	8	2	Primary school
4. 2 nd Son	6	0	−
5. Mother	70	6	−
6. Brother	36	12	Service
7. Nephew	15	9	College student

Source : Field Survey, 2003.

brother and his son to get higher education. The family compositions, age, educational level, and occupation of selected rented farmer Shekh Abdul Hanif are presented in table 10. Mr. Hanif works fulltime in gher farm along with permanent hired labor, and his wife also prepare homemade feed for prawn along with household chores. His brother is a service man. His brother and nephew also support the gher farm work in prawn harvesting period as supplementary laborers.

7. Conclusions

The rice-prawn gher farming system is a new invention in agricultural system in the Southwest Bangladesh. Land tenant systems and farm size have been changed after the introduction of gher farming system. The land tenant system has changed from sharecropping to rental, and the farm size has become smaller due to involvement of landowners in gher farming system. Prior to gher farming system, the landlords rented out their lands to tenant on sharecropping basis but now the landlords rent out only the surplus land that they cannot utilize on their own on rental basis. The gher farming system has changed not only the land tenant system but also the cropping pattern and this new cropping pattern has increased labor demand.

Gher farming system has also created job opportunities for not only permanent hired labors that usually come from nearby *thanas* or districts but also temporary hired labor. Per bigha labor use in gher farming was higher than per bigha *boro* and local *aman* paddy production. Gher farming has also created more job opportunities for family male and female labors compared to *boro* and local *aman* rice/paddy. Not only the local labors were benefited due to gher farming but also the people of nearby villages and the landless peoples, who have job opportunities especially in *boro* season from rice cultivation.

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