



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

IMPACTS OF RICE-PRAWN GHER FARMING ON LAND TENURE SYSTEM IN BANGLADESH- A CASE STUDY OF KHULNA DISTRICT

Basanta Kumar Barmon

ABSTRACT

The present study attempts to examine the impacts of rice-prawn gher farming on land tenure system in southwest Bangladesh. Primary data and case studies are used in the present study. The land tenure system has changed after the introduction of rice-prawn gher farming system from traditional sharecropping system to fixed rent. Natural risks, calamities and uncertain yield of prawn are the main factors that enforced the land tenure system from sharecropping to fixed rent. The amount of rent paid is usually determined by several factors including the location of the land, size and quality of gher farm and the relationship between the landlord and the tenant and the amount varies from Tk 20,000 to Tk 25,000 per hectare. The amount of rent and time also depend on the relationship between the landlord and the tenant.

I. INTRODUCTION

Land tenure system is an important feature of agriculture in many developing countries in the world, especially in Asia (Huang, 1975; Zaibet and Dunn, 1998; Sharma, 2000; Adams and Rask, 1968). More than one-sixth of the total cultivated land in Bangladesh is farmed under different tenurial arrangements (Taslim and Ahmed, 1992; Ahsan and Ahmed, 2000). In Bangladesh, farms are usually cropped under three basic contract forms: (i) ownership where the plot is cropped by its owner, (ii) sharecropping tenancy where the tenant rent in land from the landlord and bears the costs of labor and non-labor inputs, and they share the output. Some times the landlord shares the cost of some inputs, and (iii) fixed-rent tenancy is a rental agreement in which the landowner receives a predetermined amount (either in cash or kind) from the tenant irrespective of crop yields or product prices and the tenant collect the entire revenue. Under a fixed-rental contract system, the entire risk burden falls on the tenant. Regardless of crop failure, the landlord gets a fixed amount. In addition to these above three land tenure system, land mortgage system also found in some areas of Bangladesh. Among the above mentioned four land tenancy agreements, fixed rent tenancy is the most prevalent tenancy arrangement in the rice-prawn gher farming in southwest Bangladesh.

Over the past few decades several economic journals have published a large number of articles or research notes on tenant system, tenant models, efficient use of resources under different tenancy models, merits and demerits of contractual agreements of agricultural land

in developing and developed countries. Like other developing and developed countries, the tenancy-efficiency issue has also long been debated in Bangladesh. A large number of studies provided contradictory results of tenant efficiency issues in Bangladesh since independence. Even though the empirical results have varied, most of the researchers found that tenancy system is necessarily less efficient than owner cultivation in Bangladesh (Zaman, 1973; Hossain, 1977; Jabbar, 1977; Talukdar, 1980; and Mandal, 1980).

The landholding patterns and cropping patterns have changed after the introduction of rice-prawn gher farming in southwest Bangladesh in late 1980s. As a result, socioeconomic condition as well as household income level of the gher farmers has changed. There is a small number of literatures that focused on cost and benefit analysis of fresh water rice-prawn gher farming in greater Khulna district (Abedin, J. and Kabir, 1999), as well as the impact of shrimp gher farming on environment and ecology in the coastal region in Bangladesh (Asaduzamman et al, 1998; Nijera Kori 1996; Datta 2001; and Sobhan 1995). However, the impact of rice-prawn gher farming on land tenure has received less attention. Therefore, the present study attempts to find out the reasons why the land tenant agreement has been changed from sharecropping system to fixed rent agreement after the introduction of rice-prawn gher farming in Southwest Bangladesh.

II. METHODOLOGY OF THE STUDY

1. Sampling Technique

Primary data were used in this study. The farm surveys were conducted in 2002, and 2003. 62 farmers were randomly surveyed in 2002 that contained mainly socio-economic conditions, production costs, outputs and yield of prawn. Out of 62 gher farmers, own and pure tenant farmers were equally divided. In this year, tenant-cum-owner farmers were also surveyed. In 2003, 40 farmers were randomly selected and out of 40 farmers, pure tenant, owner-cum-tenant, and owner farmers were 16, 12, and 12, respectively. In addition, a census was also conducted in Bilpabla village in 2003.

2. Location of the Study Village

Bilpabla village is selected purposively as it is one of the typical villages in rice-prawn production at Dumuria Thana in Khulna district. Bilpabla is located about 7 kilometers west of headquarter of Khulna district. The village is divided by a small river and the households are mainly located on both sides of the river (Figure 1). The demographic characteristics of the village are very similar to other villages where rice-prawn farming is practiced.

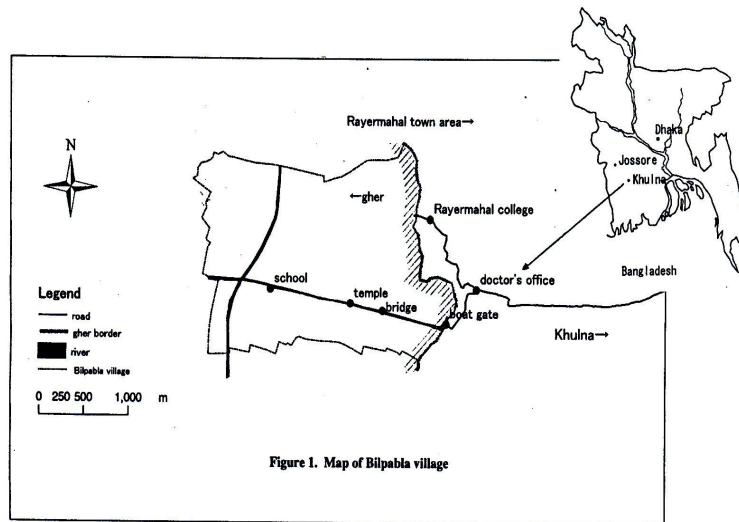


Figure 1. Map of Bilpabla village

3. Profile of the Study Village

The general description of population and households of Bilpabla village are presented in table 1. Bilpabla village had a total of 401 households with a total population of 1893 people with 53% male (1,002) and 47% female (892). The average family size of the households was 4.72, which was similar to Khulna district but lower than that of (5.6) overall Bangladesh (BBS, 2002). The working population was 871 people. In other words, about 46% total populations are engaged in temporary or permanent money earning activities in inside or outside of the village. Out of the working population, 64% (561) were male and rest of the 36% (310) was female. The average age in the households in this village was 44 years (Field survey, 2003).

**Table 1. General Descriptive Statistics
of Bilpabla Village, 2003**

Total households (Nos)	401
Total population (Nos)	1,894
Average family size (Nos)	4.72
Occupation (Head of households):	
Rice-prawn farming	292
Part time rice-prawn farming	40
Daily labor	30
Service	11
Prawn depot	10
Others	18
Average farm size (ha)	
Own land (ha)	0.51
Rented land (ha)	0.68

Source: Field survey, 2003.

Rice-prawn gher farming is the main occupation in the village. Along with gher farming, people are also engaged in several activities such as prawn business, van pulling, boating, mud snail crashing for prawn feed and other formal and informal activities in both inside and outside of village. The people who have a gher farm work as day laborers on a daily basis. Some people engage in gher farming activities in the night and work in the day in the government service or as a day laborer. A small number of people also engage in fishing from canals and paddy farming. Before the gher farming had started, almost all households were farmers, day laborers, and fishermen.

Among 401 households, 129 households had their own land for paddy cultivation, 127 households had some land and rented in some land from landlords on a sharecropping basis, 45 households had no land but they rented in all land on a sharecropping basis, and the remaining 100 households had no land and they engaged in other agricultural and/or non agricultural activities such as day laborers, fishing from swamplands or rivers, carpenters and government services (Field survey, 2003).

4. Landholding Patterns

Prior to gher farming, about 80% of landlords rented out all of their land to tenants on a sharecropping basis, but the introduction of the gher farming system lead landlords to convert their paddy field into gher farming. Landlords now operate gher farming themselves on the plots, which are close to their house. However, in gher farming system, it is difficult to operate several gher at the same time. Therefore, landlords still have to rent out their surplus lands even if the lands are located close to their house. The remaining 20% of landowners and small farmers who used to cultivate their own land have also converted their paddy fields into gher farming (Field survey, 2003).

Financially more stable sharecroppers preferred a fixed period rental contract to operate gher-farming, while the financially relatively weak farmers were unable to operate gher by themselves and worked as hired labors in gher farming. Moreover, some of the non-agricultural day labors, landless and marginal farmers in the area also rented land from the landlord on a rental contract basis.

Table 2. Change in Landholding Patterns and Status of Households in Bilpabla Village

Former status		Present status (2003)			
	Number	Own farmer	Own-cum-tenant farmer	Tenant farmer	Landless and others
Own farmer	129 (100)	22 (17)	94 (73)	11 (9)	2 (1)
Owner-cum-sharecropper	127 (100)	9 (7)	109 (86)	8 (6)	1 (1)
Sharecropper	45 (100)	3 (7)	15 (33)	25 (56)	2 (4)
Landless and others	100 (100)	2 (2)	29 (29)	38 (38)	31 (31)
Total	401	36	247	82	36

Source: Field survey, 2003.

Notes: 1) The figures in parenthesis indicate percentages.

2) Landless and others include labors, fishermen, carpenters and service holders.

The changed land holding patterns of Bilpabla village are summarized in table 2. It is evident from the table that before the gher farming had started, among 401 households, 129 households had their own land for paddy cultivation, 127 households had some land and rented in some land from landlords on a sharecropping basis, 45 households had no land but they rented in all land on a sharecropping basis, and the remaining 100 households had no land and they engaged in other agricultural and/or non agricultural activities such as day laborers, fishing from swamplands or rivers, carpenters and services. The status of households has changed after the introduction of gher farming technology in Bilpabla village. In 2003, among 401 households, 36 households have their own land for gher farming, 247 households have a combination of their own land and rented in land from landlords on fixed tenant basis, 82 households have no land for gher farming but they have rented in gher land on a fixed rent basis, and the remaining 36 households have no gher land and engage in either agriculture or non-farm activities. The figures in table 4 indicate that the number of landowner farmers have been decreased significantly after the introduction of gher farming. This is not the impact of gher farming but a waterlogged condition, which prevented the production of crop. As a result landowner farmers had to sell their land to maintain their livelihood. However, farmers who have a combination of owned and rented land have increased (about two times) significantly compared to prior to gher farming. The main reason is that farmers have rented in gher land

along with their own land, and landless and others households have engaged in gher farming. As a result, a large number of landless and others have significantly decreased (about three times) compared to prior to gher farming. Farmers renting land have also increased about two times compared to sharecroppers. The figures in the table also indicate that sharecroppers and landless households have gained access to their own land after the introduction of gher farming. Therefore, it is concluded from the table that the land holding patterns and status of households in Bilpabla village has been changed after the introduction of the rice-prawn gher farming system.

III. SOCIO-ECONOMIC CHARACTERISTICS

1. Landlords of Gher Farming

Most of the landlords of rice-prawn gher farming are absentees and live in town, another districts, metropolitan as well as outsidess of the village. Moreover, a large portion of the landlords is either service holders or businessmen. Some landlords also live in village whose have an attractive amount of land and a fraction of their land which is located in other farm fields rent to several tenants because rice-prawn gher farming is capital intensive business and needs proper take care and monitoring.

There are only three landlords in Bilpabla village. One landlord holds about 5.2 hectare of farmland. He cultivated only 2.4 hectare of gher farms and remain 2.8 hectares land leased out among 8 tenants on fixed rent basis. The other two landlords rented out only 1.0 hectare and 0.8 hectare of gher land in 2003 (Field survey, 2003).

2. Tenants of Gher Farming

The majority of the tenant gher farmers are landless young men. These young men are educated and more informative about gher farming as compared to typical gher farmers. In addition, a significant portion of the landless farmers have migrated in from other villages after the introduction of rice-prawn farming because of better job opportunities as well as better living standard compared to their original villages. Most of the migrated farmers had relatives of this village. Along with young gher farmers some tenant farmers are aged and have converted their entitle from sharecroppers to rented or fixed tenant farmers after the abolishing of traditional sharecropping system and advent of technologically more advance modern rice-prawn gher farming. After the gher farming system, small portions of day laborers have also changed entitle from day laborers to tenant gher farmers. Although only three landlords live in Bilpabla village, however, the tenant farmers rented in gher farmlands from the landlords of other neighboring villages.

IV. LAND TENURE SYSTEM OF RICE-PRAWN FARMING

The majority of fixed rental contracts of gher farming (more than 90%) are usually written down. Only a fraction of the contracts (less than 10%) are unwritten and dependent on the sanctions of communal relationships rather than on the formal force of law (Field survey,

2003). On the other hand, the landlord and tenant just trust each other and make verbal agreements under the unwritten contract. They do not want any witnesses or written agreement when they enter into fixed rental contracts. Both parties emphasize the power and binding nature of the verbal contracts. Successful oral contracts depend much more on trust, which is more a product of relations of community than of domination. Both parties of the contractual agreement believe that *"the words of a man are more worth than pieces of paper"*.

1. Determinant of Fixed Rent

As mentioned earlier that prior to rice-prawn gher farming system, the landlord rented out excess land to tenant on sharecropping basis. After the introduction of new rice-prawn gher farming system the land tenure system has changed from sharecropping to fixed cash. The main reasons are that the monitoring cost, input costs, and production risks were higher in comparison to modern variety (MV) paddy production. In addition to these, the main outputs (prawn and fish) of gher farming are not observable like paddy farming. Both parties of the tenurial arrangement can not predict the production of prawn like paddy production because the prawn production depends on the mortality rate of fingerlings and the unknown virus diseases. Moreover, the landlords got fixed amount of income from renting out gher lands that was not possible before gher farming. As a result, the landlord preferred fixed rent instead of sharecropping.

According to the sharecropping system in paddy farming system the output was equally divided between the tenant and the landlord where the tenant shouldered the all input costs of production. In other words, the value of land rent was determined by the half of the output. The output was varied from farm to farm, from year to year due to the natural risks. As a result, the land rent was flexible due to uncertain production of paddy. Sometimes the paddy fields were totally damaged due to severe natural calamities. In this situation, the landlord did not get any output and the sharecroppers lost the total production costs.

Suppose the sharecropper produced Y unit of the output using X_i inputs. Therefore, both the landlord and tenant got $Y/2$ unit of output. In general, if the market value of inputs is greater than outputs (i.e. $X_i > Y/2$) then tenant will avoid the sharecropping contract. However, before the gher farming system, even though $X_i > Y/2$ the share tenant did not leave the sharecropping system. The main reason was that the farmer produced only local varieties of paddy (local *aman* and *aus* paddy) and all most all inputs were supplied from farmer's house. The farmer did not use any types of chemical fertilizer, irrigation, and pesticides for production. The farmer used only homemade manure for paddy production. The human labor and bullock labor were also supplied from farmer's house however some farmer also hired bullock labor. The farmer used family supplied labor in leisure period. If the seed/seedling cost was greater than the output cost, then the tenant engaged in paddy production under sharecropping system.

At early stage of rice-prawn farming system, the land rent was fixed based on the 'reservation rent'¹ and 'limit rent'² theories. At the early stage, the landlords claimed the amount of reservation rent that was equal to two times of output (market value of paddy) of sharecropping system because of the high international market price of prawn. On the other hand, the tenant also agreed to landlord's reservation rent. Therefore, the equilibrium rent (fixed cash) is, reservation rent (R_r) = limit rent (R_l) = $2.Y/2=Y$ = total output of sharecropping system.

2. Amount of Fixed Rent

In sharecropping system, the landlord and tenant found that the average market value of half of the output per hectare was about taka 12,500. Therefore, the equilibrium rent has been decided based on reservation rent and limit rent that was 25,000. The gher farming system was introduced since mid 1980's; however, the land rent is not changed even though the monetary unit (taka) has been devaluated several times. The main reason is that at the early stage of gher farming the land fertility was high compared to the present situation. As a result, the yield of prawn was also high. In addition to this, the production cost was also lower than the present situation. Therefore, the per unit land rent is still same as before even though the money has been devaluated several times since mid 1908's.

According to perfect competition market, the land rent should increase due to scarcity of gher farmland. We will now consider the interaction between landlords and tenant farmers in terms of a process of contracting and re-contracting. Let consider the participants enter into contracts, which are not binding. Before entering into the gher farming system the farmers need some practical experiences of prawn management system and it takes some times. The farmers are more risk-averse who are directly wanted to enter the gher farming system without any practical experiences. In other words, the farmers can easily enter the gher farming system but cannot produce the optimal amount of prawn, however, sometimes the experienced farmers also cannot produce optimal amount of prawn due to natural risks and uncertainties.

First we consider the costs of entering into contracts are zero. Moreover, we consider only one landlord and one tenant in land contracting system. Let R_r represent the reservation rent of the landlord and R_l represent the limit rent of the tenant farmer. If R_l is greater than or equal to R_r , then a tenant will enter into the contracts. In symbolically we can write

$$R_l \geq R_r$$

If the limit rent of tenant farmer equals the landlords reservation rent, then the two parties will enter into a tenancy agreement and the equilibrium rent will be $R_l = R_r$.

¹ Reservation rent is defined as the minimum rent the landlord is prepared to accept for leasing his land.

² Limit rent is defined as the maximum rent the tenant farmer is prepared to pay for an operating unit.

Now consider one landlord and two tenant farmers A and B. To see the other farmers, tenant B wants to enter the gher farming system but he has no practical experience of gher management and his limit rent (R_b^l) is greater than that of the experienced tenant farmer A.

Symbolically, $R_b^l > R_a^l > R^r$.

In this case the landlord will claim more rent from tenant A or he will rent out land to tenant B due to higher limit rent compared to tenant A. If a tenant wants to enter into gher farming system he faces some constraints those are directly or indirectly related to gher farming system. As rice-prawn gher farming is a more risk-averse farming compared to any agricultural crops. So, if the tenant farmer B enters into the gher farming without any practical experience he will be more risk-averse compared to existed tenant farmers in gher farming. In addition, most of the tenant farmers are poor and first borrow loan from landlord or bank and then starts his gher farming system. But if the new tenant farmers severely fall into loss then the new tenant sell their small property to reimburse the landlord's rent or bank loan and next year he has to exit gher-farming system. Therefore, the tenant B has no intension to enter into the gher farming with R_b^l limit rent. Moreover, if the tenant B enters into the gher farming system after the practical experience of gher management system and his limit rent is greater than tenant A, then the tenant A has a malicious tendency to give poison the tenant B's gher unit. At that situation, if the tenant A willingly will not exit the gher farming then the tenant B will not enter the gher farming system even though he has some practical experience. But if the tenant A willingly leave the gher farming system, then the tenant B enter into the gher farming and at that time the tenant B has tendency to give equal amount of tenant A that are prevail in the existed market. Therefore, the land rent is not being increased even though the numbers of new tenants are increasing over the time.

Now consider the aspect of landlord who can hire permanent hired labor to take care the gher farming and the landlords are completely engaged in non-farm activities. The permanent hired labors usually come from other non-gher farming villages. At the appointment stage the permanent hired labors have not sufficient knowledge to take care the gher farming. Therefore, at the early stage of employment, if the gher farmers do not take care alone permanent hired labor, then there is an opportunity to fall high loss from gher farming. On the other hand, when the permanent hired labor gathers practical experience then he claims more wage rate or sometimes steals prawn from gher secretly or uses more leisure time for another purposes those are unknown to landlords. In other words, the permanent hired labor disrupts every stage of prawn production. Therefore, the landlords are not interested to start gher farming using permanent hired labor.

3. Risk and Uncertainty

Risk and uncertainty are pervasive characteristics of agricultural production and play a significant role in the production choice, output, and its future market price (Sandol, 1971; Ligon, 2003; Adesina and Ouattara, 2000; Hayami and Otsuka, 1993). Risks and uncertainties are always associated with rice-prawn gher farming. The main product of rice-prawn gher

farming is prawn, and the optimal production of prawn depends on several uncontrollable environmental conditions or factors such as poor weather conditions (seasonal flooding, high temperature and draught), viral diseases and controllable factors such as feeding system, feeding types, and proper managements. But the natural risks such as optimal rain, higher temperature, flood and unknown viral disease are beyond the control of farmers and these factors especially viral diseases and higher temperature and draught (the leasing time of prawn fingerlings) seriously affect mortality late of fingerlings as well as the yield of prawn.

Table 3. Year-wise Profit and Loss of Different types of Rice-prawn Farmers

Year	Types of Rice-prawn farmers					Unit:Taka
	Pure Tenant		Owner-cum-tenant		Owner Farmers	
	FM1(0.71)	FM2 (1.60)	FM1 (1.80)	FM2 (2.60)	FM2 (0.60)	FM4 (1.00)
1994	55,000	NA	NA	225,000	45,000	55,000
1995	-28,000	158,000	150,000	265,000	55,000	66,000
1996	30,000	85,000	152,000	186,000	52,000	122,000
1997	62,000	166,000	-94,000	90,000	48,000	65,000
1998	25,000	-75,000	85,000	175,000	-15,000	88,000
1999	-28,000	72,000	88,000	182,000	36,000	-40,000
2000	82,000	123,000	136,000	173,000	34,000	82,000
2001	69,000	150,000	42,000	-120,000	42,000	55,000
2002	25,000	-82,000	-45,000	-160,000	48,000	-45,000
2003	26,000	67,000	68,000	95,000	-20,000	55,000

Source: Field Survey, 2003.

Notes: 1) The figure in brackets indicates gher farming area (hectare).

2) FM indicates farmer.

3) NA indicates Not Available data.

4) 1US\$ is equivalent to about 69.85 Taka (December, 2005).

In addition, the feeding types and system also affect the prawn production. Usually meat mud snails is the main feed for optimal growth of prawn. Along with mud snail the farmers also use the different types of home made feed. As a result, the yield of prawn widely varies within the gher farming. In general if the natural risks such as viral disease and weather conditions are not severe and the farmers use meat of mud snails for prawn feed and take care properly the farmers get optimal production of prawn. Annual profit and loss of rice-prawn gher farming is presented in table 3. It is appeared from the table that the profit and loss are fluctuated widely from year to year as well as different types of gher farmers. Table 4 shows the average yields of prawn of three types of gher farmers for 2 years, and two measures of the risk involved, the standard deviation and the coefficient of variation. The data strongly suggest that high risks and uncertainties are associated with rice-prawn gher farming; thus, the production is very erratic.

Table 4. Average Prawn Yield (per hectare) of Rice-prwan Farming

Particulars	Year	Farm No.	Average Yield (Kgs)	Min (Kgs)	Max (Kgs)	Standard Deviation	Coefficient of Variation
Pure Tenant	2003	16	618.4	452	734	82.3	13.31
	2002	31	638.0	362	917	115.3	18.07
Owner	2003	12	578.3	339	762	124.8	21.58
	2002	31	714.6	533	977	113.0	15.81
Owner-cum-Tenant	2003	12	653.1	529	847	75.3	11.53
	2002	NA	NA	NA	NA	NA	NA
All	2003	40	616.8	339	847	97.3	15.77
	2002	62	676.3	362	977	119.6	17.68

Source: Field survey, 2002 and 2003.

Note: NA indicates Not Available.

VII. CONCLUSIONS

Rice-prawn gher farming system is an indigenous agricultural system solely developed by farmers during mid 1980s. The rental contract agreement has a tendency from one shape to another shape, for example, sharecropping to fixed tenant system, and this tendency depends upon the degree of economic and natural risks, and uncertainties. Since more natural risks and uncertainties are involved in gher farming compared to paddy production, therefore, the land tenure system has changed from traditional sharecropping system to fixed cash system. In addition, the poor or marginal tenants have lost their temperament to participate in gher farming due to high natural risks and uncertainties, social malpractices and large amount of working capital. These factors hinder the optimal fixed cash rent even though the market competition is existed in gher farming area.

REFERENCES

- Abedin, J., and K. Kabir (1999): *Cost Benefits Analysis of Gher System under Khulna Areas before Project Intervention*. A Survey Report Prepared by Greater Options for Local Development through Aquaculture Project of CARE- Bangladesh.
- Aftabuzzaman, (1998): Sustainable Environment-Friendly Aquaculture. In Centre for Policy Dialogue, Environmental Consequences of Export Oriented Shrimp Culture in Bangladesh, CPD Dialogue Report No. 18, Centre for Policy Dialogue, Dhaka, Bangladesh.
- Asaduzamman, M. and K.A. Toufique (1998): Rice and Fish: "Environmental Dilemmas of Development in Bangladesh" in Growth or Stagnation? A Review of Bangladesh's Development 1996, Center for Policy Dialogue, University presses Ltd. Dhaka (mimeo).
- Adams, D.W. and Rask, N. (1968): Economics of Cost-share Leases in Less-developed Countries. *American Journal of Agricultural Economics*, Vol. 50, No. 4 pp. 935-942.
- Adesina, A.A. and Brorsen, B.W. (1987): A Risk Responsive Acreage Responses Function for Millet in Niger. *Agricultural Economics*, Vol. 1, pp-229-239.
- Adesina, A.A. and Ouattara, A.D. (2000): Risk and Agricultural Systems in Northern Côte d'Ivoire. *Agricultural Systems*, Vol. 66, pp. 17-32.
- Ahsan, N., and Ahmed, N. (2000): Report of the APO seminar on "Impacts of Land Utilization Systems on Agricultural Productivity". Islamic Republic of Iran, 4-9 November, 2000. Published by

- the Asian Productivity Organization, 1-2-10 Hirakawacho, Chiyoda-ku, Tokyo 102-0093, Japan.
- Datta, D.K. (2001): *Ecological Role of Fresh Water Apple Snail Pila globosa and the Consequences of its Over-harvesting from Beel Ecosystem of Bagerhat and Gopalganj district*. A Study Report. Study Carried out Jointly by Khulna University and GOLDA Project of CARE Bangladesh. Funded through Department for International Development.
- Habib, E. (1998): "Legal Aspects of Shrimp Cultivation", Paper Presented at the Workshop on Environmental Impact of Structural Adjustment Policies in Bangladesh Organized by the Center for Policy Dialogue, 17 May 1998, Dhaka.
- Hayami, Y., and Otsuka, K. (1993): *The Economics of Contract Choice: An Agrarian Perspective*. Clarendon Press Oxford.
- Hossain, M. (1977): Farm Size, Tenancy and Land Productivity: An Analysis of Farm Level Data in Bangladesh. *The Bangladesh Journal of Development Studies*, Vol.5, No. 3, pp-285-384.
- Huang, Y. (1973): Risk, Entrepreneurship and Tenancy. *Journal of Political Economy*. Vol. 81, No. 5. pp. 1241-1244.
- Huang, Y. (1975): Tenancy Patterns, Productivity, and Rentals in Malaysia. *Economic Development and Cultural Change*, Vol. 23, No. 4, pp. 703-718.
- Jabbar, M.A. (1977): Farm Structure and Resource Productivity in Selected Areas of Bangladesh. Agricultural Economics and Rural Social Science Paper No. 3. Dhaka: *Bangladesh Agricultural Research Council (BARC)*.
- Ligon, E. (2003): Optimal Risk in Agricultural Contracts. *Agricultural Systems*, Vol. 75, pp. 265-276.
- Nijera Kori (1996): The Impact of Shrimp Cultivation on Soils and Environment in Paikgacha Region, Khulna (Limited to polders 20, 21, 22, 23, and 24).
- Mandal, M.A.S. (1980): Farm Size, Tenure and Productivity in an Area of Bangladesh. *The Bangladesh Journal of Agricultural Economics*, Vol. 3, No. 2, pp-21-42.
- Otsuka, K. and Hayami, Y. (1988): Theories of Share Tenancy: A Critical Survey. *Economic Development and Cultural Change*, Vol. 37, No. 1, pp. 31-68.
- Sandol, A. (1971): On the Theory of the Competitive Firm under Price Uncertainty. *American Economic Review*, Vol. 61, No. 1, pp. 65-73.
- Sharma, H.R. (2000): Tenancy Relations in Rural India: A Temporal and Cross-sectional Analysis. *Indian Journal of Agricultural Economics*, Vol. 55, No. 3, July-September, pp. 295-307.
- Shaban, R.A. (1987): Testing between Competing Models of Sharecropping. *Journal of Political Economy*, Vol. 95 No. 5 pp-893-920.
- Talukdar, R.K. (1980): Land Tenure and Efficiency in Boro rice production in an area of Mymensingh district. *The Bangladesh Journal of Agricultural Economics*, Vol. 3, No. 2, pp-43-55.
- Taslim, M.A., and Ahmed, F.U. (1992): An Analysis of Land Leasing in Bangladesh Agriculture. *Economic Development and Culture Change*. Vol. 40, No. 3, pp 615-628.
- Zaibet, L.T., and Dunn, E.G. (1998): Land Tenure, Farm Size, and Rural Market Participation in Developing Countries: The Case of the Tunisian Olive Sector. *Economic Development and Cultural Change*, Vol. 46, No. 4, pp. 831-848.
- Zaman, M.R. (1973): Sharecropping and Economic Efficiency in Bangladesh. *The Bangladesh Economic Review*, No. 1, Vol. 2.