BJAE, III (1), June 1980 27-50

COOPERATIVE FARMING AS AN ALTERNATIVE TO SHARE RENTING IN BANGLADESH: TEST OF SOME HYPOTHESES[*]

Jasim U. Ahmed[**]

ABSTRACT

This paper seeks to examine the possibility of cooperative farming as an alternative to share renting with the help of data on three experimental cooperative farms in Bangladesh. It has been observed that cooperative farms may provide an alternative to share renting only if due shares of returns for all land and non-land resources supplied by members are ensured. Due to absence of such provisions, practice of renting was prevalent in the cooperative farms under study. There is evidence that under the existing methods of organization of the cooperative farms, the members of small and medium farm size, unlike similar size groups of non-members, tended to increase their operated area significantly by renting in more land than they rented out. This is possibly the reflection of the less exploitative terms of share renting in the cooperative farming areas compared to other areas. In the long-term content, however, the objective of equity in income distribution will be blurred by the parallel existence of share renting within the co-operative farms since it will provide a source of income transfer from tenant members to land-owner members.

I. INTRODUCTION

According to economists dealing with the problem of cooperative farming in Bangladesh, the main objective behind cooperative farming is to help increase productivity and to ensure equity in income distribution (Husain 1979). It is further argued that the heterogeneity in resource endowment of farmers may constitute a positive factor in farmers' decision making with respect to participation in cooperative farming (Ahmed 1978).

---

*This paper is a revised version of some sections of a report to be published in July 1980 (See Ahmed et al. 1980).

**Jasim U. Ahmed is Assistant Professor in the Department of Cooperation and Marketing, Bangladesh Agricultural University, Mymensingh. Views expressed in this paper are exclusively his own, and do not represent the official standpoint of the Department he works in. The author acknowledges the useful comments of Prof. A.M.M. Husain and Dr. M.A. Jabbar of the Faculty of Agricultural Economics and Rural Sociology at the BAU on earlier version of the paper.

According to this argument, the impact of cooperative farming should be to optimize the resource mix of farmers with heterogeneous resource endowment by pooling thier means of production, and thus reduce the extent of renting. Thus under ideal arrangements of pooling resources for joint production by ensuring proportionate share of net returns for all factors of production contributed by members, labour-surplus farmers with land constraint and land-surplus farmers with labour constraint may be able to optimize their resource combination within a joint production unit.

Under conditions of imperfect distribution of returns, whereby all factors of production contributed by members are not equally treated in fixing shares of net returns, the impact of cooperative farming may be just the opposite. Under such conditions, cooperative farming is likely to strengthen the resource positions of land owning members and enable them to increase their cultivated area by renting in and mortgaging in more land, or by renting out or mortgaging out less land. While this impact is not likely to be uniformly distributed amongst various categories of members, this may ultimately come into conflict with the goals of equitative income distribution by increasing competition for rented land and eventually converting many tenants into wage earners.

The main objective of this paper is to test the following hypotheses :

1) The nature of resource endowment of farmers influences their willingness to participate in cooperative farming.

2) Cooperative farming can replace share-renting, if the methods of income distribution ensure equitable returns to all factors contributed by members.

3) Under imperfect conditions of distribution of returns, cooperative farming helps increase the operational area of member farmers by enabling them to rent in or mortgage in more land than they rent out or mortgage out vis-a-vis non-members.

For testing these hypotheses, the paper makes use of some data obtained from a field survey conducted during April-July, 1979 on three action research projects on cooperative farming in Mymensigngh, Bangladesh. In none of these three projects, the methods of distribution of output ensure proportionate returns to all factors of production contributed by members.

The paper is organized as follows. In Part II, it provides the background of the projects under study. Part III deals with the impact of resource endowment of farmers on their willingness to participate in cooperative farming. In Part IV, the paper tries to analyze the probable changes in the renting behaviour of cooperative farmers. Some conclusions on the basis of the findings have been presented in Part V.

II THE COOPERATIVE FARMING PROJECTS IN MYMENSINGH

With regard to practice of group farming in the geographical area now comprising Bangladesh, two major historical highlights may be delineated. The first, a non-political one, dates back to 1963-64 when the Cooperative Directorate of East Pakistan started organizing cooperative farms apparently without any nation-wide socio-political goals (Pakistan 1970, p. 11). In 1978, there were about 316 of these cooperative farming societies with a total number of 10,847 members. In terms of economic functions, however, they now represent only single-purpose credit cooperatives. The second historical highlight is the sudden wave of experimentation with cooperative farming by different organizations in Bangladesh following her independence in 1971. This may be viewed as a reflection of the commitments of the country's new leadership at that time to what was termed as "socialistic pattern of economy" (GOB 1973, pp. 1-8).

Following the Cooperative Farming Seminar at the Bangladesh Academy for Rural Development (BARD), Comilla, in 1972, many organizations launched experimental projects on cooperative farming. **Shimla** under the sponsorship of Bangladesh Agricultural University, Mymensingh, is one of them. Most of the cooperative farming programmes launched in 1972 had to be closed down in one or two years after their inception mostly because of financial loss (Ahmed 1978). The project at Shimla, however, is still functioning and has been replicated in ten other areas.

For the present paper, only three societies of the expanded project on cooperative farming action research in Mymensingh were selected. Variety in the type of pooling was the principal ciriterion for the choice of the societies. The societies selected were : (1) Shimla, the pioneer society which was organized in 1972, (2) Katalshar cooperative farming society which was organized in 1976, and (3) Gopalpur cooperative farming society which was founded in 1977. Shimla has the lowest level of pooling of resources ; only irrigation was done jointly at the Shimla farm during 1979 boro season. Katalshar had an intermediate level of pooling of resources for the 1979 boro whereby irrigation and all other post-transplantation operations except the harvest were done collectively. Gopalpur reveals the highest degree of pooling whereby all post-tillage operations including harvesting and threshing were under joint management. The type of pooling arrangement may vary from year to year in accordance with the decision of the general body of members.

The basic principle of organization and management of the three experimental cooperative farms of Shimla, Katalshar and Gopalpur was that of joint use of inputs for

mechanization programme or input supply facilities for providing sufficient incentive to farmers for growing other major crops also under joint management.

Credit appears to be one very important motivating factor in organizing farmers for joint boro production. The percentage of costs of purchased inputs covered by credit in the first production season of the projects was 93% in Shimla, 76% in Katalshar and 91% in Gopalpur. The proportion of cash costs met from credit supplied through the cooperative declined in the years after foundation, and the decline was found to be associated with a fall in the proportion of members' land brought under cooperative farm with the exception of Shimla (Table 1). The usual sources of loan are the commercial banks. They provide the cooperative farming societies with medium-term loans for building threshing, drying and storage facilities, and short-term loans for meeting operational costs of members in the joint boro production. Measured by the loan repayment ratio, however, the performance of the three cooperative farming societies seems to have deteriorated since their starting years. In the starting years, the proportion of a year's due loan repaid at year end was as high as 82% in Shimla, 73% in Katalshar and 86% in Gopalpur. The figures dropped to only 45%, 60% and 70% respectively by 1979.

Some weaknesses in the financial position of the three cooperative farms are also evidenced by poor deposits from members, and very low accumulation of reserve funds. Despite provisions for building reserve funds out of the gross product of members' boro crop, the amount of net deposits in the reserve fund has been so far almost nil. This tends to reflect the inadequate emphasis given by the managing bodies of the cooperative farms to shifting from subsistence type financial management to a progressive system of building funds for future and reducing reliance on external finance. Also lack of adequate knowledge of organization and management of cooperative may have made it difficult for the general members as well as the managing bodies to strictly follow the principles of handling financial affairs as set by the by-law book.

The level of mechanization employed in the production of boro crop by the three cooperative farms is very low. Although irrigation is done entirely by deep tubewels, other kinds of mechanized practices for intercultural and post-harvest operations are limited to occasional use of hand-operated weeders, sprayers for biocides, and pedal threshers. The low application of mechanized and semi-mechanized devices for the agricultural operations in the cooperative boro production may be due to relatively low labour/capital price ratio, and the supply constraints on some means of mechanization like power-tiller and energy.

III IMPLICATIONS OF NON-LAND RESOURCES FOR DECISIONS OF FARMERS ON COOPERATIVE FARMING

The main purpose of this section is to examine the probable relation of the resource endowment of farmers to their willingness to participate in cooperative farming. Data on the four main non-land resources available for the whole crop year 1978-79 in the 189 member farms and 111 non-member farms selected from the three cooperative farming project areas were collected for this purpose. These four non-land resources are : fixed labour, draught animals, farm implements and manure.

The basic assumption used in this analysis is that a cooperative farm helps optimize the resource mix of members with various levels of availability of resources per acre of owned land. It has been hypothesized that a farmer's willingness to join in a pool of resources may depend on the degree of deviation of the amount of resources available to him from the optimum level or from the average level in the sample.

Rcsouree Endowment and Goal Patterns of Individual Memers : The Theoretical Premise

Options of members in respect to socio-economic ends of their cooperative farm represent a complex issue, and these options are tied up with their private production possibilities and individual preference patterns. Conflicts in choice between different production possibilities and in preference patterns sharpen since members represent heterogeous groups in respect to farm size, tenure relations and nature of resource endownent. It is obviously more complex for members who are to divide their production possibility choice between the plots/crops under private management and those under cooperative management. This is precisely the situation facing the three experimental projects for cooperative farming under study. It has been observed that subsidy and service support have apparently strengthened the option of farmers in favour of cooperative boro farming in the three projects at Shimla, Katalshar and Gopalpur.

Now, the question to be investigated is—given the amount of own land, fixed labour and fixed capital (work animal, implement and manure), what may be the choice of a farmer with regard to pooling land, labour and fixed capital under cooperative arrangement in an effort to optimize the resource combination for a profitable farming ? Assuming no supply constraint on variable inputs, a farmer with fixed amount of land and relatively inadequate supply of family labour and fixed capital may like to hire these inputs to make them match with his land input. But assuming supply constraints on variable

inputs coupled with inadqeuate supply of fixed labour and fixed capital, he may like to either rent out some land or choose, as in some of the cooperative farming project areas, to participate in a pool of land, labour, other variable inputs and capital for coolective production.

Farmers with the opposite nature of resource combination, i.e. land constraints with surplus of fixed labour and fixed capital, will have another kind of alternatives. Given the adequate supply of variable inputs they can rent in land. Again, with limited supply of variable inputs they may better like to either sell/hire out their surplus labour and fixed capital or share them with those having deficiency in labour and fixed capital within the framework of collective production.

The assumption of no supply constraint on variable inputs like seed, fertilizer, water and casual labour is definitely not safe. In real situation, constraints on variable inputs hold an important place in influencing the choice of the above alternatives, and the cheapest one available to the farmers in many of the cooperative farming project areas seems to be joining in the cooperative farm which suppliesor pays for a large part of the variable inputs. Farmers with just the optimum amount of fixed labour and work animal power for planting their own land may have even a harder choice among the available alternatives. Yet, certain degree of constraints on capital and cash inputs may make their options for a source of subsidized input supply like cooperative farm outweigh the options in favour of hiring and purchasing the variable inputs which are becoming increasingly expensive day by day.

Inventory of Non-land Resources of the Respondents

In order to ascertain the relationship between resource endowment positions of farmers and their willingness to join in cooperative farming, an inventory of nonland resources of the respondents (189 members of cooperative farms and 111 non-members) was taken. The amounts/values of these resources have been computed into figures per farm, per acre of own land and per acre of cultivated area (Table 2).

Fixed labour available for farm work has been derived by adding the man-units of family labour to that supplied by permanently hired labour (employed for a term not less than half-year). Using the scale employed in conventional farm management studies, all male members aged 12 years and more, except the invalid, were considered capable of farm work. Standard man-units were derived by taking two members of 12 to 16 years age group for one man-unit. Draught animal data were not adjusted to standard unit of

TABLE 2 MAN-UNITS, WORK ANIMALS, FARM IMPLEMENTS AND MANURE AVAILABLE IN THE MEMBER AND NON-MEMBER FARMS BY FARM SIZE

Size Class (acres)	Man-unit			Draught animal			Value of farm implements (Tk.)			Quantity of manure (mds.)		
	Per farm	Per owned acre	Per culti-vated acre	Per farm	Per owned acre	Per culti-vated acre	Per farm	Per owned acre	Per culti-vated acre	Per farm	Per owned acre	Per culti-vated acre
Members												
Upto 2.49	1.77	1.42	1.31	1.43	1.14	1.06	78	62	58	124	99	92
2.50-4.99	2.28	0.57	0.55	2.72	0.68	0.66	141	35	34	256	64	62
5.00 and above	2.71	0.39	0.41	2.95	0.43	0.45	157	23	24	410	59	62
All farms	2.12	0.64	0.64	2.13	0.65	0.65	113	34	34	226	69	69
Non-Members												
Upto 2.49	1.90	1.54	1.42	2.10	1.71	1.57	85	69	63	165	134	123
2.50-4.99	2.34	0.62	0.64	2.63	0.69	0.72	131	35	36	282	74	77
5.00 and above	2.57	0.31	0.35	3.18	0.38	0.41	162	20	21	552	67	70
All farms	2.21	0.57	0.58	2.54	0.65	0.67	119	31	32	305	78	81

Source : Field survey.

animal power due to scanty and/or unmeasureable information on their performance. Farm inplements data were collected in terms of their current value in Taka while data on manure available at farm for the whole crop year were in terms of maunds.

Both in the member and non-member samples, the availability of fixed labour, draught animals, farm implements and farm yeard manure per acre of own land and cultivated area declined with increase in farm size. But the per farm availability tended to rise with increase in farm size (Table 2). Number of man-units per acre of own land and cultivated area was higher for the member farmers compared to non-members, while the quantity of manure per acre of own and cultivated area was higher in case of non-members. Regarding availability of draught animals and implements per acre of own land and cultivated area, very negligible difference could be seen between the samples.

Relationship Between Resource Level and Opinion on Collectivization

In Table 3, it has been attempted to show roughly the pattern of probable relationship between the level of resource endowment of a farmer with his choice of pooling. The sample farmers - both members of the cooperatire farms and non-members - have been classified according to the level of the total value of the four main non-land resources, i.e. fixed labour, work animal, farm implements and manure, they have under their disposal for the year.

In order to determine the value of these four factors, the going market price was considered. This method was not, however, without demerits. Price of some factors, like labour, varied from place to place, and from time to time as well. But for the purpose of Table 3, the approximate average rate was considered which was around Taka 12.00 per man-day without meal. Total man-days available for farm work was derived by multiplying the fixed man-units by 365 days. The figure was then multiplied by Taka 12.00 to arrive at the value of labour available for farm work. No man-days were deducted from total man-days per year because their supply is fixed and has to be paid for or their maintenance costs have to be met even if they are not used.

Draught animals were valued at Taka 2000.00 per animal head. The figure was fixed after consultations with agricultural credit inspectors from different banks and Small Farmer Development Projects (SFDP) who are involved in administration of loans to farmers for purchase of draught animals. The usual bullock loan varies from Taka 2,000.00 to Taka 3,000.00, assuming the cost of feed included in the loan assessment. Therefore, the lowest figure of the range for bullock loan was considered as approximate

TABLE 3 VALUE OF FIXED RESOURCES PER OWNED ACRE OF MEMBERS AND NON-MEMBERS, AND THEIR OPINIONS ON COLLECTIVIZATION OF ALL FARM OPERATIONS FOR BORO PRODUCTION

Level of resource	No. of farms	Percent in total	Opinion on pooling I[a]				Opinion on pooling II[b]			
			In favour		Against		In favour		Against	
			No.	Percent	No.	Percent	No.	Percent	No.	Percent
Members										
Low	58	31	51	88	7	12	28	48	30	52
Medium	72	38	55	76	17	24	25	35	46	65
High	59	31	53	90	6	10	34	58	25	42
Total	189	100	159	84	30	16	87	46	102	54
Non-members										
Low	41	37	37	90	4	10	24	59	17	41
Medium	33	30	19	58	14	42	8	24	25	76
High	37	33	35	95	2	5	29	78	8	22
Total	111	100	91	82	20	18	61	55	50	45

a. Assuming harvest under individual management.
b. Assuming harvest under collective disposal.
c. Below Taka 4,000.00 per owned acre.
d. Taka 4,000.00 to Taka 9,000.00 per owned acre.
e. Above Taka 9,000.00 per owned acre.

Source : Field survey.

market value of a draguht animal. In taking the lowest estimate, it was also taken into account that agricultural credit meant for dragught animals is usually given for purchase of bullock, while many of the farmers under study use underaged animals as well as animals of poor performance too.

The value of farm yeard manure was fixed rather arbitrarily since there was neither any standard unit of weight nor any going market rate. Farmers, however, reported the price range to be between Taka 2.00 and Taka 5.00 per maud. For the purpose of Table 3, the lowest estimate was considered since the input is a family supplied resource, and its liquidity is very low. The value of farm implements was obtained from the farmers according to their estimate.

Average computed value of non-land factors of production according to the above procedure was Taka 4,275.00 per owned acre for members and Taka 3,984.00 per owned acre for non-members. The members and non-members were then distributed according to the level of availability of these resources in terms of value per acre of owned land. Three different levels were set for this purpose :

low - below Taka 4,000.00

medium - Taka 4,000.00 to Taka 9,000.00

high - above Taka 9,000.00

By this standard, 31% of the member farms revealed low availability of non-land resources, 38% showed medium level of availability and 31% a high level of availability. The corresponding percentage values for the non-member sample were 37%, 30% and 33%.

The opinion of member farmers and non-member farmers on two different pooling types were classified by their resource level in order to determine the relationship between resource endowment per acre of owned land and opinions on different types of pooling. Two types of opinion questions on the collectivization of all farm operations for boro were placed before the respondents—one assuming the harvest under individual management (type I) and the other assuming harvest under collective disposal (type II). The opinions on the collectivization of type I reveal that 88% of the members with low resource level per acre of owned land were in favour of this pooling arrangement ; the corresponding figures for the members with medium and high resource level were 76% and 90% respectively. The corresponding percentage values for the non-member farmers of these three resource classes were 90%, 58% and 95% respectively (Table 3).

It is further evident that in both the samples, the average acceptance levels of the pooling type I were not significantly different. In both the samples, the acceptance level was lowest among the farmers with medium level of resource endowment. This may be probably explained by the fact that farmers with medium level of resource endowment per acre of owned land have generally the least deviation from the optimum combination of factors of production and, therefore, do not like to destablize their resource combination by participating in the collectivization of a high degree. Chi-square tests, however, indicate that the differences of the opinions on pooling type I among farmers of different resource levels are not significant at 5% level for the members and significant at 1% level for the non-members.

Regarding opinions of the respondents on pooling type II, assuming harvest under collective disposal, the most apparent impression on the basis of Table 3 is that the acceptance level dropped much compared to the type I. This holds true both for the members and non-members interviewed, the fall of the acceptance level being from 84% to 46% in the member sample and from 82% to 55% in the non-member sample. The general pattern of the distribution of the opinions on the pooling type II remains, in both the samples, similar to that on the pooling type I with farmers of medium level of resource endowment showing the lowest degree of acceptance. This confirms the previous proposition that farmers with medium level of resource endowment per acre of owned land are least interested in a high degree of pooling, involving all farm operations, probably because they have the least deviation from the optimum resource availability which they do not like to share out under a joint management. Chi-square tests indicate that the differences of opinions on pooling type II among the three resource classes were found to be significant at 5% level for members and at 1% level for non-members.

It may be concluded from the above tests that a cooperative farm can foster complementarity among farmers with heterogeneous nature of resource endowment and provide a basis for collective resource use reducing the extent of renting in. Such a collective resource use would, however, necessitate a proper sharing of the returns in proportion with all factors of production supplied by members. This would mean a very high level of collectivization of the production process. Paradoxically, however, the acceptance level of cooperative farm has been found to fall as the level of pooling is raised.

Unfortunately, data are not available at the moment to explain the causes of this paradox. One probable explanation could be that, although both the land-surplus and labour-surplus farmers are aware of the advantages of co-operative farming, they do not like to share out the marginal returns of their surplus inputs through cooperative production. This lack of willingness may be due to the fear that the resources they would sup-

ply to the cooperative farm would not be properly valued. Some misconception about the methods of distribution of the cooperative's returns may also give rise to the suspicion that the share of returns due to a particular input as fixed by the co-operative farm will be lower than its opportunity cost. Thus, many of the farmers will be disinclined to actually join the collective production group even if they realize its importance. This contradiction may be removed by more demonstration, extension and member training.

IV. IMPLICATIONS FOR TENURE RELATIONS

This section seeks to provide an analysis of the probable effects of the cooperative farming projects on tenure relations of farmers involved in a collectivization programme. The reader should be, however, cautioned of two theoretical premises from which the forthcoming analysis starts off. First, unlike full fledged cooperative farms, the projects under study are organized by farmers who are for most of the crop year individual entrepreneurs and for a certain crop season "cooperative farmers", and they are free to transfer profits from the "cooperative sector" of their individual economies to the "private sector". Second, the cooperative boro crop accounts for only one-fifth of the net cropped area of member, but the profit/loss it produces may have influence on the resource allocation pattern of a member farmer for the crops outside the "cooperative sector" too.

It has been hypothesized that due to increased supply of modern inputs like credit, HYV seeds, fertilizer and irrigation water through cooperative farms, the members would be inclined to maximize or increase their net cultivated area by renting in more land and by renting out less land compared to non-member farmers. It has been also hypothesized that increased incomes from the cooperative farms, and borrowed capital from institutional sources by the authorization of the cooperative farms, should raise the capacity of the members to mortgage in more land, or at least prevent mortgaging out by them. To test these hypotheses, land tenure and mortgage data from the two samples of 189 members of the three cooperative farms and 111 non-members were used. The data belonged to the crop year 1978-79.

The effect of cooperative boro production on the tenure relations has been examined at two levels. Firstly, it has been attempted to examine the aggregate effect by looking at the deviation of the total cultivated area of the member farmers from their own area and comparing the extent of this deviation from that in the non-member farms. Secondly, the effect has been examined by looking at the tenure characteristics of the selected boro plots of the sample members vis-a-vis non-members. In order to isolate the effect of farm size and tenure status of the farms a bivariate cross-tabulation was done by distributing the tenure data of the sample farms by farm size as well as tenure group.

Three farm size groups and four tenure groups were fixed for this purpose. The farm size groups are : small (less than 2.50 acres), medium (2.50-4.99 acres) and large (5.00 acres and above). The tenure groups are : part-operators, who operated part of their own land and rented out the rest ; owner-operators, who operated all their own land ; part-tenants, who operated rented in land in addition to their own land ; and tenants, who cultivated exclusively rented in land.

The Aggregate Effect

As evident from Table 4, the average area owned by the sample of members was 3.29 acres as against 3.90 acres for the non-member sample. The average area operated was 3.30 acres in the member farms and 3.78 in the non-member farms. Thus, the member farmers operated, on the average, 0.01 acres more area than they owned, while the non-members operated 0.12 acres less than they owned. This may be due to the fact that the extent of renting and mortgaging out was lower in the member sample than in the non-member sample, and the extent of mortgaging in was higher for the former (Table 5). The extent of renting in was, however, higher among the non-member farmers. But the balance between area rented in and the area rented out was 0.03 acres per farm for members and -0.03 acres for non-members (Table 4).

A break-up of the members and non-members by farm size indicates that the extent of mortgaging out, renting in and mortgaging in tended to be lower for the relatively larger farmers. The degree of renting out among members was highest in case of large farm size group and lowest in case of medium size group. In the non-member sample, however, the degree of renting out seems to have increased directly with the increase in the size of ownership (Table 5).

In terms of percentage figures the extent of renting out and mortgaging out was found to be higher for the non-members. The extent of renting in was higher for the non-members but the extent of mortgaging in was higher for the members (Table 5). These seperate figures for the extent of renting in, mortgaging in, renting out and mortgaging out, however, do not reveal any aggregate effect on the size of the cultivated area and change in the tenure relations.

In order to determine the possible impact of co-operative farming on tenure relations, the net effect has been assumed to be reflected into the deviations of the cultivated area from the own area of the farmers. The levels of significance of the deviations of the cultivated area of the member farmers as well as non-member farmers in the control sam-

TABLE 4 ACRES OWNED AND CULTIVATED BY SAMPLE MEMBERS AND NON-MEMBERS BY FARM SIZE

Size class (acress)	Percent of farmers	Acres per farm						t (x_1, x_6)
		Own (x_1)	Rented in (x_2)	Mort-gaged in (x_3)	Rented out (x_4)	Mort-gaged out (x_5)	Culti-vated (x_6)	
Members								
Upto 2.49	50	1.25	.26	0,05	.11	.10	1,35	3.124**
2.50 - 4.99	27	3.98	.45	.08	.24	.14	4.13	2.651**
5.00 and above	23	6.92	.21	.08	.63	.01	6.57	1.051
All farms	100	3.29	.30	.07	.27	.09	3.30	0.019
Non-members								
Upto 2.49	45	1.23	.22	.06	0.9	.08	1.34	2.629*
2.50-4.99	27	3.80	.40	.03	.34	.24	3.65	0.969
5.00 and above	28	8.30	.70	.06	1.04	.18	7.84	1.766
All farms	100	3.90	.40	.05	.43	.14	3.78	0.304

$x_6 = x_1+x_2+x_3-x_4-x_5$

** t Significant at 0.01 level.

* t Significant at 0.05 level.

Source : Field survey.

TABLE 5 EXTENT OF RENTING IN AND MORTGAGING IN Vs RENTING OUT AND MORTGAGING OUT BY SAMPLE MEMBERS AND NON-MEMBERS BY FARM SIZE

Size class (acres)	Percent of own area		Percent of cultivated area	
	Rented out	Mortgaged out	Rented in	Mortgaged in
	Members			
Upto 2.49	8.8	8.0	19.3	3.7
2.50 - 4.99	6.0	3.5	10.9	1.9
5.00 and above	9.1	0.1	3.2	1.2
All farms	8.2	2.7	9.1	2.1
	Non-members			
Upto 2.49	7.3	6.5	16.4	4.5
2.50 - 4.99	9.0	6.3	11.0	0.8
5.00 and above	12.5	2.2	8.9	0.8
All farms	11.0	3.6	10.6	1.3

Source : Field survey.

ple were calculated by means of t test. The 't' values were found to be not significant at 0.05 level for both the samples : members of cooperative farms and non-members (Table 4). This indicates that the co-operative farmers as a whole do not seem to reveal a different pattern of deviation of cultivated area from their own area when compared to the sample of non-members.

A break-up by farm size, however, indicates that in the member sample the deviation of the cultivated area from own area was significant at 0.01 level for small and medium farmers and not significant at 0.05 level for large farmers. In the non-member sample, however, the deviation was not significant at 0.01 level for all the size groups, but

significant only at 0.05 level for the small size group. Another distinguishing feature between these two samples seems to be that among the cooperative farmers both the small and medium size farms cultivated significantly higher land area than they owned (significant at 0.01 level) while in the non-member sample the small farmers cultivated only little more than they owned (significant at 0.05 level only) and the medium farmers cultivated less area than they owned (not significant at 0.05 level).

This seems to reveal that the cooperative farmers in the medium size group, and to some extent also those in the small size group, might have increased their cultivated area significantly by renting and mortgaging in more land in comparison with the parallel size groups in the non-member sample. Therefore, although the sample of members as a whole does not provide evidence of significantly different size of cultivated area from the own area, the medium and small size groups tend to show a different picture in this regard.

A similar analysis of the deviations of the cultivated area from the own area has been done by breaking down the samples by tenure class. The classification of members and non-members by tenure arrangements indicates that the proportion of part-operators and tenants is higher among non-members than among members while that of owner-operators and part-tenants is higher among the latter (Table 6).

Another feature in the comparison of the two samples by tenure characteristics is that the percentage of cultivated area mortgaged in by the part-operators, owner-operators and part-tenants was higher in the member sample compared to the corresponding tenure classes in the non-member sample. On the other hand, the extent of mortgaging out by the part-operators and part-tenants was lower among members vis-a-vis the comparable tenure classes among the non-members (Table 7).

Tests of the deviation of the size of cultivated area from that of own area by tenure category indicates an almost similar pattern of deviation in the member and nonmember sample. Part-operators in both the samples operated significantly less area (significant at 0.05 level) than they possessed. Both owner-operator members and non-members cultivated about the same amount of land as they owned—the deviation being not significant at least at 0.05 level. But the amount of deviation of the cultivated area above the own area was significant at 0.01 level for the part-tenants in the member sample and at 0.05 level for the similar tenure class in the non-member sample.

TABLE 6 ACRES OWNED AND CULTIVATED BY SAMPLE MEMBERS AND NON-MEMBERS BY TENURE CLASS

Tenure class *	Percent of farms	Acres per farm						t
		Own (x_1)	Rented in (x_2)	Mort-gaged in (x_3)	Rented out (x_4)	Mort-gaged out (x_5)	Culti-vated (x_6)	(x_1, x_6)
Members								
Part-operator	24	5.46	a	.04	1.05	.17	4.28	2.071*
Owner-operator	40	3.09	a	.10	a	a	3.19	0.095
Part-tenant	36	2.00	.84	.05	.03	.12	2.74	2.799**
Tenant	a	a	a	a	a	a	a	a
All farms	100	3.29	.30	.07	.27	.09	3.30	0.019
Non-members								
Part-operator	33	6.50	a	.03	1.26	.32	4.95	2.010*
Owner-operator	35	3.42	a	.09	a	a	3.51	0.079
Part-tenant	30	1.76	1.29	.03	.03	.12	2.93	2.278*
Tenant	2	a	1.16	.08	a	a	1.24	a
All farms	100	3.90	.40	.05	.43	.14	3.78	0.304

a. None/not applicable

$x_6 = x_1 + x_2 + x_3 - x_4 - x_5$

** t significant at 0.01 level.

* t significant at 0.05 level.

Source : Field survey.

TABLE 7 EXTENT OF RENTING IN AND MORTGAGING IN Vs RENTING OUT AND MORTGAGING OUT BY SAMPLE MEMBERS AND NON-MEMBERS BY TENURE CLASS

Tenure Class	Percent of own area		Percent of cultivated area	
	Rented out	Mortgaged out	Rented in	Mortgaged in
	Members			
Part-operator	19.2	3.1	a	0.9
Owner-operator	a	a	a	3.1
Part-tenant	1.5	6.0	30.6	1.8
Tenant	a	a	a	a
All farms	8.2	2.7	9.1	2.1
	Non-members			
Part-operator	19.4	4.9	a	0.6
Owner-operator	a	a	a	2.6
Part-tenant	1.7	6.8	44.0	1.0
Tenant	a	a	93.6	6.4
All farms	11.0	3.6	10.6	1.3

a. None/not applicable.

Source Field survey.

Tenure Position of Boro Plots

Since cooperative farming is practised only during the boro season, it is perhaps appropriate to look at the tenure positions of the boro plots of cooperative farmers against those of non-members in order to get an idea of the effect of cooperative farming on tenure relations. Table 8 indicates that there is substantial difference between the tenure positions of the boro plots of members and non-members so far as share renting—the overwhelmingly dominant form of renting—is concerned. Both in terms of proportion of total

number of plots and proportion of acreage, the extent of sharing in was lower among non-members' plots as against cooperative plots as well as private plots of coopertive farmers. Share cropping may be considered as a form of exploitation of dispossessed marginal farmer who sells his labour in the shape of share cropping relationship (Alavi 1978,

TABLE 8 DISTRIBUTION OF THE SELECTED BORO PLOTS ACCORDING TO TENURE ARRANGEMENTS

Area	No. of plots					Acres				
	Own	Shared in	Mort-gaged in	Leased in	Total	Own	Shared in	Mort-gaged in	Leased in	Total
Members' cooperative boro plots										
Shimla	80	16	4	a	100	27.20	4.95	0.76	a	32.91
Gopalpur	46	3	a	a	49	16.97	1.00	a	a	17.97
Katalshar	38	1	1	a	40	14.67	0.17	0.15	a	14.99
All areas	164	20	5	a	189	58.84	6.12	0.91	a	65.87
	(87)	(11)	(2)	(a)	(100)	(90)	(9)	(1)	(a)	(100)
Members' private boro plots										
Shimla	27	12	1	4	44	12.27	3.78	0.40	1.40	17.85
Gopalpur	27	5	a	a	32	20.95	2.75	a	a	23.70
Katalshar	b	b	b	b	b	b	b	b	b	b
All areas	54	17	1	4	76	33.22	6.53	0.40	1.40	41.55
	(72)	(22)	(1)	(5)	(100)	(80)	(16)	(1)	(3)	(100)
Non-members' boro plots										
Shimla	47	1	2	a	50	13.66	0·30	0·30	a	14.26
Gopalpur	43	2	1	a	46	29.42	1.90	0.50	a	31.82
Katalshar	15	a	a	a	15	8·82	a	a	a	8·82
All areas	105	3	3	a	111	51.90	2·20	0.80	a	54.90
	(94)	(3)	(3)	(a)	(100)	(95)	(4)	(1)	(a)	(100)

Figures in parentheses indicate percentage.

a. None b. Not cultivated.

Source : Field survey.

pp. 22-23). By this measure, one could blame the cooperative farms under study for helping increase this phenomenon instead of reducing or eliminating it (Table 8). But there will be an immediate question raised against this proposition : why then is the extent of share cropping higher among cooperative farmers compared to non-member farms ? The answer is perhaps that the renting arrangements in the cooperative farms, specially those of share cropping, are less exploitative against the terms offered the tenants in other areas. This is because of two reasons. Firstly, many of the variable costs, like those of irrigation and fertilizer, are shared by the share croppers and the landlords within the cooperative farming area. Secondly, many of the modern inputs, like irrigation water, fertilizer, insecticides and credit are provided through the coopera tive farms at subsidized rate.

However, another alternative (or additional) explanation to the higher extent of share cropping among the cooperative plots vis-a-vis non-member plots may be that the current arrangements for pooling resources and distribution of output are not competitive enough to replace share renting. The inadequacies in the organizational arrangements, in this regard, are mainly two : lack of proper valuation of all resources supplied by members, and the absence of provisions for paying appropriate returns to non-land factors of production used in cooperative farms.

V. SUMMARY AND CONCLUSIONS

A significant level of complementary relationship has been observed between the nature of resource endowment of farmers and their decisions with respect to participation in cooperative farming. Farmers with high and low per acre availability of fixed labour and capital. measured by degree of deviation from the average level, indicated a high degree of willingness to participate in coopertive farming, apparently with a view to optimizing their resource combination. Share-tenants and their landlords mostly belong to these two groups of farmers. Therefore, theoretically, cooperative farming may provide an alternative to share-renting. Paradoxically, the members of the cooperative farms were found to rent in/out much of their boro paddy acreage instead of cultivating it jointly under collective production methods.

It may be, therefore, concluded that although land surplus and labour-surplus farmers are aware of the advantages of mutual cooperation under collective arrangement, in actual practice they do not like to share out the marginal returns of their surplus inputs

to be supplied to the collective farm. This may be due to the following suspicions among members :

(1) that the cooperative farm may not properly value the resources supplied by members ;

(2) that the return to inputs as calculated by the cooperative farm will be less than their opportunity costs ; and

(3) that the non-land resources are not considered for fixing share of returns from cooperative farming, this being the concern of the land poor and landless farmers mainly.

Thus, inspite of realizing the importance of cooperative production, many farmers are disinclined to join a completely collectivized production group due to the apprehensions of improper method of distribution of output. That is why they also prefer simple types of cooperative farms without collectivizing the distribution of returns.

Regarding the effects of the cooperative farms under study on tenure relations, two sets of observations may be made on the basis of the field surveys. Firstly, considering the total cultivated areas of members and non-members as a whole, the aggregate impact of cooperative farming on the tenurial behaviour of farmers seems to be low. But a comparison across farm size shows that cooperative farmers of small and medium farm size, unlike similar size groups in the non-member sample, seem to have increased their cultivated area significantly by renting or mortgaging in more land. Higher demand for rented land by the members of small and medium farm size compared to the non-members of similar farm size may be the reflection of the less exploitative terms of renting in the cooperative farming areas. This is particularly due to the sharing of some variable costs, like those of irrigation and fertilizer, by the share tenants and landlords, and subsidized input supply within the cooperative farming areas.

Secondly, considering the boro paddy plots of members and non-members, the extent of share renting was found to be higher amongst members. This indicates that the present organizational patterns of the cooperative farms are not appropriate enough to replace share cropping. Rather, they seem to help increase the demand for and decrease the supply of land in the tenure market by augmenting input supply including credit. Considering the less exploitative share renting arrangements as against those in other areas, this may not be absolutely undesirable. It is, however, open to question: how long will these terms remain less exploitative ? The higher demand for rented land may, in the long run, strengthen the bargaining position of the landlords and eventually lead to the withdrawal of the present soft terms of share cropping.

In the long-term policy context, however, the objective of attaining equity in income distribution will be blurred by the parallel existence of share renting within the cooperative farms since it will provide a source of income transfer from tenant members to landowner members. The rate of transfer will depend on the terms of renting. The objective of equity can be effective if renting can be totally eliminated by the cooperative farms through a method of pooling of all inputs and distribution of returns in proportion with the total quantum of all inputs supplied by each member. Theoretically, this has been found feasible by the opinion surveys since the farmers with deviation from optimum level of land and non-land resource mix, constituting a vast majority of all farmers surveyed, indicated a significant degree of willingness to participate in cooperative farming under such arrangements. The farmers with optimum level of land and non-land resource combination may be also expected to join in the cooperative farming schemes under such arrangements since the subsidized input supply through the cooperatives will be an incentive for them due to the current constraints on modern inputs, like irrigation, fertilizer and insecticides in the open market.

REFERENCES

Ahmed 1978 Ahmed, J. U. : "Cooperative Farming Experiments in Bangladesh". *The Bangladesh Journal of Agricultural Economics.* I, 2 (December, 1978).

Ahmed et al. 1980 Ahmed, J. U., S. M. Kamrul Hassan, and Nasreen Sultana : *Resource use pattern and costs returns in cooperative Boro paddy production in Bangladesh.* Report No 11, Dacca : National Foundation for Research on Human Resource Development, July 1980.

Alavi 1978 Alavi, H. : *Capitalism and Colonial Transformation,* paper at the Seminar on Underdevelopment and Subsistence Production in South East Asia, Bilefeld (Germany), April, 1978.

GOB 1973 Government of Bangladesh : *The First Five Year Plan.* Dacca : 1973.

Husain 1979 Husain, A.M.M. : "The Shimla Cooperative Farming Project in Bangladesh', in J. Wong (ed.), *Group Farming in Asia.* Singapore : Singapore University Press, 1979.

Pakistan 1970 Government of East Pakistan : *Research Study on the Introduction of Agricultural Farming on Cooperative Basis.* Dacca : 1970.