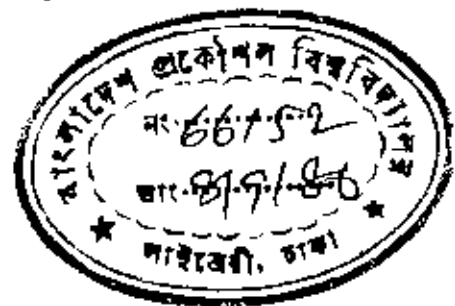


THE ROLE OF CO-OPERATIVES IN THE ADOPTION ON TECHNOLOGICAL
CHANGE IN BANGLADESH

THESIS

Submitted to the Department of Urban & Regional Planning,
Bangladesh University of Engineering & Technology, Dhaka
in partial fulfilment of the requirements for the degree
of MASTER OF URBAN AND REGIONAL PLANNING

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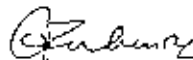
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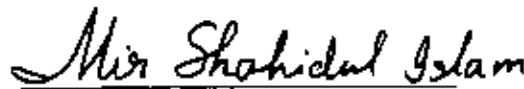
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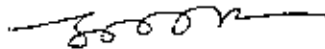
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ABSTRACT

The study intended to observe the scope of participation of majority of farmer in BRDB co-operatives and accessibility of farmer to other means of production. The inception of modern seed-fertilizer-water based technology created growth momentum by replacing traditional mode of production. The Co-operatives were created to ply crucial role in the transition of technological change in agriculture to attain the twin objective of growth and distribution. But the institution's role in the adoption and diffusion process presents a dismal picture by attaining partial objective. So, an emphasis is given in this study in institutional planning to attain economic growth, social justice and distribution of physical resources through multi-purpose production co-operatives and proposed to integrate service delivery agencies at all territorial level of functions.

Title of the Thesis: The Role of Co-operatives in the Adoption on
Technological Change in Bangladesh

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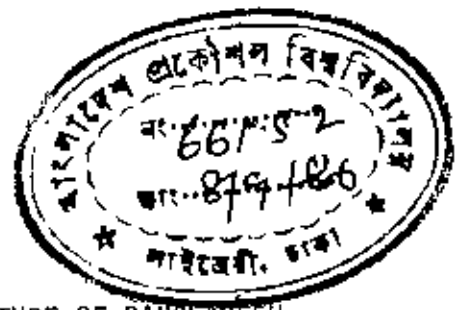
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1. CHAPTER

1.0 INTRODUCTION

1.1 THE CO-COOPERATIVE MOVEMENT IN THE AGRICULTURE OF BANGLADESH

The Co-operative movement in this sub-continent began with the adoption of co-operative Credit Societies Act of 1904 to confine the activities of co-operatives in the field of agricultural credit and subsequently that was substituted by the Co-operative Societies Act of 1912 to allow co-operative sale and service functions. In Bengal, an effort has been made through passing of Bengal Co-operative Societies Act of 1940 to adapt the movement to suit the requirements in the changed situations.

It has been observed that inspite of all government efforts the co-operative movement failed to achieve any break-through in improving the lot of broad masses. In early sixties, in this background, the then Pakistan Academy for Rural Development (PARAD) at Comilla under the able and dynamic leadership of Dr. Akhter Hamid Khan, made an experiment to evolve a model for agriculture cum rural development which would be suitable to the socio-economic conditions of this country.

Under this model, an integrated approach to rural development was experimented in the Comilla Thana area. There were four major components of this model,

- i) Two-tier Co-operative System
- ii) Thana Training and Development Centre
- iii) Thana Irrigation Programme
- iv) Rural Works Programme

Having noted its success and tremendous people's response to these programmes than any other traditional form of co-operatives, it was drawn up hopefully and approved by the then government to replicate it to the country.

The Comilla model virtually provided a sense of direction to the vast rural masses in their agricultural productive efforts. The group action of the farmers demonstrated the potential that even the small and marginal farmers working jointly could be able to change their lot by the use of new technological innovations in agriculture.

1.2 AGRICULTURAL CO-OPERATIVES IN THE ADOPTION OF MODERN TECHNOLOGY TO THE MAJORITY OF FARMERS

The technological innovations extended to developing societies. The local institutions, norms, behaviours and values of a society need to be adjusted with the newer orientation of the innovations. The intervention of new technology in a society changes the traditional production function and other related activities. In the case of introduction of HYV technology, the assumption behind it is that the traditional production function reached its maxima, where a breakthrough in production is necessary to combat with the urgency of food and poverty in a developing society. The innovations introduce new inputs, techniques of production and necessary physical and social infrastructure. A little consideration is made in designing the institutions to diffuse the innovations, assuming that no single model is acceptable to all recipient countries and viable in all situations. The formation of farmers' groups and co-operatives are often taken as an easy answer.

In the process of modernisation of agriculture, farmers are given incentives and motivations in adopting modern technology through their own institutions, co-operative institutions are better placed instead of an individual to bear risk and profitability of an innovation. There is another reason that large number of small and marginal farmers in developing society are individually unable to

adopt the package technology without the shade of co-operative umbrella. In the process of adoption and management of these ingredients of new technology requires collective action for both economic and social reasons. For, proper and efficient utilisation of modern inputs, to the majority of farmers, the involvement of farmers co-operative is felt necessary.

The importance of co-operative in the process of adoption, because of two reasons, firstly, inability of a traditional society to accept the new technology for high degree of risk involved in adoption, secondly, the unwillingness of farmers to use other resources in new practice.

Therefore, the emphasis is given for institutional planning through co-operatives at farmer's level with collective participation and development of local leadership. It is acceptable that farmer's co-operatives in all situation can give a choice and opportunity to avail and to utilise the modern technology. The majority farmers participation in newer orientation is only fruitful through institutional normative involvement.

In our country, in search for an effective farmers' co-operative the Comilla model was experimented to make the technological breakthrough in agriculture by using modern inputs by the majority of farmers. Through this co-operative, it was hoped to change the lots of majority of farmers.

1.3 THE ROLE OF CO-OPERATIVES IN AGRICULTURAL DEVELOPMENT

Co-operatives play an impressive role in improving the quality of life of commonmen. The role of co-operatives extends through multiple purpose of societies to all important sectors of the economy, such as, agriculture, industry, transport, commerce, housing, business, etc. The world assembly recognised that co-operative can play a vital role in the development of various fields of production, distribution and consumption in any sphere of the economy.

A co-operative is formed by homogenous group of people with setted objective of common interest, which helps in mobilisation of resources, distribution of benefit among members, develop skill and ability of the people in raising their efficiency, building up infrastructures and hence it can speed up the progress of the country.

The process of co-operatives have become a part of life in Bangladesh for long eighty years, each village now on average have two co-operative societies. The assets which these societies have built up, the goods and services they produced, the employment opportunities they created and the pivotal role they played in the transfer of technology are too impressive to ignore. Co-operatives thus constitutes an organ of the whole social institution.

The application of co-operation in the field of agriculture has an important role to play in the development of this sector. Through agricultural co-operation, producers' and consumers' co-operatives have largely contributed to the great increase in agricultural sector. In a developing country like ours, co-operatives play a crucial role to solve her agricultural problems. It is through co-operatives that farmers are motivated and mobilised in an organised manner for the adoption and use of scientific method of cultivation, thus the yield from the land increased manifold. Co-operatives for credit, marketing, savings and supply etc. help farmers to improve their productivity and level of income. In a word, we can say co-operative is the path finder of agricultural development.

Understanding the need for an effective rural institution in the country, a model of co-operative agriculture has been developed, which is popularly known as Comilla model. The new two-tier co-operative system was engaged with two objectives,

first to increase agricultural productivity by using modern techniques and secondly to develop savings in rural community. The national thrust was given to this programme for agricultural-cum-rural development under the auspices of IRDP, now known as BRDB.

Under this approach, the village level 'Krishak Samabaya Samity' (KSS) are federated at thana level--the second tier of the co-operative, which provides the clientele service facilities and supplies of modern inputs, credit, training and extension to village level primary societies. Its cumulative achievement, till now, contributed to increasing agricultural production by the merit of introducing new technology at farmers' level and thus the income of member co-operators increased remarkably. In this way co-operatives open a new vista of operation particularly in the field of agriculture.

1.4 OTHER CO-OPERATIVE BUILDING ATTEMPTS IN BANGLADESH:
SHIMLA CO-OPERATIVE FARMING PROJECT AND GRAMEEN BANK
PROJECT

The co-operative institution is more responsible for the progress in the diffusion of modern agricultural technology and for the distribution of benefits out of it to the member farmers. In this view, the BRDB co-operatives could not make any headway in the distributional aspect as experienced in Bangladesh (FFYP, 1973-78, P-155).

The BRDB formed co-operatives are basically service delivery oriented rather than production oriented. In search for production oriented co-operative and hopefully to reach the bottom section of farmers by a new version of co-operative structure, a brief survey of two co-operative institutions are made in the following section.

1.4.1

SHIMLA CO-OPERATIVE FARMING PROJECT (SCFP)

In Shimla, under Muktagacha upazila, twenty miles from Mymensingh, a co-operative farming research project was undertaken by the department of Co-operation and Marketing of Bangladesh Agricultural University in 1972, to study, (Husain, 1978)

- i) the conditions necessary for the successful implementation of the co-operative farming project, determining the extent and nature of pooling of resources from the farmers and on the basis of that distribution of output,
- ii) the economic and social benefits accrued to the members to the formation of the society including,
 - a) gains in productivity
 - b) better employment of the rural labour force
 - c) rise in income
 - d) improvement in social relationship and status of the farmers, and on the basis of that
- iii) to recommend a model co-operative farming set-up for Bangladesh.

On the basis of above setted objective, a co-operative farming society was formed with one hundred and four members by pooling their land under joint management and resolved to work jointly by contributing labour and other productive resources. Later on, a number of landless farmers were also enrolled as members of the society.

The managing committee elected by the members, responsible for preparation of production plan. The committee procures the inputs, distributes them among different production blocks, supervises production operation and carried other functions.

The yielded crop collected together blockwise to facilitate threshing, drying and storage. The distribution is followed by deducting combined production cost and provision for reserving some cost for next season, building a compulsory savings of the society and contributing to general welfare fund.

Moreover, the society undertakes other functions of development of livestock, poultry, horticulture, fisheries, cottage industries, provision for water supply, drainage, rural electrification, improvement of roads, education and

cultural facilities.

1.4.1.1 ACHIEVEMENTS OF SCFP

The achievements so far made from the project, are as follows, (Husain and Ali, 1976),

1. Within the co-operative farming project per acre yield increased significantly.
2. Income of the member-farmers increased significantly.
3. An improved farming technology introduced.
4. Agricultural credit for productive utilisation ensured.
5. Farmers social relationship and unity increased.
6. Villagers better employment opportunity created.
7. Pooling of resources of the farmers could only partly be achieved under given socio-political structure.
8. Relatively better distribution of output ensured.
9. A model co-operative farming by-law has been developed and afterwards recognised by the Co-operative Directorate.
10. The idea so far replicated in 10 villages.
11. The concept of all round development of the village has been partially applied and considerable progress achieved.

1.4.1.2 COMPARISON BETWEEN SCFP AND BRDB PROGRAMME

- a) SCFP made production based multipurpose society, BRDB based co-operatives are service delivery oriented.
- b) SCFP intended to serve various other socio-economic needs of the villagers, BRDB based co-operatives necessarily do not serve other social facilities.
- c) SCFP determined to pool productive resources from the farmers with their consent and on that basis distribution of output is made while BRDB co-operatives retain individualistic mode of operation.
- d) In SCFP joint management and supervision is introduced, but BRDB co-operatives do not ply with such attempt.
- e) In SCFP landless farmers are taken as members and get opportunity to work under the society. Recent attempt of landless programme introduced by BRDB under different non-farming programme.
- f) Concept of all round development programme applied in Shimla, but BRDB programme do not conceptualise 'integrated development' though titled the name 'integrated programme' for integrating different agencies.

1.4.2 GRAMEEN BANK PROJECT

Grameen Bank (GB) came into existence as a specialised banking institution in 1983, as a successor to the Grameen Bank Project (GBP), started in 1976.

Grameen Bank Project aimed at designing an organisational framework, which would provide reasonable forum through which banking system could extend credit to the poorest strata of the society, both men and women. The GBP credit targetted to the poor, defined as persons belonging to households owning up to 40 decimals of cultivable land. It was closely supervised programme.

The bank developed its own delivery recovery system. The bank staffs motivate and encourage people with the rules and procedures of the bank. Where, any person, whose family owns less than 0.5 acres of cultivable land, and the value of all the family assets together does not exceed the market value of one-acre of medium quality land in the area, is eligible to take loans from the bank for any income generating activity. The peoples are to form a group of five, with a Chairman and a Secretary. Several

groups in the same village hold their weekly meeting jointly. All groups' Chairman, elect one Centre-chief and a Deputy-Chief. Loans are given to individuals or groups. There are lot of group responsibility distributed among them, but the loanee himself is responsible for his loan. All loans are extended for one year. Pay back are made in weekly instalments, each is 2 percent of the principal amount. In each group they can engage in same collective activity also, which cannot be achieved by an individual's attempt. The group bondage give an individual of a group with protection of group fund and emergency fund (Yunus, 1984). These groups and centres are the main vehicles for the members' participation in all activities.

The members are encouraged to believe the Grameen Bank as their own bank and they are represented by four persons on the Board of the Directors of the bank. The socio-economic homogeneity of their membership give them opportunity for widespread and genuine participation in decision making and implementation of the activities. The loan recovery percentage is highest comparing other banks those operating in Bangladesh.

1.4.2.1

COMPARISON OF 'LANDLESS-PROGRAMME' BETWEEN GB AND BRDB

BRDB has a landless programme at Madhupur of Tangail district. There were 37 landless co-operatives with 938 members under this programme. Taka 0.2 million was disbursed as credit in 1983-84 for activities such as cow - fattening, pond fishing, oil pressing, carpentry, rickshaw pulling etc. Landlessness was defined as owning 50 decimals of agricultural land.

The following differences of BRDB with GB were identified,

- a) BRDB organised the landless into formal co-operatives, duly registered, whereas GB groups were informal organisation.
- b) In BRDB, there were 15 members per co-operative as against 5 person per group in Grameen Bank. Procedural and paper work is much greater in BRDB. In GB, loan repayment is made on a weekly basis. In BRDB, repayment is made after a considerable duration. There was a serious staff shortage in BRDB for their preoccupation with a number of other programmes. Intensive care is not done in BRDB.

- c) In GB, loans are for individual, whereas in BRDB loan are given only to the co-operative according to a production plan.
- d) Group responsibility and risk sharing is pertained by each member of the group in GB, but in BRDB responsibility rests solely to individual.
- e) The overall performance of GB is much better than those of BRDB landless programme.
- f) Scope of participation in decision-making and implementation of plan is better in GB than that of BRDB.

11. CHAPTER

2.0 HYV TECHNOLOGY: ITS SUPPLY AND USE

2.1 NATIONAL LEVEL SUPPLY AND USE OF INPUTS

Popular name of HYV technology implies the provision of a package of modern agricultural inputs including the high-yielding variety (HYV) seeds, fertilizers and controlled water supply (low-lift irrigation pumps and tubewells). The use of chemical fertilizer is necessary to increase the yield, particularly in respect of irrigated boro crop and wheat. In this chapter we try to picturise national level supply and use of different inputs for last years.

2.2 FERTILIZER

During the first year of BADC's operation in 1961-62, 31000 tons of fertilizer were sold. The sale rose to 2.78 lakh tons in 1969-70, 3.84 lakh tons in 1972-73 and 8.75 lakh tons in 1980-81.

In 1983-84, the total quantity of fertilizers distributed, was 1129060 tons, which was an increase of 17 percent over the 1982-83 sale of 968093 tons. The Fertilizer sale in 1983-84 was highest, which shows steady increase of consumption. The sale was 7.52 percent above the target of 10.50 lakh tons set by BADC. The national sale target of fertilizer for the year 1984-85 has been fixed at 13.66 lakh tons. This reflects an increase of about 32% over the actual sale of 1983-84.

Table 2.1
1984-85 Sale Target of Fertilizer against
Actual Sale of previous year ('000 tons).

Type	Sale Target for 1984-85	Actual Sale for 1983-84
UREA	896	708
TSP	403	261
MP	67	63
TOTAL	1366	1032

Source: BADC, 1985

The year-wise quantum increase of supply of different fertilizers can be observed from the following table.

Table 2.2
Distribution of Different Fertilizer by its
Type over the year ('000 tons)

<u>Year</u>	<u>Urea</u>	<u>TSP</u>	<u>MP</u>	<u>DAP</u>	<u>Others</u>	<u>Total</u>
1971-72	170	60	14	-	-	244
1972-73	277	89	18	-	-	384
1973-74	268	94	18	-	-	380
1974-75	174	75	18	-	13	280
1975-76	312	110	22	-	14	458
1976-77	353	126	22	-	11	512
1977-78	480	192	41	-	6	719
1978-79	471	178	47	38	9	743
1979-80	533	205	46	42	11	837
1980-81	560	215	45	42	13	875
1981-82	519	208	45	49	9	830
1982-83	631	204	49	74	10	968
1983-84	708	261	63	94	32	1129

Source: BADC, 1985

2.3

SEED

Improved seeds play a vital role in increasing agricultural output. The cultivation of HYV crops under seed-based technology is the most important element in this new agricultural strategy. The practice of HYV seed become popular day by day, the national data signifies its increasing trend.

The distribution target for 1984-85 shows an upward trend in comparison to actual distribution of cereal seeds in 1983-84. The projection has been made for distribution of 1.15 lakh maunds of paddy and 6.43 lakh maunds of wheat seeds during 1984-85. The actual distribution during 1983-84 was 74802 maunds of paddy seeds and 375,242 maunds of wheat seeds. The following table shows the distribution programme of seeds by variety for the year 1984-85 as against actual distribution during previous years.

Table 2.3
Distribution of Cereal Seeds
(maunds) in years

<u>Variety</u>	<u>1980-81</u>	<u>1981-82</u>	<u>1982-83</u>	<u>1983-84</u>	<u>1984-85</u> (Target)
Aus	13471	10940	14659	9948	20000
Amon	16859	18520	35701	42338	55000
Boro	12133	22407	29175	22516	40000
Paddy	42463	51867	79535	74802	115000
Wheat	379057	296745	359283	375242	643200
Total Cereal	421520	348612	438818	450044	758200

Source: BADC, 1985

2.4 IRRIGATION

The mechanised irrigation is very much essential to increase agricultural production by bringing maximum possible acreage under irrigation and through efficient utilization of water resources. It is used for getting a major crop in the winter and also for saving existing crop from draught by supplementary irrigation.

2.4.1 LLP

The mechanised irrigation started in this country in 1951 with three low-lift pumps in haor areas. Since then, BADC took over the responsibility of distributing low-lift pumps throughout the country.

Use of low-lift pumps has spread very rapidly after liberation. While in 1961-62 only 1400 pumps were used throughout the country with an acreage of 62142 acres, the number increased to 24483 in 1970-71 covering 8.8 lakh acres. The field position stood at 36382 in 1975-76 and area covered was 13.23 lakh acres. During 1980-81, 13.97 lakh acres were brought under irrigation with 35951 pumps in operation. In 1984-85 boro season, 60307 low-lift pumps were proposed to be operated to bring 20 lakh acres under irrigation. Year-wise distribution of low-lift pump and acreage covered are shown in the following table.

Table 2.4
Low-lift Pump Irrigation

Year	No. operated	Area Irrigated (acres)	Unit coverage (acre)
1960-61	1400	62142	44
1964-65	2239	132262	59
1970-71	24483	889807	36
1975-76	36382	1323818	36
1980-81	35951	1397177	39
1982-83	42181	1365840	32
1983-84	43615	1231000	28

Source: BADC, 1985

2.4.2 DTW

Specially during the winter season, ground water is being used for irrigation with the help of tubewells. Utilisation of ground water through tubewells with many advantages become very popular. Both deep and shallow tubewells are used for irrigation.

The Deep Tube well (DTW) project of BADC was initiated in 1967-68. Since inception of the scheme, BADC has sold 9281, sunk 20698 and commissioned 19101 deep tubewells till February, 1985. During 1983-84, the number of tubewells in operation was 15519 as against 13794 in the previous year. The total area irrigated was 10.3 lakh acres as against 10.0 lakh acres in 1982-83. During 1984-85, 19000 deep tubewells were expected to be in operation which would bring 11.40 lakh acres of land under irrigation. The following table shows the progress of deep tubewell irrigation in the country.

Table 2.5
Progress of Deep Tubewell Irrigation

<u>Year</u>	<u>Operation(nos.)</u>	<u>Area Irrigated ('000 acre)</u>	<u>Unit coverage (Acre)</u>
1973-74	1494	61	41
1974-75	2699	118	44
1975-76	3828	154	40
1976-77	4461	164	37
1977-78	7453	338	45
1978-79	9329	504	54
1979-80	9795	582	59
1980-81	10131	641	63
1981-82	11491	798	65
1982-83	13794	1000	72
1983-84	15519	1030	66

Source: BADC, 1985

2.4.3 STW

The Shallow Tubewell programme was taken by BADC in 1970-71. Since the inception of the scheme of STW, 75693 tubewells were sold. During 1983-84, 67103 shallow tubewells were in operation as against 62253 in 1982-83. The area irrigated through shallow tubewells in 1983-84 was 7.50 lakh acres as against 7.38 acres during the previous year. In 1984-85 a sale of 20000 STW expected to be sold. The following table shows the trend of shallow tubewell irrigation over the year.

Table 2.6

<u>Year</u>	<u>Progress of Shallow Tubewell Irrigation</u>		
	<u>No. operated</u>	<u>Area covered (Acre)</u>	<u>Unit coverage (Acres)</u>
1973-74	998	4462	4
1974-75	1029	6773	7
1975-76	2162	12894	6
1976-77	3045	17706	6
1977-78	6447	58985	9
1978-79	8329	88493	11
1979-80	11280	136837	12
1980-81	20931	244602	12
1981-82	42955	499384	12
1982-83	62253	738137	12
1983-84	67803	749971	11

Source: BADC, 1985

2.4.4 AREA COVERED

In 1983-84, 43615 low-lift pumps, 15519 deep tubewells, 67803 shallow tubewells were put in operation. All these taken together supplied irrigation to 30 lakh acres in 1983-84. The total acreage covered in the previous year 1982-83 was 31.04 lakh acre. Comparing unit coverage of each devices, the LLP shows decreasing trend during last five years, for DIW trend of unit coverage since inception shows increasing rate but in last few years marginal increase is low. For the unit coverage of STW shows almost constant during last five years.

By looking into the distribution of acreage crop wise, in the winter season (comprises both boro and wheat crop), share of winter acreage to total were estimated 75%, 73% and 72% for the years 1979-80, 1980-81 and 1981-82 respectively. While for the Aman crop the share were found 9%, 10% and 11% for the years 1970-80, 1980-81 and 1981-82 respectively. All contribution goes for the irrigation devices used by farmers. In winter crops, contribution of tubewells are well understood, where coverage by DTW is higher.

Table 2.7
Area (Acres) Irrigated under Different
Crop

<u>Year</u>	<u>Aus</u>	<u>Aman</u>	<u>Boro</u>	<u>wheat</u>	<u>Total (with others e.g. pulses, potato etc.</u>
1979-80	227040 (6%)	317765 (9%)	2491750	426225 (75%)	3877310
1980-81	295780 (7%)	347030 (10%)	2467500	481320 (73%)	4649840
1981-82	279330 (7%)	455337 (11%)	2574043	468478 (72%)	4264331

Source: BBS, 1983-84 yearbook of Agricultural Statistics, 1985.

Note: Computed Figures in parenthesis shows percent acreage of each crop to total. Boro and wheat crop considered unitely as winter crop. 10% of Total acreage are under pulses, potato etc.

- III. CHAPTER
- 3.0 RESEARCH METHODOLOGY
- 3.1 THE PRESENT STUDY--THE PROBLEM

Agricultural productivity is a crucial aspect of Bangladesh's struggle to achieve development. The technological possibility by adopting HYV technology to increase production provide some hope. Since last two decades, government promoting seed water-fertilizer based HYV technology to pull potentiality of agriculture out of stagnation. To modernise traditional agriculture, use of modern inputs have been introduced embodied in HYV seed, fertilizer, improved cultural practices, pesticide and controlled irrigation. In this drive, farmers are motivated and given opportunity to utilise modern technology. BRDB based co-operatives provide these services. By now, there is increasing evidence to indicate deficiencies in this institutional attempt. Its performance so far has been dismal and disappointing that majority of the farmer do not have even reasonable access to input delivery system and participation in farmer's institutions. The delivery based development programme could not solve the problem of growth with distribution.

The agricultural productivity so far increased has failed to distribute its benefit to the majority of farmer's.

The HYV technology tends to benefit the larger and the medium group of farmers in BRDB based co-operatives and enrich them substantially within the institutional support. In the given socio-economic and agrarian structure a policy through an alternative institutional arrangement, support or change might provide maximum benefit to the majority of farmers...

For the partial fulfilment of the given problem, the study attempts to enquire the procedure of channelling modern inputs to the co-operative member-farmers and involvement of different group (farm-size) of farmer's in those co-operative institutions.

The access situation of different farm-groups would be understood by the proportionate share received by them from the input delivery system within their given ownership pattern of resources. The findings of the present study are expected to find out valuable criterion on effectiveness of present institutional approach and to help develop suggestion in institution building in the field of agriculture.

3.2 OBJECTIVES OF THE STUDY

The specific objectives of the study are,

- i) To identify the present functional linkage of agencies involved in the channelling of modern technology to the farmer's level BRDB co-operatives (KSS);
- ii) To examine the functions and objectives of BRDB co-operatives in terms of scope of participation and accessibility of modern technology to the majority of farmer's (small farmer); and on the basis of that
- iii) To make suggestion for building an appropriate institutional framework for the development of agriculture in Bangladesh.

3.3 METHODOLOGY AND PROCEDURE OF THE STUDY

The present study follows a methodology based on qualitative and quantitative approach. Data and information have been mainly collected from primary sources through field survey. Other relevant data and information have also been collected from secondary sources.

The specific methodology of the study are as follows:

- a. Literature review
- b. Field survey, which includes
 - i) Preparation of the interview schedule
 - ii) Pre-testing of it
 - iii) Finalisation for interview
 - iv) Selection of study area
 - v) Sampling design
 - vi) General survey
 - vii) Selective survey
 - viii) Personal observation
- c. Processing and analysis of data

The brief outline of the procedure of study, have been followed as,

- a. Year-wise national level data collected on the supply and use of modern inputs.
- b. Adoption and diffusion effect of modern technology in the study area have been enumerated.

- c. Nature and scope of participation of different farmer-groups in the co-operatives are enumerated.
- d. Data on distributional pattern and use of modern inputs by different farm-size groups within BRDB Co-operatives collected to understand the access situation.
- e. Specifically, other two institutional attempts in Bangladesh have been observed to find any potential remains therein to help develop any drawback of present institutional form.

3.4 PREPARATION OF THE SCHEDULE

Besides gathering personally observed facts, the researcher had to collect the study information through interview method. Firstly, a draft schedule was prepared keeping ahead the objectives of the study. Preliminary schedules were pre-tested with three general members and one executive member from each society. Then, final interview schedule was prepared with necessary improvements, re-arrangements and additions to the prior one.

In order to collect relevant information two different types of interview schedule were prepared, one for general members and other for the manager of the society to fulfil the objectives of the study as well as the characteristics of the universe under survey. The schedule contained both open ended and closed ended questions in Bengali. Questions were structured and asked directly to the respondents. The following broad items which were arranged in logical sequence, both for the eliciting the required facts from the farmers systematically and facilitating the analysis of data, are,

1. Identification of the farmer-member
2. Their socio-economic traits
3. Types and use of land in possession

4. Use of inputs

- i) Draught animal
- ii) Farm-implements
- iii) Fertilizer
- iv) Irrigation water
- v) Insecticide, pesticide etc.
- vi) Seeds
- vii) Credit
- viii) Training

5. Market participation

3.5 SELECTION OF THE STUDY AREA AND THE SAMPLE

Two upazila's -- Trisal and Muktagacha of Mymensingh district were selected for the study. The study area was included in specific Rural Development Programme, RD-1 project of IRDP, where the irrigation component was expanded in terms of its scope and an irrigation management programme (IMP) was introduced with the objective of increasing efficiency of water use.

From each upazila two KSS's were selected purposively in conformity to reflect average picture of the whole upazila and in selecting two KSS's, their geographical spread was taken to see the level of performance of the societies located at different distance from the upazila headquarter. In selection of two societies from each upazila, one KSS having two DTW's and the other having single, were taken into consideration.

All member-farmer's of each KSS were interviewed and non-cooperative farmer's of that village were also dealt purposively. Manager of each society was also interviewed separately. Records and registers of these societies were also examined. The Survey was conducted in early 1986.

The sample size of the present study was considered to be large enough to permit broad generalisation for that upazila

and small enough that to be manageable. The creditability of the survey may be claimed justified by the well prepared questionnaire, procedure of data collection and accuracy of data.

3.6 COLLECTION OF DATA

The collection of relevant data was taken by the investigators. All efforts was made by the researcher himself to ensure the collection of reasonable accurate data by prior instructions and training the investigators.

3.7 PROBLEMS FACED IN DATA COLLECTION

Respondents might view the interview with suspicion, for that a close acquaintance was made with the people before conducting survey. Still at the time of data collection many respondent were reluctant to answer for ungrounded fear. Again they have been assured that the study based on purely academic purpose.

3.8 PROCESSING AND EDITING OF THE COLLECTING DATA

After gathering all interview schedules, the researcher scrutinised to find whether there were any inconsistency, collected data were transferred to a master sheet and compiled to facilitate tabulation. Qualitative data were converted into quantitative data by assigning suitable scores. Editing and coding of the data were also done to eliminate errors and bias.

3.9 TABULATION AND ANALYSIS

Final tabulation work was started after accomplishing the pre-tabulation tasks. A list of tables was prepared on the basis of aims and objectives of the study. Finally, tabulated data were calculated and analysed to obtain the results. In analysis, simple averages, percentages etc. are used extensively with necessary statistical treatments. In representing tables cross-tabulation style are used.

IV. CHAPTER

4.0 INSTITUTIONS INVOLVED IN THE CHANNELLING OF MODERN TECHNOLOGY

4.1 THE COMILLA CO-OPERATIVES

The two-tier system of co-operatives were set up at the Comilla Kotwali Thana in 1960 consisting of:

- i) a number of village-based primary societies (krishi Samabaya Samiti-KSS) scattered throughout the thanas, and
- ii) a thana level central co-operative association(TCCA). The TCCA provides the servicing, training and supervised credit in support of the primary village society.

The village co-operatives

- a) hold weekly meeting with compulsory attendance
- b) select a representative (model farmer) for receiving training at BARD or TTDC
- c) perform joint production planning
- d) use supervised production credit
- e) adoption agricultural practices and skills
- f) make regular cash and savings deposits

The important features are that

- i) The member farmer has to buy a minimum share of Tk.10/- and to save at least Tk. 0.50 per week and hand it over to the manager of his co-operative at the weekly meeting.
- ii) Credit is provided only against the security of mortgage of land. The amount of loan generally relate directly to the area of land offered for mortgage.
- iii) Loans are sanctioned by the Agricultural Co-operative Federation (ACF) on a basis of production plan charged of 15% (the breakdown is; KTCCA gets 7%, village co-operatives get 2%, 5% is realised as service charge for administration of credit and 1% to the manager of the village society as an incentive for collection of loans),
- iv) The credit is secured in the village itself and time required for processing of the loan from initial application to delivery is about one month.
- v) By October, 1968 all 21 thanas of Comilla were covered (Abdullah, 1973, p.50).
- vi) Average number of members per society at the Comilla Kotwali Thana was raised to 34 in 1970-71(BARD, 1977).

4.2 THE THANA IRRIGATION PROGRAMME (TIP)

It opened up possibilities of better winter cultivation for new crops. Fertilizer, better seeds, pest-control, training and extension services with irrigation increased the possibility of production. These, together, increased the demand for credit. To begin with, the process was slow but with the availability of high yielding varieties there was an explosion. Since then demand for inputs including credit has consistently risen. Physical improvements in crop yield has helped stabilisation of farmer's institution.

Where a group of farmer can obtain a power-pump or tube-well. The programme began in 1966-67 on a pilot basis in 10 thanas. So, essentially the operation and organisation of TIP can be summed up this way,

i) installation cost of power pumps or tube-wells are borne by BADC who employs a full time driver-cum-mechanics. The full costs and a yearly rental of Tk.300/- are payable by co-operative group as a whole. The fuel is also supplied by the BADC stores at the fixed rate.

ii) these groups could apply for credit from the Co-operative Bank at a rate of 9% per annum (Rahim, 1974, p.166).

iii) in 1972-73 the TIP covered 352 thanas (out of 411 thanas) of Bangladesh and the average number of members per TIP was 27. (Abdullah, 1973, p.49).

These informal groups subsequently converted into registered Co-operative societies and affiliated to Central Co-operative Bank (CCB), recently to TCCA.

4.3 INTEGRATED RURAL DEVELOPMENT PROGRAMME (IRDP)

Preceding liberation of Bangladesh, it was decided to replicate the Comilla type of co-operative all over Bangladesh under the aegis of the Integrated Rural Development Programme. Its main purpose is to lay the institutional framework for stable and self-reliant co-operatives according to the Comilla principles of linking credit, services and training to productive investment and internal savings. At the end of February, 1973 there were 7,184 primary society (KSS) in IRDP areas (IRDP, 1973), excluding Comilla Kotwali Thana, which had 328 KSS in 1970-71 (BARD, 1977, p.56).

Great majority (5,182) of the IRUP Co-operatives were still in Comilla district. Total membership in 1973 was 180, 217; which implies an average of 25 members per IRDP Co-operative society. Total number of thanas then covered was 33 (20 in Comilla).

As a part of the national Five-year plan the programme was prepared to bring 250 thanas between 1972-73 and 1977-78.

- Accordingly, major emphasis has been given on group action through co-operatives assuming that existing extension system is

inadequate to meet the response of farmers to modern seed-based technology.

The main features of the co-operative system may be summarised as follows, (IRDP, 1978, pp.21-22),

- i) organisation of farmers into Krishak Samabaya Samity (KSS) at village level,
- ii) federation of KSS into TCCA at thana level,
- iii) linking the TCCA with other thana level organisations and agencies,
- iv) introduction of supervised credit for productive purposes,
- v) accumulation of own capital through weekly thrift deposits and sale of shares,
- vi) arrangement of continuous training for the co-operative to disseminate new ideas and technology,
- vii) provision of training of officials to rural development,
- viii) arrangement for supplying different production inputs to the farmers,
- ix) provision of marketing facilities to ensure a reasonable price to growers,
- x) co-ordination with other nation-building programmes like, TIP, population control and family planning etc,

- xi) organisation of TCCAs into district federation for co-ordination of TCCA activities and development of leadership amongst the co-operators,
- xii) organisation of district federations into national federation in order to co-ordinate rural development activities at the national level, to promote leadership among the co-operators and to spread co-operative education.

The IRUP has been reorganised and redesigned as the Bangladesh Rural Development Board (BRDB) in 1983. Since, its creation, BRDB embarked on the rural poor programme as a national programme and started organising the landless rural people of men, Bittahen Samabaya Samity (BSS) and co-operatives of women-Bangladesh Mohila Samabaya Samity (MSS).

4.4 BANGLADESH AGRICULTURAL DEVELOPMENT CORPORATION (BADC)

BADC, a public corporation, was created in 1961 to take over the activities of procurement and distribution of inputs, viz. improved seeds, chemical fertilizers and irrigation equipments to the farmers.

4.4.1 SEED

BADC is entrusted with the task of multiplication, production and supply of high-yielding varieties of seed. It supplies mainly paddy, wheat seeds and seed potato. It has 21 seed multiplication farms and 15 contract growers zones for the purpose. (BADC, 1985, p.12). BADC procured breeder seeds and pic-foundation seeds from BRRI and BARI and multiplies these seeds in Seed Multiplication (S.M) farms as foundation seed. These foundation seeds are in

turn multiplied in S.M. Farms and in the contract grower fields as Certified seeds, which are ultimately moved to different Upazila Sales Centres. After arrival of seeds at Upazila level, unionwise allotment is made by Upazila Seed Inspector in consultation with local officials. The seeds are sold directly to the farmers on 'first come first served' basis. No reserve provision is kept for co-operators.

4.4.2 FERTILIZER

Due to implication of new seed based technology, the demand for chemical fertilizers increased steadily. To ensure timely storage, supply and distribution of fertilizers, BADC has set up a network of storage facilities from ports of entry and factory gates to sale centres.

There are mainly five Primary Distribution Points (PDP) and sixty one upazila Sale Centre (USE) all over the country (BADC, 1985, p.17). BADC has introduced a New Marketing System (NMS) of fertilizer distribution in 1978.

Under this system, any private individual, company, farmers' association or co-operative can become fertilizer wholesaler or dealer by registering itself with the sale centre. Whole sale fertilizer dealers have also been appointed at upazila level to ensure fertilizer availability at farmer's level. In present system no restriction is imposed on the retail sale of fertilizers to the farmers. Each TCCA (now UCCA) can procure fertilizer in advance against their bank guarantee and after harvesting they repay its value.

4.4.3 IRRIGATION

BADC is responsible for supply, maintenance and operation of various irrigation equipments, viz. low lift pumps (LLP), deep-tubewell (DTW), shallow-tube well (STW) and hand tube-well (HTW). The irrigation field staff is available at Upazila level for survey, preparation and implementation of irrigation schemes. For proper storage and maintenance, BADC has set up a wide network of store-cum-workshop at Upazila level throughout the country. To ensure supply of diesel and lubricants to farmers, BADC procures oil and fuel from the oil companies and makes it available from Upazila stores. Any number of pumps can be purchased by any individual or group at fixed prices. The tubewell owner group's are solely responsible for the operation of tubewells, while BADC ensures technical services for maintenance and repair.

For BRDB Co-operatives (KSS) to possess a DTW, they have to apply to TCCA to justify their need and potentiality. After official proceeding, final approval comes from the Upazila Inspection Team (U.I.T.). BADC study its feasibility and give approval for installation, which become sunk by BADC approved contractors.

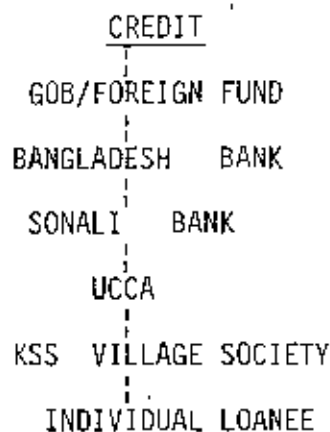
In this regard, Sonali Bank, the financier for TCCA meet the lumpy loan requirement. Sanction of STW and LLP follows same procedure, but in these items supplier are private agencies. The procedure for HTW follows same order, here department of Public Health Engineering (PHE) are the supplier.

4.5 BANGLADESH RURAL ELECTRIFICATION BOARD (BREB)

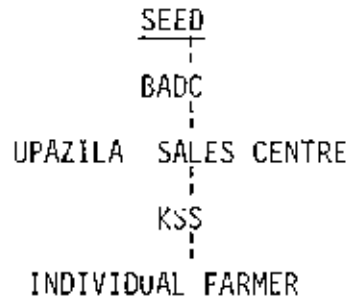
REB works with the system of national irrigation development, which supply electricity for rural areas and thereby supply power to different irrigation units. Power Development board (PDB) also supplies electricity, but REB taking over its responsibility in rural areas.

4.6 NATIONAL INPUT DISTRIBUTION-CHANNEL TO KSS

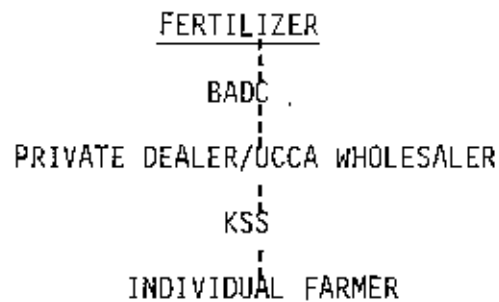
For credit, UCCAs are linked with Sonali Bank, which receives fund from Bangladesh Bank. The primary societies receive fund from their ULCA, then distributed to individual loanees. The institutional steps down of credit can be diagrammed as follows,



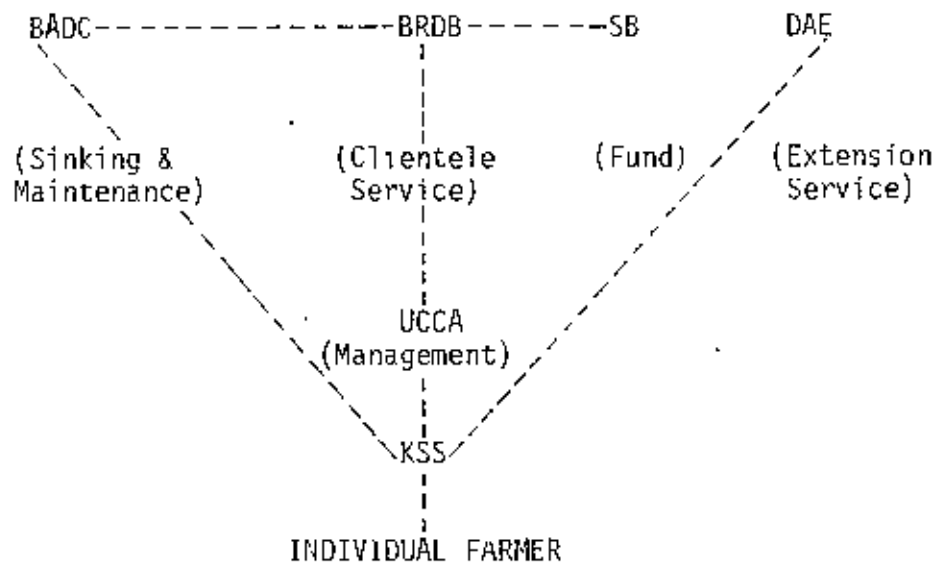
In seed distribution, BADC is the sole producer and distributor. It distributes through its upazila sales centre to individuals. Groups of farmers from KSS or farmers individually can procure seed. This procedure can be schematised as,



In respect of fertilizer distribution, BADC engages private dealer at upazila level, where an UCCA can hold a whole saler licence. Thus an individual farmer can buy privately or in groups through KSS. This can be diagrammed as follows,



In respect of irrigation devices, BRDB performs clientele services, receives fund from Sonali Bank, BAUC procures and sinks the tubewell. After installation, BADC carries the responsibility of maintenance. The necessary extension services rendered by Department of Agricultural Extension (DAE) for production practices at farm level. This can be given by schematic representation.




V. CHAPTER

5.0 FARMER'S PARTICIPATION IN CO-OPERATIVES - ITS NATURE AND SCOPE

5.1 MEMBERSHIP CHARACTERISTICS BY FARM-SIZE

To study the nature and scope of farmer's participation in co-operatives, the information that we have on the characteristics of members of co-operatives can be divided into two parts, those relating to members of managing committee in KSS and those pertaining to general members of KSS.

In order to achieve the goals of the present study and for the purpose of analysis, all farm families have been classified over preceder into five specific sub-groups,

- 
- i) Landless farmer (only house-holder)
 - ii) Marginal farmer (owning less than 1 acre of land)
 - iii) Small farmer (owning less than 2.5 acre of land)
 - iv) Medium farmer (owning less than 5.0 acre of land)
 - v) Large farmer (owning more than 5.0 acre of land)

For the purpose of the present study a downward adjustment is often made by including marginal farmer into small farmer group, though in specific situation they borne different characters and nature of action.

The landholding owned by a farmer indicates his socio-economic status in rural Bangladesh. In this study, the level of land owned by the members of KSS indicate predominance of medium and large farmers. The following table reveals the picture.

Table 5.1
No. and P.c. Distribution of Households by Farm-size
in each Co-operative in the Study Area

Farm Size (Acre)	Mukttagacha					Trisal				
	Mankon		Nandibari		All	Salimpur		Jhaierpar		All
	No.	%	No.	%	%	No.	%	No.	%	%
0-.99	3	8	5	7	7.3	2	7	7	10	3
1.0-2.49	7	17	14	20	19.1	4	13	12	17	16
2.5-4.99	20	50	31	44	46.3	13	43	34	49	47
5.0-Above	10	25	20	29	27.3	11	37	17	24	28
Total	40	100	70	100	100.0	30	100	70	100	100

Source: Field Survey, 1986

Table 5.2

P.C. Distribution of households by Membership Status
and by Farm size groups in the Study Area

Characteristics	General Members		Committee Members	
	Trisal	Muktagacha	Trisal	Muktagacha
Farm-size(Acre)				
Less than 1	9	7.3	0	0
1.0-2.49	16	19.1	8	8
2.5-4.99	47	46.3	58	50
5.0+above	28	27.3	34	42

Source: Field Survey, 1986

Among the members of managing committee greater representation pertained by large farmers. In this section, representative from poor farmers is nil in both areas.

The idea gathered in this study about the predominancy of medium and large farmer in co-operative can be further established, if the information on land owned are contrasted with those reported by land occupancy survey, which shows the proportion (%) of households against the four land owing categories of less than 1, 1 to 3, 3 to 5, and 5 above (acre) are 58, 25, 9 and 8 respectively for whole Bangladesh. (BBS, 1985, p.844).

5.2 MEMBERSHIP STATUS BY INCOME AND OCCUPATION

The characteristic pattern of membership in a co-operative is very much influenced by the level of income and type of occupation of the participant farmers. First, to know the level of income, annual household income is considered and members' proportion in classified income-groups are observed in the following table.

Table 5.3
Proportionate Distribution of Members by level of Income
and type of Membership in the Study Area

Annual Income in Groups(Tk.)	General Numbers			Committee Members			
	Trisal	Cumu- lative	mukta- gacha	Cumu- lative	Trisal	Cum. Mukta- gacha	Cum.
Less than 6000	06	-	0	-	-	-	-
6000-12000	18	24	18	-	10	-	17
12001-18000	26	50	21	39	30	40	10
18001-24000	08	58	17	56	15	55	20
24001-30000	17	75	18	74	17	72	16
30001-above	25	100	26	100	28	100	38
Average .:	12,344		14,990		18,900		22,100

Source: Field Survey, 1986

The table reveals that KSS managing committee members are wealthier followed by general members. The half of the general members of Trisal area are earning below Tk.18,000 annually, while the general picture of Muktagacha is quite happier.

For investigating into the nature of participants in the co-operatives, the type of occupation is an important criteria. In this section, the type of occupation of the members are studied by the type of membership status in KSS.

Table 5.4

Proportionate Distribution of Members by Type of Occupation and Type of Membership Status in the Study Area

Type of Occupation	General Members		Committee Members	
	Trisal	Muktagacha	Trisal	Muktagacha
Agriculture	88	84	92	90
Agri.+ Business	05	06	08	10
Agri.+ Service	06	06	-	-
Agri.+ Others	01	04	-	-

Source: Field Survey, 1986.

The table reveals that Committee members are more engaged with business. During field survey, it has been reported that two managers are engaged with agri-business. One is paddy supplier to Tongi rice-mills and other one is the dealer of fertilizer in local market. The general members include some service holders, those serving outside the village but engage their land to get services from co-operative, specially DTW project. The others reported as mechanics, seasonal wage labourer etc.

5.3 MEMBERSHIP CHARACTER BY EDUCATIONAL LEVEL AND SCOPE OF TRAINING

The level of education of a member indicate his social status and general qualification. Again, education attributes for a member's acceptability to new ideas and practices and for the cause of development of the society. In the following table, the level of education is compared between general members and committee members in the study area.

Table 5.5

The Level of Education by the Membership
Criteria in the Study Area

(% of member under each category)

Level of Education	Trisal		Muktachacha	
	General Member	Committee Member	General Member	Committee Member
Illiterate	34	-	26	08
Signatory	19	-	38	16
Primary	13	42	24	58
Secondary	18	42	06	10
Higher Secondary and above	06	16	06	08

Source: Field survey, 1986.

The table shows that, greater proportion of general members in Trisal grouped as illiterate and 53% are below primary education, while those of 64% are below primary level in Muktagacha. The general level of education is better in muktagacha. Among the managing committee members in Trisal, the 100% of them crossed primary level education, but in Muktagacha 76% crossed the primary bar. So, the Committee members of Trisal area are more educated.

The scope of training is limited to the members of managing committee. They are supposed to take training from ICCA (Now UCCA) and replicate it to general members about the principles of organisation and management of the society and about the production activities e.g. proper application of fertilizer, water management, line sowing etc. The model farmer is responsible to disseminate new ideas of cultivation. It is reported that the frequency of training was regular in the RD-I project duration, the system now deceased. Then the irrigation management programme (IMP) was introduced caused efficient use of irrigation water, benefits are gaining still now. Neither any regular and systematic programme of training on HYV cultivation to farmers, nor any type of education on co-operation and resource use in the society is practiced.

5.4 PARTICIPATING THE MEETING AND DECISION MAKING

Managing Committee members are supported to attend regular office meeting and general members when general meeting convened to carry out activities efficiently and regularly. In respect of decision-making the democratic principle is desirable.

To investigate the regularity of meeting, the number of participants in the meeting, the role of specific persons in decision-making certain scores are assigned against each classified order of attributes, are tabulated as follows.

Table 5,6
Distribution of scores assigned for selected
attributes

Attribute	Orders of attribute	Score	Maximum score
Weekly meeting	No meeting in a month	0	
	Weekly meeting "	1	
	2 weekly meeting "	2	
	3 weekly meeting "	3	
	4 weekly meeting "	4	=4
Attendance	below 33%	1	
	33%-66%	2	
	66%-100%	3	=3
Decision	Manager alone	1	
	Manager consulting with President	2	
	Managing body members	3	=3
All attributes, maximum attainable score by a society			=10

Table 5.7

Performance of Co-operatives by Selected
Criteria in Study Area

(% of max. score secured in each category by each KSS)

Performance Criteria	Trisal		Muktachacha		All Area
	KSS ₁	KSS ₂	KSS ₁	KSS ₂	
Meeting	(2) 50	(3) 75	(3) 75	(3) 75	
	Av. = 62		Av. = 75		Av. = 69
Attendance	(1) 33	(2) 66	(2) 66	(1) 33	
	Av. = 50		Av. = 50		Av. = 50
Decision	(1) 33	(2) 66	(2) 66	(2) 66	
	Av. = 50		Av. = 66		Av. = 58
All Criteria	(4) 40	(7) 70	(7) 70	(6) 60	
	Av. = 55		Av. = 65		Av. = 60

(Figures in parenthesis show absolute max. score in each category)

Source: Field Survey, 1986

Among three criteria , attendance performance scored least and meeting performance is highest. In place variation, Muktagacha KSSs scored better. The composite score by all criteria in all areas enumerated 60%, which indicate that still there are scope to improve the performance of co-operative in the involvement of member farmers and improving decision making process.

5.5 ELECTION AND DURATION OF OFFICE BEARERS

The democratic principle advocates the need of election and holding the office during the length of time as approved by the constitution of the society. If the process is continuous, power can be successively transfered from one person to another.

In survey, it was observed that two committees holding their office for more than 5 years, the rest two societies continuing three years and four years. In a Committee, two specific positions are important, those are the President and the Manager. These persons holding their office continuously for 5 years in two KSSs of Trisal. This phenomenon creates stagnation in the organisation, which was found accute in Trisal area, but Muktagacha KSSs are not better off. This

information implies that power is held by few persons and decision process is very much centralised to those persons.

5.6 GROWTH OF MEMBERSHIP IN THE FARMER'S CO-OPERATIVES

By looking into the growth of membership in co-operatives in the following computed table, we can find that the increase in membership in two societies are quite rising than others. That is, their compound annual growth rate are 11% and 12% respectively, while other two are 5% and 6%.

Table 5.8
Size and growth of Membership in Farmers'
Co-operatives in Study Area

Year	Muktagacha		Trisal	
	KSS ₁	KSS ₂	KSS ₁	KSS ₂
1975-76	29	-	-	-
1980-81	40	32	30	45
1984-85	78	40	40	80
Compound Growth rate	11%	5%	6%	12%
Av. size in first 5 yr. (1976-81)	35	-	-	-
Av. size (1976-86)	55	35	35	57

Source: Field Survey, 1986

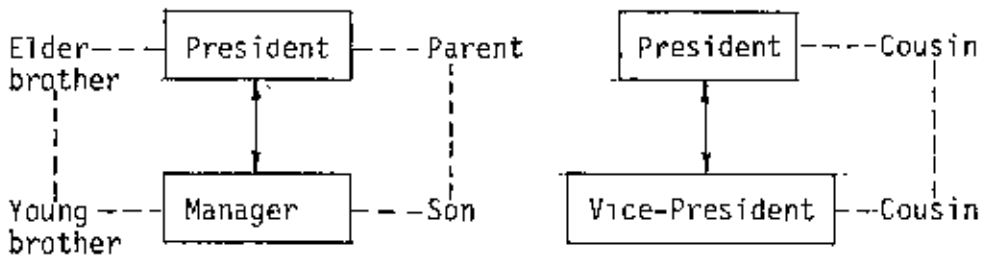
It is important to consider here that two greater sizes KSSs possess two DTWs each, while the other two possess one each. Then, it can infer that membership grew more due to involvement of new irrigation group in the society. It was due to inability of new irrigation groups in registering themselves in ICCA, where a prior registered KSS located nearer to or around them. By looking the average size of members in the table, this inference can be further strengthened.

5.7 FAMILIAL CONNECTION IN THE MANAGING COMMITTEE

The study observation reveals that the familial relationship exists in between and amongst the members of the managing committee. In the committee, it is observed that the President and the Manager are parent and son respectively. In another committee, the President and the Manager are elder brother and young brother respectively. It is observed in another committee, that the President and the Vice-president are cousins and the Manager and the Driver-cum-mechanics are cousins, though they do not hail from same grand-father. In investigation, it is found that this relationship is

rooted from very beginning of society formation and sanctioning of the DTW project. The large or medium farmers collecting their lands within their ancestry or from horizontal social relatives, find themselves more dependable, reliable, financially fit and risk sharing to sanction such a lumpy DTW project. Likewise, in the involvement of resources, the benefits tend to be distributed among them. It is observed that they increase the membership in the name of wife, children and others from same household or kins to keep power and benefit within them. So, the kinship relation or horizontal social relation with the possibility of spatial integration influence to formulate a society.

Fig. 5.1
Kinship relations in the managing committee



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5.8 GEO-SOCIAL FACTOR IN THE SOCIETY

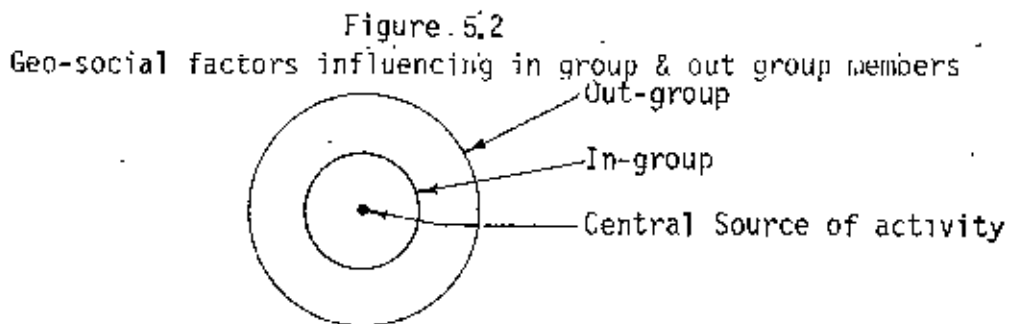
In the intended goal of achieving a DTW - based irrigation scheme in the winter season, the farmers form a co-operative under the auspices of BRDB. They avail the devices to the society by justifying members economic potentiality and satisfying soil feasibility study by engineers.

Due to the location of DTW and its command area of operation, two types of groups are identified in the scheme, those are, the in-group and the out-groups, as termed by the author. The in-groups actually form the society, manages it, locate tubewell in their own land or in their opted land. They enact each other with close social and spatial connection. But due to engagement of preferential land in the scheme, an arbitrary external factor influences in the determination of enrolment size of membership in the society. To fulfil the coverage of land, the preferential plot-holders get into as members, those are termed here as out-groups. They do not participate in the society actively, never included in the managing committee and act indifferently. The out-group members keep weaker relation among them and with the in-group members also. They usually complain that in-group members

are getting fullest utilisation of the resources and they are deprived of it. Specially, in the period of load-shedding in electricity operated machines, they said that they merely find managers and driver of the machine to request to water their plot.

So, this spatial difference in members comes with social disintegration and factions in the society. In this respect, any attempt for co-operation in the field of agriculture may be failed or may create under-utilisation of resources. So, the situation demands the character of a society to be developed as geo-social institution.

For the limited scope of the study, the observations by the researcher is partial and cannot include other factors in connection. To make any comment and to generalise of any idea about it, an intensive research about it is deemed necessary.



VI. CHAPTER

6.0 ADOPTION AND DIFFUSION OF HYV TECHNOLOGY THROUGH COOPERATIVES

The main purpose of this chapter is to examine and analyse the process of HYV adoption and diffusion in the study area as experienced by a sample survey.

6.1 THE EARLY ADOPTER

Evidence from study area shows that co-operative members were the first to adopt HYVs and their rate of adoption (ratio of number of farms using HYV seeds to total number of farms) was quite rising. It is for the reason that membership in farmers' organisation bring it with numerous advantages through improved access to source of knowledge and information on new technology and access to supply of input such as fertilizers, irrigation water etc. But the non-members caught up markably from 20 to 60 percent in Muktagacna and 15 to 70 percent in Trisal within 5 years time.

Table 6.1
Rate of Adoption of HYV rice and Co-operative Membership in the
Study Area (Proportion of Farmers in % in each category)

<u>Area</u>	<u>Status in Cooperative</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Muktagacha	Member	75	85	85	90	95
	Non- Member	20	25	30	40	60
Trisal	Member	70	80	85	95	98
	Non- Member	25	30	45	60	70

Source: Field Survey, 1986

To adopt a new technology, it involves a process consisting of five stages, these are, awareness, interest, evaluation, trial and adoption (Lionberger, 1966). In this study the role of model farmer is identified as responsible for diffusion of HYVs and improved cultural practices. In Trisal and Muktagacha, 62% & 70% of the co-operative members respectively reported to adopt new ideas by one-crop year period (time considered here for two extreme stages of initial and final). But successively, the model farmers influence and 'neighbourhood' effect extend it beyond the membership barrier within next few years.

6.2 FARM SIZE AND HYV ADOPTION

Other than the rate of adoption i.e. a ratio between number of farms using HYV seeds and the total number of farms, the intensity of adoption i.e., the proportion of rice area under HYV (instead of cultivators) is another measure of adoption of new technology (Asaduzzaman & Alam, undated).

In this study, a positive relationship observed between farm size and adoption rate and among the adopters in the co-operative an inverse relationship has been observed between farm size and intensity of adoption.

Table 6.2
Farm Size and rate of Adoption by Membership Status*

Farm Size (in acres)	(% of farmer in each class)			
	Adopter: Member		Non-Member	
	Trisai-Mukhtagacha		Trisai-Mukhtagacha	
0-.99	94	90	60	45
1.0-2.49	99	91	65	50
2.5-4.99	99	99	75	70
5.0-above	100	100	80	75

Source: Field Survey, 1986.

Table 6.3
Farm Size and Intensity of Adoption by Membership Status**

Farm Size (in acres)	(% HYV rice acreage to total in each class)			
	Member		Non-Member	
	Trisai-Mukhtagacha		Trisai-Mukhtagacha	
0-.99	80	85	30	40
1.0-2.49	76	79	60	50
2.5-4.99	72	75	65	60
5.0-above	68	70	60	60

Source: Field Survey, 1985

Note: HYV adoption used here to mean adoption HYV seed with practiced use of fertilizer, water, pesticide etc.

* Rate of adoption means ratio between number of farm using HYV seed and the total number of farm.

** Intensity of adoption means the proportion of rice area under HYV -to total cultivable land.

In the study, it is understood that membership status does not appear to influence HYV adoption to the farmers, except in case of non-member, the medium-sized farmers devote more acreage into HYV cultivation intensively. It is evident from the survey that rate of adoption is higher among larger farmers. The implication of this relation is that larger farmer has ability of more risk bearing and investment ability in the use. But considering problems of fragmentation of land, less managerial ability, proximity of land to irrigation sources, tenancy, inefficiency in resource use etc. they can not devote more cultivable land under HYV. But in the case of small and poor farmers, once the fear of uncertainty and risk is overcome, he prefer to put much effort to exploit the benefit of HYV technology. It can be clarified further in saying that the small farmers adjusting with overhead cost of decision to adopt, he is likely to more committed to the new variety in terms of proportion of his total acreage under HYV with intensive use of their family labour.

6.3

ADOPTION CONCENTRATION

Information from the study area sets the idea that HYV rice cultivation is basically concentrated in Boro season. The controlled and assured irrigation throughout the dry season, might cause for its concentration. Again, the risk and uncertainty compared to Aus and Aman season is less in Boro season. From a sample information of study area confirms that yield of HYV Boro is quite higher than that of Aman. Again co-efficient of variation of HYV Aman output is .142 compared to .026 in the case of HYV Boro. This reflect

the fact that HYV Aman is more uncertain and risk bearing. Even the coefficient of variation of TV Aman is less than that value of HYV Aman.

Table 6.4
Comparative output, Variance, Co-efficient of
Variation in two Major Crop by Variety

Determinant Statistic	Aman		Boro	
	TV	HYV	TV	HYV
Mean yield (\bar{x}) (md. per acre)	29.75	40.5	35.22	60.0
Variance(s^2)	8.31	33.25	8.56	2.5
Coefficient of Variation (s/\bar{x})	.097	.142	.083	.026

Note: No. of sample farm is 20.

Average figure for study are:

Boro rice area as proportion of total rice area:	40%
HYV area to Total land:	55%
Boro HYV area as proportion of total HYV area:	45%
Boro HYV area as proportion of Total Boro area:	95%

VII. CHAPTER

7.0 ACCESSIBILITY TO RESOURCES

7.1 THE PROBLEM OF ACCESS DEFINED

Huda (1983)) in his study made contribution in defining the problem of access. He defines four types of access in the context of agricultural development. The components are,

- i) access to information
- ii) access to inputs
- iii) access to markets
- iv) access in social services

These access are conjointly contributory and none of them can alone achieve the goal of increased productivity in agriculture. However, access to one rather than other bring possibility of nearer achievement. The nature of the agricultural production organisation is such that one cannot secure access in perpetuity.

The core determinant of the problem of access is the ownership pattern of means of production: Land being the most valuable assets, by virtue of its ownership in large quantity, the land rich group can have privileged access to public goods and services. The very distribution pattern of land makes the rich peasantry to have better access to given resources. A small peasant can get access to information regarding modern technology, but he cannot get access to modern inputs and services to make effective use of his access to information. The unequal social setting in which he is living prevents him to get the benefit. Again, rich peasantry, because of its class strength and closer connection with public supply machinery have the better access situation.

Given the problem of access, in this piece of study, we turn to get specific access situation.

7.2 ACCESS TO LAND

Ownership of land is the core determinant of access in the context of rural Bangladesh. Land ownership determines a peasant's income and other factors of

market in privileged way. The groups, rich in land-ownership can easily get involved into local institutions and can share public resources.

The distribution of land ownership in the study area shows disparity in a disproportionate way. The following table can present the reality.

Within the co-operatives, the distribution of land ownership is quite contrasting, the following tables shows the relative share of different farmer groups.

Table 7.1

Relative Share of Owned-Land by Different Farmer Groups in Co-operatives in Study Area, for 1985
(in acre)

Farmer Group	Land-Size (Acre)	Muktagacha		Trisal	
		Land-Owned	%	Land-Owned	%
Small	0-2.49	41.5	10.8	36.4	10.0
Medium	2.5-4.99	162.3	42.2	159.3	44.0
Large	5.0-above	180.0	47.0	166.0	46.00

Source: Field Survey, 1986

Now, if we get to find, the impact of temporal change in landownership pattern in the study area, the figure from the following table gives the idea that medium size-farmers were progressive in acquiring more land, then followed by large and small farmers. This signifies that medium-sized farmers could manage to fetch the return in a greater way.

Table 7.2
Relative Change in Shares of Owned-Land by
Farm-Size Groups in Co-operatives in Study Area, During
1980-85
(in acre)

Land size Area	Muktachacha			Trisal			Average Change
	1980	1985	% Change	1980	1985	% Change	
0-2.49	26.0	41.5	159.6	22.3	36.4	163.2	161.4
2.5-4.99	90.3	162.3	179.7	90.0	159.3	177.0	178.3
5.0-above	107.0	180.0	168.2	95.0	166.0	174.7	171.4

Note: 1980 figures taken as base

Source: Field Survey, 1986.

It is not only the case with land, the distribution of most other elements of production is equally unequal. Following access situation give some indications.

7.3 ACCESS TO DRAUGHT ANIMALS

In this section we try to find the pattern of possession of draught animals in co-operatives by different farm-size groups.

Table 7.3

No. Distribution of Type of Draught Animals
Owned by Farm-size Groups in the Study Area

Farm size (Area)	Muktagacha				Trisal				Total Animal	Av. in each H./hold
	Coopt-1 Cow-Ox	Coopt-2 Cow-Ox	Coopt-1 Cow-Ox	Coopt-2 Cow-Ox	Coopt-1 Cow-Ox	Coopt-2 Cow-Ox	Coopt-1 Cow-Ox	Coopt-2 Cow-Ox		
0-99	4	-	3	-	3	1	8	5	24	1.4
1.0-2.49	24	37	10	5	6	2	15	10	79	2.1
2.5-5.99	60	30	30	12	30	12	68	30	272	2.8
5.0- +	60	20	27	12	32	16	50	20	237	4.0

Source: Field Survey, 1986

The table reveals that rich in landowner groups use more oxen than small farmer groups. The maximum number of animals are possessed by the medium-group of farmers. But, in respect of per household ownership large group farmers are highest. Number of cows greater than oxen irrespective of places, but the later is more possessed in Trisal area than Muktagacha. Small farmers (0-2.49 acres) shares only 17% of total draught animals in the study area.

7.4 ACCESS TO FARM-IMPLEMENTS

In this study, farm-implements include plough, ladder and spade. By the number of items possessed by some categorised farmer-group the accessibility is understood.

Table 7.4
No. Distribution of Farm-Implements by Farm-size
Groups in Study Area

Farm size Area	Muktagacha				Trise			Area To- tal	Grand Total	Av. per H./ hold
	Plough	Ladd- er	Spa- de	Total	Plo- ugh	Ladd- er	Spa- de			
0-.99	6	5	13	24	9	9	14	32	56	3.2
1.0-2.49	24	24	23	71	16	16	17	49	120	3.2
2.5-4.99	87	90	51	228	90	82	48	202	430	4.4
5.0- +	75	45	38	158	62	57	47	166	324	5.5
Total	192	164	125	481	177	145	126	449	930	

Source: Field Survey, 1986

Itemwise the number of plough is highest than other implements irrespective of places. The small farmer group (upto 0 to 2.49 acre) possess only 19% of total implements. Average figure again confirmed our idea that small farmers are least accessible to the productive resources.

Not only the quantitative distribution of farmer implements are unequal, the type and quality of implements also vary qualitatively. The small farmer groups use iron shares of plough are generally of one type and length of iron share are comparatively small than medium and large farmers. The variations occur in length as 4" to 6", 6" to 8" and 9", the deeper share is used in dry-soil, while the shorter are in humid soil. The reason lies behind that large and medium farmers use to cultivate in Aus-season.

7.5 ACCESS TO IRRIGATION

Source of mechanised irrigation creates the possibility to cultivate Boro as second seasonal crop in dry season. Co-operators are supplied DTWs in a privileged way. By the virtue of membership status in co-operatives, the large farmers are the first to fetch the maximum return out of use of modern devices.

Table 7.5
Acreage under Boro Cultivation by Farm-size
Groups in Co-operatives in Study Area

Farm Size (acre)	Muktagacha			Trisal			Grand Total by Area	Av. per H. hold
	Coopt-1	Coopt-2	Total	Coopt-1	Coopt-2	Total		
0-2.49	5.39	11.2	16.59	2.76	11.78	14.54	31.13	0.6
2.5-4.99	24.0	40.92	64.92	16.12	47.6	63.72	128.64	1.3
5.0- +	24.8	48.0	72.8	24.2	42.16	66.36	139.16	2.3
Total	54.19	100.12	154.31	43.68	101.54	144.62	298.93	

Source: Field Survey, 1986. . .

In Muktagacha small farmers comprises 10.75% of total Boro acreage under irrigation and in Trisal it figures at 10.05%. Considering average figure in two areas, the small farmers cultivate 10.40% of total Boro acreage, medium farmers are 43.03% and large farmers are 46.55% of total acreage. Average figure reveals the access situation of irrigation to each group.

7.6 ACCESS TO CHEMICAL INPUTS

Due to privatisation drive, the TCCA's role in the distribution of fertilizer has been diminishing since 1979-80, now farmers use to collect their requisite from open market. Generally, the factors of market do not favour the farmer's interest. The following table shows the diminishing role of TCCA in two study upazila.

Table 7.6
Yearwise Distribution of Fertilizer Through
TCCA in two Study Upazila

Upazila	Quantities in '000 maunds							
	75-76	76-77	77-78	78-79	79-80	80-81	81-82	82-83
Mukta-gacha	27.5	21.0	43.5	62.2	22.8	18.0	14.8	17.4
Trisal	35.0	35.0	51.4	43.0	20.0	12.8	12.4	5.2

Source: BRDB, RD-1 Programme

The study reveals that farm-size groups vary in their application of fertilizer by type and across upazila, though it is prescribed that application retain the neutrality of scale.

Table 7.7
Average Rate of Application of Fertilizer by Type and by Farm-size Groups in Two Study Area
(Fig. are of Boro season in seers per Acre)

Farm size (acre)	Mukttagacha			Trisal		
	Phosphate (P)	Potash (K)	Nitrogen (N)	Phosphate (P)	Potash (K)	Nitrogen (N)
0-2.49	56	16	96	48	16	88
2.5-4.99	64	24	80	64	24	72
5.0- +	64	24	80	64	24	72

source: Field Survey, 1986

The table shows that generally the medium and large farmer groups apply more amount of fertilizer. But by the rate of application of nitrogen in two areas implies that small farmers use more nitrogen, it seems more popular among those farmers. In Muktagacha area farmers use to combine Nitrogen(N), Phosphate (P) and Potash(K) in a quite larger proportion irrespective of farm-sizes.

From the aggregate, the average use of fertilizer, gets our idea of respective share of fertilizer to different farm-size groups in co-operatives. The following table can clear the thing.

Table 7.8

The Use of Fertilizer by its Type and by Farm-size Groups in Co-operatives in Two Study Area (Figures are aggregate use of Boro and Aman in 'Seer pér' àcré)

Farm size (acre)	Muktagacha			Trisal		
	Phosphate (P)	Potash(K)	Nitrogen (N)	Phosphate (P)	Potash(K)	Nitrogen (N)
0-2.49	73	22	155	72	36	132
2.5-4.99	80	42	100	94	32	112
5.0- +	86	42	140	96	42	114

Source: Field Survey, 1986

The total use of fertilizer is greater in Muktagacha for the fact that total area of cultivation in that area is larger. Now, proportionate share of small farmer to total use is only 10.0%, for medium farmers is 40% and for large farmer it is 50%.

In respect of pesticide use, Muktagacha accounts 375 seers and Trisal 150 seers, which is 40% of use of prior area. It may be caused by the fact that in last year Muktagacha was more susceptible to insect-attack and diseases and farmers general attitude in use of it. The small farmers share 9% and 16% of total use in Muktagacha and Trisal respectively.

7.7 ACCESS TO MARKET

Farmer's participate in the market with their harvest. The relatively small farmer's have to response to market within short time after harvest. But relatively large farmers participate within longer range of time, it is due to their resource potentiality and anticipation of a bit higher price in lean period. The following table show the nature of market participation by landownership groups in the study area.

Table 7.9
Market Participation by Farm-size
Groups in Co-operatives in Two Study Area
(% of farmer responded under each category)

Sale of paddy after harvest	Muktagacha			Trisal		
	Farm-size (acre)			Farm-size (acre)		
	0-2.49	2.5-4.99	5.0-+	0-2.49	2.5-4.99	5.0- +
0-30 days	55	45	35	56	50	40
31-60 days	45	45	45	40	45	45
61-90 days	0	10	25	4	5	15

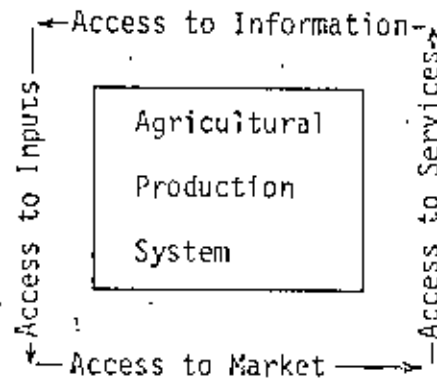
Source: Field Survey, 1986.

The table reveals that small farmer groups participate (55%) within one month. While the medium farmers are 47.5% and large farmer's are 37.5% to participate with the product within one month. This signifies the least accessible position of small farmers to the market and their economic instability.

7.8 ACCESS CONSTELLATION

The important aspect of access constellation is that each identified components of access are conjointly contributory to the realisation of specific goals i.e, the increased productivity in agriculture. One component itself can bring nearer to realisation or can partially achieve the goal, but until and unless all components closed together to act to complete the total system the specific goal cannot be realised. These relations as set forth (Huda, 1983, p.46) can be represented in a schematic diagram as follows,

Fig. 7.1
Access Constellation



In our study, it is observed that information about new technology, techniques of improved cultivation and farmers training are not evenly spread over individual membership

in the co-operatives. It has been found that by virtue of membership status, information sub-system is biased for committee members, then to rich and medium farmers in the co-operatives.

Because of those farmers' dominant position in the societies and closer connection with the service offering agencies, they are treated in a privileged way. The small farmers generally lack the knowledge about the new technology and in cases where they are informed or aware of it, they are denied access to it.

Alike the access situation of information, the market institutions, its input and output factor markets act favourably for the well-to-do farmers. In study, it already observed that managers himself engaged in fertilizer and rice trading in addition to farming occupation. It is revealed from the study that in market participation small farmers are prized by least accessible position. They use to sell their product earlier due to their economic instability.

In order to remain farmers active both mentally and physically, need literacy, education, health and other social facilities. The level of education reflects a farmer's cosmopolitaness to the newer and outer orientation. In this respect, the

medium and large group of farmers are instantly achieving higher level of education. Likewise, the other institutional social facilities are also trickled down favourably towards those privileged group of farmers.

The ownership of means of production is the core determinant of access as expressed earlier. The fundamental reflection of inequality in terms of both material and non-material possession, is determined by ownership pattern of land. It provides the owner a secured means of gaining a continuous stream of income and keeping social status, which in turn helps them to avail these goods and services that further strengthen their income generation and keeping status quo. By virtue of ownership of land, those middle and rich group of farmers thus have privileged access to a number of other inputs for agricultural production.

In rural scene, the land ownership distribution is highly skewed, we observe a similar unequal distribution in other means of production. Consequently, the access to modern inputs, information, social services and market all tend to be biased against small farmers. The small number of farmers are getting benefits out of modern technology. In fine, a distinct process of differentiation of farm households into owners

and non-owners, into better off and worse off, has become clearly set in.

In the following, to strengthen the idea of input use differentiation, an effort has been made to understand the accessibility of inputs to different farmer groups in the co-operatives. An aggregative analysis is made based on selected input variables. The access analysis is aggregated from two upazila survey figures. Proportion of each identified farmer group to total number of members in co-operatives are differentiated to derive each farmer's participation rate from their respective farmer-group. Then each farmer's participation rate is multiplied with the figure of proportionate input share by that farmer group to develop an index of accessibility of inputs pertained by respective farmer group.

The following table reveals the idea that input use by three group of farmers are not uniform, unevenly distributed and dominated by medium and large farmer groups.

Table 7.10

Distribution of Farmer's Participation and share of Inputs by groups in the Co-operatives and Chi-square Values

Farmer Group	% of farmer in each group	% Share of inputs in each group			
		Draught Animal	Tam Imple-ments	Boro Area	Fertilizer
Small	25.7	17	19	10	11
Medium	46.7	44	46	43	39
Large	27.6	39	35	47	50
Chi-square value	8.09	12.38	11.06	24.74	24.26
Level of Significance	.05	.01	.01	.01	.01

Now, to understand each farmer's accessibility of inputs, the indices of accessibility is calculated and shown in the following table.

Table 7.11
Indices of Accessibility of Inputs by the
Farmer Groups in the Co-operatives

Farmer Group	% of farmer in each group	Index of accessibility of input			
		Draught Animal	Farm implement	Boro Area	Fertilizer
Small	25.7	4.36	4.88	2.57	2.82
Medium	46.7	20.54	27.48	20.08	18.21
Large	27.6	10.76	9.66	12.97	13.80

Note: Index of accessibility is derived simply by multiplying crude rate of farmer's participation in each group to respective group share of inputs.

The table reveals the picture that small farmers are in least accessible position, while medium farmers ranked high followed by large farmers in the co-operatives.

7.9 IMPLICATION

From the discussion, the foregoing section clearly indicate that the problem of access has become quite critical on the pace of technological change gained momentum in Bangladesh. Benefits of technological change have now been reaped by the large and powerful. Small peasants are being kept out of the benefit possibility. To realise the goals of disseminating technological benefits to the larger section of farmer are still a myth. It is in the nature of thing that co-operatives take recourse to institutional means to realise the preferred goal. The BRDB based Co-operatives are far from their objectives. The architect of Comilla model co-operative critically looked it, as, co-operatives turn into Kulak Clubs'. (BARD, 1983, p.198).

The situation calls for redesigning of institutional arrangement in respect of scope of participation and availability of goods and services for the majority of farmer's in Bangladesh.

- VIII. CHAPTER
- 8.0 SUMMARY, SUGGESTION AND CONCLUSION
- 8.1 SUMMARY
- 8.1.1 PROBLEM SETTING

The technological change by the adoption of HYV technology in agriculture give hope to combat with the crucial situation of hunger and poverty. To couple with technological change, the institutional answer was sought out from the Comilla model, which became replicated throughout the country under the auspices of IRDP (presently BRDB). It has made modest progress in disseminating new technology and to a certain extent achieved growth momentum. It followed bureaucratic system of delivery of inputs. The organisational structure follows 'patron-client' relationship favourably for richer section of people. Judging in the light of aims, goals and objectives of the co-operatives the real achievement and performance of the co-operatives of our country is really poor. The BRDB co-operatives are organisationally weak, delivery oriented and biased against the majority section of the farmers (small, marginal and landless). So, majority of the farmer's could not able to fetch the benefit from technological change so far spread over. The Co-operative system could not ensure distributive justice along with the goal of increased productivity and income.

8.1.2 OBJECTIVES

The present study was conducted to achieve the setted objectives, to

- a) identify the present functional linkage of agencies involved in the channelling of modern technology to the farmer's level BRDB Co-operatives (KSS);
- b) examine the functions and objectives of BRDB Co-operatives in terms of scope of participation and accessibility of modern technology to the majority of farmer's (small farmer); and on the basis of that
- c) make suggestion for building an appropriate institutional framework for the development of agriculture in Bangladesh.

8.1.3 DATA BASE

The methodology follows both qualitative and quantitative approach. Data and information was collected from both primary and secondary sources. To perform the study, four KSSs were sampled from two upazilas, namely Trisal and Muktagacha of Mymensingh district. Where two KSSs were selected from each Upazila confirming that one KSS possess a single DTW and the other one possesses two DTWs.

Now, to narrate the study in brief, here the discussion followed by chapters.-

8.1.4 INVOLVED INSTITUTIONS

In chapter-four, the institutions so far involved in the channelling of modern technology since 1960, are studied, to understand the functions and linkage of different agencies to facilitate the technological change in agriculture.

The Comilla model was developed to organise farmers into groups in villages, to provide credit, services and training from the second tier of the organisation at thana level. At this level, other horizontal agencies are linked to facilitate the activities.

A separate thana irrigation programme successively introduced at Comilla to support farmers to better winter cultivation by supplying irrigation devices, excavating canals etc. These programmes gained achievements, but confined to Comilla district.

To replicate the ideas of Comilla experience throughout the country, government decided to develop a separate institution called Integrated Rural Development Programme (IRDP) before liberation. Since the First Five Year Plan, the major emphasis has been given to disseminate the new production technology providing necessary services and supports. Linking horizontal thana level agencies and vertically to national level agencies to find each KSS into an integrated framework. After a decade, with a few internal reorganisation the IRDP is redesigned

as Bangladesh Rural Development Board, keeping services and activities almost unchanged.

Since early decade of sixties, BADC, a public organisation was created to spread the ingredients of modern technology, such as, improved seed, chemical fertilizers and irrigation devices. This institution was designed hierarchially from upazila to national level to perform its activities.

The KSS get services from BADC at upazila level through UCCA to avail seed, fertilizer, irrigation devices etc. Since 1978, due to privatisation drive, BADC operates by offering services in open market which lacks past acquaintance to distribute input to KSS.

Tubewell operations are being very popular in days amongst the farmers. To avoid dependency of fuel in operating irrigation units, the Rural Electrification Board emerged to supply power to distant rural areas.

In distribution of credit, the Sonali Bank is the official sponsor for UCCA to procure the input in advance. In respect of training, the model farmers are trained at upazila Training and Development Centre (UTDC), where the extension experts from the Department of Agriculture meet them. Moreover, DAE have union level extension agents follow up the activities at farm level.

8.1.5 SUPPLY OF INPUTS

Chapter two observes the yearwise national level data on supply and use of different inputs, such as, fertilizer, HYV seed and irrigation devices. BADC is responsible to supply the inputs from port of entry or factory gate to upazila level distribution centres. The national figure reveals that the consumption of fertilizer and seed follow increasing trend. In respect of irrigation devices, it also cover more acreage by increase of time where the DTW acreage is quite increasing than other devices, due to involvement of more farmers to better winter cultivation.

8.1.6 ADOPTION AND DIFFUSION OF HYV

Chapter six sought to examine and analyse the process of HYV adoption and diffusion in the study area. The study observes that co-operative members are the vanguard, but non-members coped up within short time. In study, a positive relationship is observed between farm-size and adoption rate, but an inverse relationship is observed between farm-size and intensity of adoption among the co-operators. This means that small farmers are more committed by their limited resources to exploit potentials of HYV. Information from study sets the idea that adoption is concentrated in Boro season for the reason that average yield of Boro is highest and co-efficient of variation is least than any other seasonal variety of crops.

8.1.7 FARMERS' PARTICIPATION

To investigate into the nature and scope of different farm sized groups in co-operatives, the study information are grouped into general members and executive members for the convenience of the analysis. The study indicate the dominance of medium and large farmers in co-operatives and also their sole dominance in executive committee. It is found that managing committee members are wealthiest followed by general members. The executive members are associated with agri-business. Their level of education and participated training are higher than those of general members.

In ranking the process of decision making and participation of farmers, the evaluated index is figured by 60%, which signifies that there are ample scope to involve more member-farmer in meetings and improving the process of decision making. In determining the index three criteria were chosen; meeting, attendance and decision, whose scored 69%, 50% and 58% respectively. It is observed that the process of election and power transfer is not continuous and confined to few persons. In the committee a close kinship relation also observed. This phenomenon tends to deviate from keeping democratic principle in the society. The scope of enrolment in co-operatives is not spontaneous, the marginal increase in membership poses the thing. Interestingly it was observed that the enrolment increased due to

involvement of new irrigation group by sanctioning a new DTW project in the name of previous co-operative. To form a agricultural co-operative the geo-social factor is not considered, which stands for healthy socio-economic co-hension amongst members.

8.1.8 ACCESSIBILITY TO RESOURCES

In chapter seven, the accessibility of modern technology to the majority of farmer's is observed by the distribution pattern of ownership of resources and availability of inputs to three distinct farm-size groups.

Land is considered as the core determinant of access, which in turn give the possessor other sources of inputs in the privileged way. Land is observed skewed for large and medium farmers in the co-operative. A similar unequal distribution of other means of production also favour those privileged groups. In respect of possession of draught animal and farm implements, it has been found that the medium farmers are highest possessor. Again in respect of coverage of boro area and application of fertilizer large farmers are highest applier. Here, two factors are influencing two groups of farmer, those are, the highest number of membership for medium group and factor of land holding for large farmer group. Again search of an individual's accessibility to resources, the computed index reveals that a medium farmer is more accessible to all productive resources followed by large and the least for small farmer.

8.1.9 SYNTHESIS FROM TWO EXPERIENCES

Literature study deals to explore the potentiality of two projects as experimented in Bangladesh in two perspectives. Shimla Co-operative is decidedly higher form of co-operative, it possibled to pool productive resources in joint management at prevailing socio-political situation and semi-feudalistic stage of agriculture. Technological transformation achieved by inducing modern inputs as well as giving equal value for wage labourer. Equity in terms of distribution of income among member-farmers is attained to a great extent by treating other 'non-land' factors into production, the 'land' bias is overcome. Organising other non-farm activities in the village by the multi-purpose Co-operative, the scope of transformation of an individual's village to a collective village seemed possible.

The Grameen Bank achieved a landmark in nullifying the concept, that the landless peoples are non-productive. Again equal potentiality of women as equal productive agent is established by its experience. The conventional system of getting the credit against some fixed assets is overcome by distributing group share of one's risk and close supervision by the loan disbursing agency. To lessen the burden of loan repayment and to ease the procedure, weekly small payback is introduced. The homogeneity in group formation favours greater scope of participation, development of leadership, better social and economic co-hension in the lower strata of the society.

3.2 SUGGESTION

The development of agriculture means to develop the farmer's quality of life. The planning for agriculture rest upon the reality that how a farmer makes his farm production plan. In Bangladesh, to a farmer, the occupation of agriculture is not only a profession but a way of life. He earns a livelihood of his family by maximising the use of his diversified enterprises (crop, fruit, vegetable, cattle, poultry, fish etc.). Any attempt to develop one or few aspects of his farming neglecting other the total perspective in development then yet to be achieved. This implies for integration and co-ordination of different sub-sector agencies of agriculture to realise total development of a farmer as well as for the collective village, composed of farmers of that village. Different occupant groups with their resource potentiality are included into comprehensive village level planning (food, employment, environment, social services etc.)

The situation implies that any public activities related agricultural research, extension, education as well as supply and services having direct influence on any aspect of farm production plan of a family that must be carried out by one administrative system and under one command at national, sub-national and upazila level.

To make balanced, optimum and effective use of national resources, the administration of inter-related and inter-dependent organisation directly linked with agricultural development might come under one administration and control both at national and other levels. It is observed in the present study that the agencies involved in the development of agriculture work isolately. Each agency plans and follows their procedure of operation in separation to give goods and services to the need of the same farmer. Here, crux of the problem came out as, inefficiency, misallocation of resources, separate and segmented target achievement, misconception to development, distrust among agencies; caused dismal performance of the agricultural sector. This situation calls to rectify institutional weakness in the channelling of technology as well as development of agriculture; and to form a consistent development policy.

To get into the problem, the institutional weakness is divided into two hands. One from the delivery side and the other is receipt side. In delivery side, the public agencies are involved in distributing necessary goods and services from national level and step down to village level. In receipt side the farmers' organisations are involved to take over those public goods and services from the bottom level. This 'give and take' process tends to complete a continuous to and fro cycle. The intergration and co-ordination of different agencies at

different level must be linked at some intermediate working level horizontally and vertically in respect of policy making, planning and implementation of their respective programme to complete the above setted cycle.

The problem can be dealt with the help of regional planning approach. Planning for socio-economic development at different territorial level instead of a single national level may be called multi-level planning. Then multi-level regional planning for agriculture indicates that form of planning, which together form a regional system by other sub-ordinate sub-systems. In the multi-level planning, lower level regional plans form the basis for higher level regional plan and the higher level regional plan provide the framework for lower level regional plans. In this approach, the goals and objectives of national planning percolate down to the smallest units through the channels formed by the hierarchy of territory, say, national level, sub-national level, regional level, sub-regional level and local level. Along the same line the national target is also to be settled.

The task for multi-level regional planning is the preparation of comprehensive regional development plans--a co-ordinated set of plans which integrates the economic, social and physical goals and objectives of a region into a single whole. Then each regional plan cumulates to national plan.

Along with the regional planning approach, the following schematic presentation have been proposed to establish some framework of reorganising and co-ordinating of existing service delivery agencies and service recipient agencies in agriculture.

Figure 8.1

Proposed Approach of Vertical (Sectoral) and horizontal (agencies) integration at different territorial level

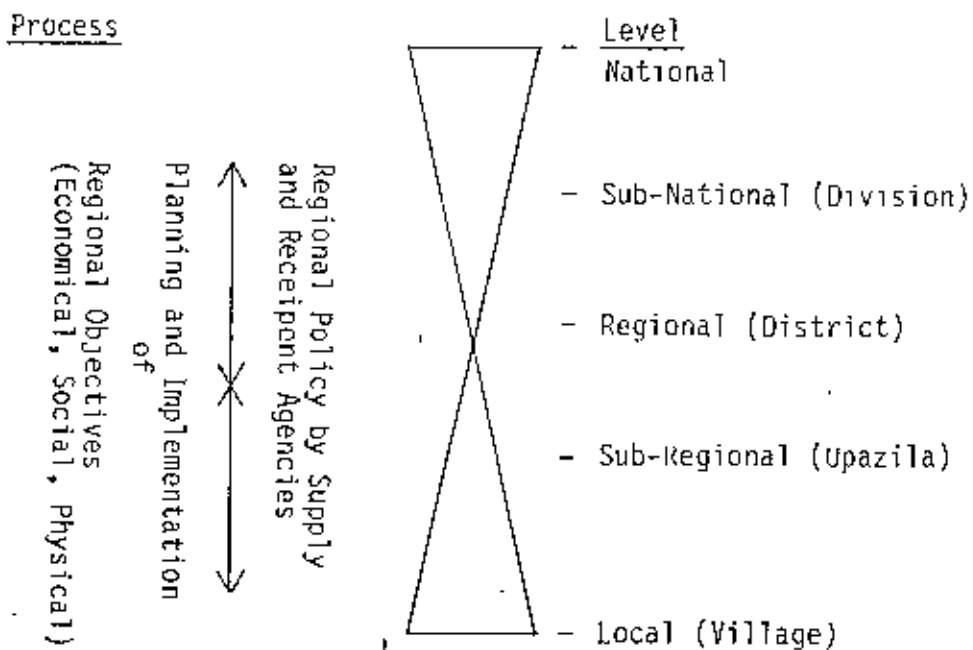
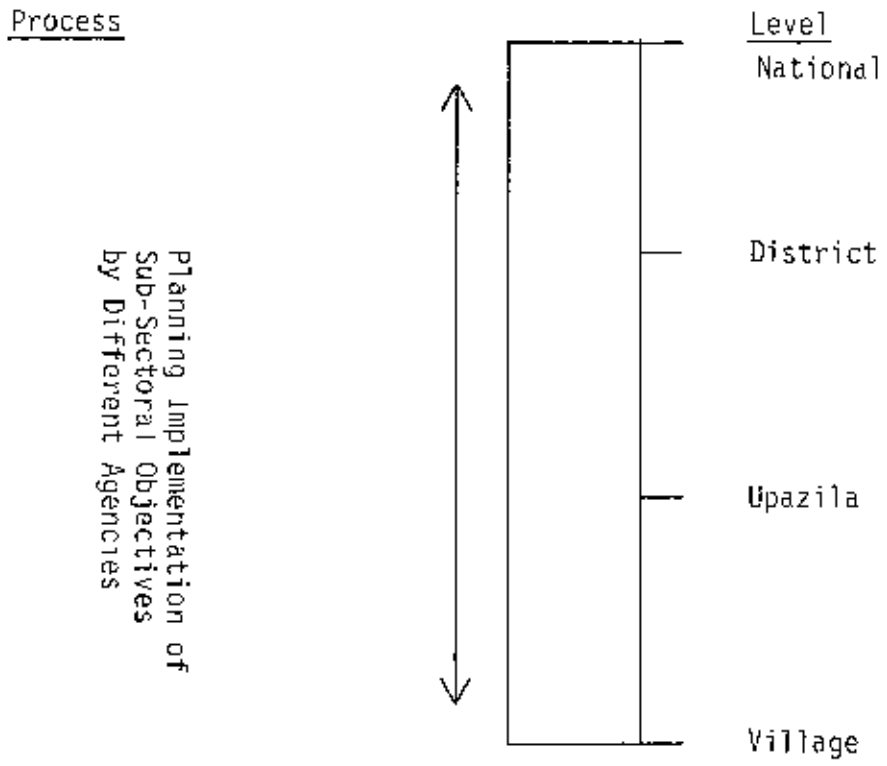


Figure 8.2
Existing Approach of Sectoral
Integration



In the proposed approach, agricultural policy and planning supposed to be prepared at regional level by the exchange of views and information from both donor and receipt counterparts. The idea of a region does not necessarily attached to a district, or sub-region to an upazila etc. For the easement of presentation, the present territorial administrative regions are attached to the theoretical region. For the purpose of planning the region and other territorial levels are suppose to delineate out along the potentiality of economic, social and physical facotrs of that region.

8.2.1 INTEGRATION OF SERVICE DELIVERY AGENCIES

It is observed in the study that compartmentalisation of different service delivery agencies persists in the malfunctioning of agricultural sector. In proposing an integrated structure of all agricultural organisations of the country, the following objectives are set out,

1. Administration of inter-related and inter-dependent agencies directly to be linked with agricultural development under one administrative control at all territorial levels.
2. To support a farmer's production plan delivery agencies are to make plan in the same manner.
3. Integration of all agencies performing similar activity to remove confusion and harrassement of the farmers.
4. Management hindrance to be removed for effective team work in a common platform.

5. Scope of participation to receive views and information from farmers side at each inter-section and regional level to be ensured.
6. Providing scope of participation of professional experts in the development process at regional level to be ensured.

3.2.2 MULTI-PURPOSE PRODUCTION CO-OPERATIVES

The development of some higher form of production co-operative depend on the prevailing socio-political situation of a country rather than any organisational or structural variable. Regarding the development of proposed production co-operative the following objectives are set out,

1. By introducing multi-purpose production co-operatives gradual transition from individualistic farming to co-operative farming merge on throughout the whole country.
2. To attain higher level of technology in agriculture scope of gradual transition of traditional mode of production to a modern one is to be made by providing material and technical support through co-operatives.
3. The policy planning of these co-operatives are to be made at regional level with horizontal placement of delivery agencies. Thus, the co-operatives are to be formed hierarchially from village to regional functional level, linked to national level for maintaining national goals and objectives.
4. Gradually transition in land reform policy to be undertaken aiming to abolish existing land use and land tenure arrangement.

5. Scope of employment of landless people to be created by intensifying modern use of inputs by the co-operatives.
6. Regional agro-industrial complex to be set up to support its hinterland, operated by regional federation of co-operatives.
7. 'Non-land' factors to be valued by assigning appropriate weights in the co-operatives so that present 'land' bias to be overcome and better distribution of income and wealth to be ensured among the members.
8. The village based multi-purpose co-operatives should take over village planning in respect of land use, labour use, potential use of local physical resources, infrastructure development etc.
9. The village co-operatives then linked with sub-regional federation of co-operative to receive some higher form of goods and services.
10. A village co-operative to be divided into blocks as a geo-social entity for better concentration of activity and increase in efficiency.

8.3 CONCLUSION

The agriculture of Bangladesh is experienced by the use of modern technology since sixties. The year-wise increasing trend of supply of inputs by public agencies poses the thing that the use of these inputs is increasingly demanded by the farmers. Through the co-operative institutions the farmers are intended to provide modern inputs for the cause of transition of agriculture to a modern one.

In study it is observed that Co-operatives play the pioneer role in the adoption of technological change in Bangladesh. In search of scope of participation of majority of farmers (small and poor) in co-operatives and their accessibility to inputs depicts a dreary picture that their representation in those co-operatives are very small and their accessibility to those inputs are also least. So, the attained national growth by the use of modern technology could not get to the majority section of the farmer. The study experience from two projects confirm the idea that small and poor peoples are also efficient and rational to productive activities. Unless there is a built-in-mechanism for those deprived peoples to participate in the development process, the upper strata people would not allow

them to do so. The solution of the problem lies not even in agriculture, but in broad-based agro-rural development.

The suggestive quest of the study came out as, to reorganise, co-ordinate and integrate public service delivery agencies at different territorial level. The service based Co-operatives needfully to be turned into production based multi-purpose co-operative to take over the responsibility of comprehensive village development plan aiming to attain economic growth, social justice and distribution of physical resources. For the purpose of policy making, planning and implementation of village development plan, regionally federated production Co-operatives would come with integrated delivery agencies into a platform to exchange views and information, thus strengthening the process of agricultural development.

APPENDIX: A

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APPENDIX: B

ABBREVIATIONS

- ACF - Agricultural Co-operative Federation
BADC - Bangladesh Agricultural Development Corporation
BARD - Bangladesh Academy for Rural Development
BRDB - Bangladesh Rural Development Board
CCB - Central Co-operative Bank
DTW - Deep Tube Well
GB - Grameen Bank
GBP - Grameen Bank Project
GOB - Government of Bangladesh
HTW - Hand Tube Well
HYV - High Yielding Variety
IMP - Irrigation Management Programme
IRDP - Integrated Rural Development Programme
KSS - Krishak Samabaya Samity
LLP - Low Lift Pump
NMS - New Marketing System
PDP - Primary Distribution Point
RD - Rural Development
STW - Shallow Tube Well
TCCA - Thana Central Co-operative Association
TIP - Thana Irrigation Programme
TTDC - Thana Training and Development Centre
TV - Traditional Variety
UCCA - Upazila Central Co-operative Association
USC - Upazila Sale Centre
UTDC - Upazila Training and Development Centre

