

alleviation programmes, (vi) financial management, (vii) family planning, (viii) horticulture, (ix) improvement of literacy, etc. Participation rate of training programmes is less than 30% of the primary cooperatives and member participation is less than 3% of all the cooperatives members. The percentage of inactive trainees is a high rate of 25%. The KSS members stress on the need for farm management and the other primary societies for skill development training as follows:

(Unit: %)

Primary societies/ programme	KSS	BSS	MSS	MBSS	Ave.
Farm management	100	-	-	-	68
Appropriate technique	9	12	-	10	9
Skill development training	34	94	80	90	52
Primary health care	16	12	60	10	17
Horticulture	24	23	20	10	22

(2) Training for women

Training programmes for female group members offer diploma and short courses in subjects such as group dynamics and participatory problem diagnosis, as well as technical skills in subject such as poultry vaccination and management training. There are specialized institutes for health care and family planning. In addition, there are leading training centers including two academies in Bogra and Comilla, the Village Education Resource Center, Proshika Development Centers, and the Training and Research Center of BRAC.

Women's participation in training remains constrained by home care obligations and social attitudes. Organizers of community-based training and outreach programmes report that the positive impacts of training become apparent, community attitudes become more supportive. The weakest area at present lies in training for self-employment, business enterprise development and management, sales and marketing.

3.6.5 Women in Development

(1) Inferiority of the current situation of women

About 86% of women live in rural areas. The majority of women, perhaps 80 to 90%, are small farmers, tenant and landless households who sustain themselves at subsistence level with income from a diversity of work as laborers on part-time as well as seasonal basis, e.g. post-

harvest activities. Women remain subordinate to men in almost all aspects of their lives. It is very difficult for them to access to markets, productive services, schooling, health care and local government. This results in high fertility patterns which diminish family well-being, damage the nutrition and health of children, and frustrate education and other national development goals.

The status of women remains low and considerably inferior to that of men in terms of health, nutrition, education and economic performance. The human development policy emphasized the importance of change in custom and practice. The encouragement of women's advancement was also expressed. Those were reflected in women-targeted development programmes. However, those programmes reached limited women. The fact indicates the importance of a strategy to reach more women, improve their access to education and training and expand their economic opportunities by systematically refining and replicating income-generation programmes for them.

(2) Development programmes

The Government and NGOs have recently initiated a number of programmes to provide access to productive resources and services to women and to expand education and health care. Several programmes focusing on production have been fairly successful although they have reached only 5-10% of women. Social service programmes, particularly family planning, have reached a larger proportion of the population and have started to show improvements, but face serious operational problems. Small-scale innovative approaches in these sectors, often involving NGOs, are also producing promising results. As of December, 1986, 900 NGOs are registered with the Directorate of Social Welfare of Ministry of Social Welfare and Women's Affairs (MSWWA) and 712 with the Directorate of Women's Affairs of MSWWA.

The Vocational Training Centers have been established under the Directorate of Women's Affairs to provide skills training to vulnerable and destitute women. Each of the 148 centers enrolls 50 women a year. Between 1972 and 1984, 26,000 women have completed the one-year course.

3.7 Marketing

3.7.1 Marketing Activity

(1) Markets

Markets in Bangladesh are classified into four (4), i.e. primary (hat), secondary (growth center), regional (market at district capital) and terminal markets (markets in Dhaka and Chittagong). Hats are operated regularly on specific days, usually selected two days a week. Growth centers locate at upazila headquarters and at strategic geographic places of upazila commanding several villages/unions. They serve as assembly centers and as wholesale outlets for re-allocation of products back to primary markets in deficit areas and forward to regional markets. Regional markets collect specific products such as paddy/rice, vegetables, fish, jute, etc. from surrounding growth center and supply to terminal markets in Dhaka and Chittagong. There are two regional markets in the related districts, i.e. Bhairab Bazar in Greater Mymensingh District and Narsingdi in Greater Dhaka District. Both markets locate at the right bank of the Meghna River opposite Nabinagar and Bancharampur. Terminal markets in Dhaka and Chittagong collect commodities from secondary and regional markets and re-distribute them to consumption areas in urban regions or export.

(2) Marketing Flow

The growth centers in the study area are distinctly under the sphere of two regional marketing channels ; (i) Nabinagar and Bancharampur under the influence of Brahmanbaria, Bhairab Bazar and Narsingdi regional markets, and (ii) Debidwar and Kachua under Comilla and/or Chandpur regional markets. The former regional markets are assembling products to Dhaka terminal markets and the latter is mainly to Chittagong terminal markets.

Bancharampur and Nabinagar are famous for handloom products which are supplied to Dhaka terminal market through Narsingdi regional market. Both Upazilas supply paddy, fish, vegetables and jute during those peak harvest seasons to respective regional markets as shown in Figure 3.11. Commodities from Kachua, i.e. fish, betel leaf and jute, reach the terminal markets in Dhaka or Chittagong mainly through Chandpur regional market. Commodities from Debidwar such as paddy, jute, vegetables and handicrafts are assembled at Comilla regional markets. Jute, vegetables and handicrafts are transported to Chittagong by truck and railway, further transhipped for export.

At the village level, barter or payment in kind of paddy and rice still prevail. Cash trading is predominant in the local markets. Farmers' participation to the marketing system of grains is limited up to primary market at village/union level in general.

Some of local markets in the study area, mainly the growth centers, are linked with the regional markets for assembling and transshipment of the products. These Upazilas assembling markets (UAM) usually locate at important places where are located along rivers for water transportation or along feeder road A connected to the national road. The UAMs are procuring the products from the surrounding areas and the other local markets. The local markets are grouped under each UAM from the internal marketing point of view as shown in Figure 3.12.

(3) Marketing of Farm Inputs

Bangladesh Agricultural Development Corporation (BADC) has been carrying out procurement, production, distribution and sale of agricultural inputs and continues to be the exclusive procurer of fertilizers from both internal and external sources. Since 1978, the number of Primary Distribution Points (PDPs) under the BADC has been reduced and all of upazila sale centers closed in order to give a greater role to private traders. Fertilizers are now sold to private dealers including the UCCAs at a fixed ex-PDP rate. Since 1982 there has been no fixed retail price and retailers are free to sell at any price.

In the study area, marketing of farm inputs i.e. seeds, fertilizers, agro-chemicals and farm tools are basically done under commercial channel. Cooperative channel is limited. Fertilizers are usually procured by wholesalers from the nearest PDPs in Chandpur, Ghorashal (greater Dhaka district) and Comilla. Agro-chemicals are usually marketed by the multinational companies through the networks of their own distributors, agents and retailers. Dealers and producers such as carpenters and blacksmiths as well as wholesaler deal with agricultural implements. There are two to four traders for seed, fertilizer and agro-chemicals and one for farm tools per local market in the study area.

(4) Government and Cooperative Marketing Activities

Procurement and distribution of food grains through public sector, Ministry of Food (MOF), aims at offering fair price to growers, securing normal supplies throughout the country, stabilizing of consumers' prices, and supplying to rural poor and the vulnerable. The MOF handles about 10 - 15 % of food grains consumed in the country. The MOF operates storage facilities i.e. 5 silos, 12 Central Supply Depots (CSDs), 625 Local Supply Depots (LSDs), and 176 godowns under Ministry of Local Government and Rural Development (LGRD) or hired from private sector in the total capacity of 1.9 million tons. The CSDs locate either in or near

the major consuming centers or at strategically important places from where the grains are distributed to LSDs. The LSDs locate at or near smaller towns or upazila headquarters and serve as both procurement centers from the covering areas and distribution points for food grains imported or brought from other depots in general.

The MOF's marketing support activities of food grain in the study area is limited to the distribution of rice and wheat through the seven (7) LSDs and four (4) LGRD godowns with total storage capacity of 9,600 tons. There are no government procurement of food grains. Food grain distribution is mainly done during lean seasons, i.e. December to February and May to September. The LGRD godowns in the study area are operated under the upazila councils for supporting of the above rationing system. Conditions of the LGRD godown structures are very poor without adequate ventilation for the long term storage as well as no assembling and drying floor of the food grains.

3.7.2 Demand and Supply of Food

(1) Food Balance of the Country

The country suffered from chronic shortage of major food commodities like rice, wheat, edible oils, etc. Actual per capita food availability is still lower than the ideal per capita food intake recommended by the Bangladesh National Nutrition Institute as follows :

Item	Recommendation	(Unit : kg/capita/year)
		Actual Availability (1987-89 Average))
Rice	135.0	93.3
Wheat	30.0	23.9
Vegetable	36.5	17.5
Edible Oil	6.0	3.8
Meat	4.5	3.0
Fish	14.0	6.0

The self-sufficiency rates for rice, wheat and edible oil through 1987 to 1989 are estimated at 89%, 38% and 20% respectively even taking into account imported food.

(2) Food Balance in the Study Area

Per capita available food grains in the study area are estimated at 126 kg in Nabinagar, 112 kg in Bancharampur, 156 kg in Debidwar and 107 kg in Kachua giving self-sufficient ratios of 70% in Bancharampur and Kachua, 76% in Nabinagar and 95% in Debidwar. The food balance varies by union as shown in Figure 3.13. The population is tributed in the grains-shortage unions is estimated at around 45% in Bancharampur, 50% in Nabinagar and Debidwar and 60% in Kachua of the respective total population.

Mustard oil is in shortage and soybean oil is imported in the study area. Nabinagar and Bancharampur export fish, livestock and poultry to the regional markets although their self-sufficiency remains below standard. The food balance in each upazila is shown in Table 3.9.

(3) Food Grain Storage

Marginal and small farmers have a limited storage capacity. They have to sell the harvest at lower prices immediately after harvest, because most of them have a debt and need cash money, and purchase back food grains at much higher rate in the lean season. Medium and large farmers have a bigger storage with 1 to 2 tons and more than 3 tons. They can store food grains for 6 months at most after each harvest season in order to sell them at higher prices in the lean seasons.

On-farm grain storages are classified into (i) pot type for milled rice and seeds, (ii) bamboo type for storing raw or parboiled paddy and wheat and (iii) gunny bags. On-farm storage losses range from 2.9 % in pot type storage, 5.0 % in gunny bags and 8.3 % in bamboo type on the average. The storage losses are caused by insect, disease, rats, birds, natural hazards, pilferage and so on of which rats cause 40 % of the total loss.

In LSDs, bagged grains are stored. The storage and handling losses in the public sector are reported at around 3% on the average through 1981/82 to 1986/87, while the field survey results on storage losses in LSDs in the study area are at around 7-10% due to poor maintenance of warehouse facilities as well as improper storage management.

3.7.3 Prices and Marketing Costs

(1) Prices of Farm Inputs and Outputs

There are no significant difference among upazilas in farm input prices. The prices are higher than declared prices by the Government. The marketing prices of farm products are changed at marketing stages. Rather than that, seasonal price fluctuation is significant. The farm gate prices of paddy, rice and wheat in the lean seasons are increased at 63 %, 55% and 41% of the prices in the peak harvest seasons respectively. The prices of vegetables and fruits in lean season become more than double than ones during harvest season. The average prices of major products in the study area are summarized as follows :

Products	(Unit : Tk/kg)			
	Farm Gate	Hat, Growth Center	Retail Price	
			Local	Dhaka
Paddy	5.2	5.6	5.9	6.2
Rice	8.9	9.3	9.7	10.1
Wheat	4.4	4.9	5.2	5.6
Jute	5.7	6.4	7.9	8.1
Potato	2.2	2.8	3.5	3.9
Mustard (Oil)	9.7	10.0	10.6	11.0
Vegetable	3.9	4.3	6.0	6.5
Pulses	12.6	13.0	13.4	14.2
Fruits	7.1	7.8	10.5	12.3
Livestock (Tk/head of cattle)	3,580	3,730	3,940	4,140
Poultry	32.6	37.3	43.9	51.0
Fish	30.2	35.0	46.6	53.5

3.8 Development Constraints

3.8.1 Production Sector

(1) Crop Production

There is a nationwide effort to identify, analyze and solve the constraints against agricultural development prevailing in Bangladesh. Under the sponsorship of the agricultural researchers and extension workers represented by BRRI and DAE, a series of workshop has been held since 1975 to identify and solve technical and financial problems faced by farmers. The information was collected mainly at the local government level in which a widely ranged support activities are carried out by Upazila officers and their staff from BRDB, BADDC, DAE, Directorate of Livestock, Department of Fishery, etc. The major constraints to crop production identified by those local officers are as follows.

- i. Lack of rationalized land use plan including selection of appropriate cropping patterns and farming techniques
- ii. Traditional land tenure custom governing land use
- iii. Low unit yield due to poor seed quality, inadequate land preparation, poor soil management, lack of soil organic matters, delay of sowing and planting, insufficient of weed control, plant protection, etc.
- iv. Lack of irrigation facilities
- v. Lack of flood protection and drainage improvement measures
- vi. Inadequate price policy resulting in low producer's incentives
- vii. Limited access to farm inputs and marketing
- viii. Weak institutional supports including credit, research and extension

Crop production in the study area suffers from unfavorable natural conditions, namely recurrent floods and cyclones. Depending upon length of flood period and water depth during monsoon, land use patterns and farm management systems differs place to place. This means that local farmers sustain crop production by applying traditional farming techniques adapted to natural conditions. To increase productivity, expansion of modern farming techniques is essential. The rational land use plan combined with selection of cropping patterns and farming practices should be established and transferred to local farmers.

With high density of population (1,325/km²) and limited farmland, the land-man ratio in the study area is one of the lowest regions in Bangladesh. As a result of rapidly expanding population and land fragmentation, land holding size of average farm family tends to be declined for many years to come. Large scale flood control measures such as Flood Action Plan-5 and the Gumti Project are ultimately required for substantial development of potential farmland in order to overcome the land shortage.

Rice production in the study area has kept good pace since 1970s as a result of expansion of irrigation facilities, i.e.DTW, STW and LLW, under Irrigation Management Programme (IMP). In association with irrigation water supply, application of improved seeds (varieties) as well as farm inputs is also essential to increase unit yields. This calls comprehensive governmental supports including appropriate credit operation, farm input supply, and extension services in line with long term strategies.

Crop production should be managed during optimum crop season by well-scheduled farming practices at appropriate time. In the study area, optimum planting and harvesting periods fall in limited durations because of floods to come at the harvesting season of the Rabi crops. Firstly, introduction of early maturity varieties enable to mitigate crop damage in harvesting season. In order to ensure optimum planting, secondly, land preparation has to be performed within right time. Thirdly, harvesting has to be completed before flooding.

The governmental supports for purchasing wheat outstandingly contributed to rapid expansion of wheat in the initial years. On the other hand, lack of grain storage and seasonal fluctuation of rice price result in inappropriate rice marketing in the whole country. Besides, high expenditure for farm inputs and irrigation water supply discourage farmers. BADC is the main supplier of chemical fertilizers, but agro-chemicals. Irrigation water charge is set up by individual owner of equipment without any indication by the Government.

(2) Livestock

Compared with crop production, contribution of livestock sub-sector is limited in terms of regional economy and farm family income. But, importance of livestock is more recognized by observation of prevailing traditional crop-livestock integrated management in the rural area. Livestock is raised only for cash income but also as work force suppliers. In view of soil fertility management and fuel sources, role of livestock in rural areas is much valuable. In addition, poultry enables women to provide opportunity to participate economic activities at homestead level. The current livestock industries are facing the following constraints.

- i. Acute shortage of feeds and fodders
- ii. High incidence of animal diseases
- iii. Low productivity of local breeds of animals
- iv. Lack of support services including problem-oriented research, input and technical advisory and training, manpower and facilities
- v. Limited market channels and facilities of meat and other products
- vi. Low price setting of meat

Shortage of feed sources is a crucial issue for further development of livestock industries in the study area as well as in Bangladesh. Although DOL has promoted the expansion of high productive grasses by setting up demonstration plots in rural areas, land shortage could not allow to make up even minimum feed requirement. Crop residues provide important feed sources. In fact farmers do not waste rice straw and plant residues of pulses. But, by-products of high feed value including rice and wheat bran and oilseeds cake are not in hands of local farmers under the current marketing system. Farmers sell unhusked paddy and oilseeds to middlemen and mill owners, who can obtain by-products. Not only feed amount but also seasonal feed deficit is also keen for stable livestock raising. During flood seasons, feed shortage becomes more serious due to limited grazing sources and livestock exhausts all crop residues derived from Rabi seasons. At the end of flood seasons, when animal power is required for the Rabi crops, most of cattle are malnourished.

Several animal diseases are identified in Bangladesh. Although services of vaccination and treatment are provided through Upazila Livestock Officer (ULO), they are far below than the actual requirement. Local cattle breeds are advantageous in terms of resistance to disease and unfavorable climatic conditions, but their productivity of meat and milk is extremely low.

Low marketing incentive is also a constraint to livestock development in the project area. Although more than 10 liters of milk per cow is gained by daily milking practice, there is no

regular channel to sell their milk. There is no slaughter house to buy farmer's cattle at favorable prices. Under such circumstances, farmers are discouraged.

(3) Inland Fishery

Constraints in the Inland fisheries sector for all the four upazilas are more or less similar in nature. They are summarized as follows.

a) Problems related to open water capture fishery

- i. Fishermen face problems in obtaining lease fishing rights in open waters;
- ii. Shortage of fishing materials like boats, nets, gears, etc.;
- iii. The traditional system of leasing of water-bodies allows rich, non-fishermen to monopolize water bodies.
- iv. Unauthorized fishing groups of fishermen guided by local influential people;
- v. Decreasing trends in yearly fish catch from open waters in contrast to increasing rate of government revenue (10-15% a year) for fishing in selected open waters;
- vi. Lack of preservation, transportation and marketing facilities, particularly during the peak season;
- vii. Non-availability of good quality yarn, net, float etc. in local areas
- viii. Fishermen are organizationally very weak and the majority of the cooperatives are virtually inactive;
- ix. Lack of awareness among the fishermen regarding cooperative functioning;

b) Problems related to closed water culture fishery

- i. Lack of technical manpower and other support services to motivate and provide extension services to pond operators and fish farmers;
- ii. Non-availability of good quality fry in the villages;
- iii. Non-availability of chemicals/medicines (Rotenone, Dipterex, etc.) in the locality;
- iv. Insufficient funds to purchase inputs to improve fish production by pond operators;
- v. Outbreak of fish disease and poaching of fish;
- vi. Marketing problems of spawn from government and private hatcheries;
- vii. Most khas ponds are under the control of local influential people;
- viii. Multi-ownership of water bodies, especially ponds;

(4) Agro-Industry

The constraints facing the agro-industry in the study area are:

- i. Weak management and organization
- ii. High initial investments for the installation of facilities and a limited access to credit
- iii. Inferior marketing channels
- iv. Inconsistent raw materials supplies
- v. Lack of skilled workers and training programmes
- vi. Lack of rural infrastructure especially rural access and electrification

3.8.2 Rural Infrastructure

(1) Irrigation, drainage and flood control

- i. Inadequate assessment system of proposed schemes due to lack of standardized planning criteria by which only promising schemes can be rigidly selected and implemented
- ii. Discouraged producers due to unstable profitability due to high water charge and low product prices
- iii. High investment and OM cost required for flood control works
- iv. Weak linkage with extension activities because of shortage of front-line extension workers of DAE
- v. Inadequate technical and financial management by cooperatives
- vi. Lack of mechanics of BADC

(2) Feeder Road and Rural Road

- i. Difficult land acquisition for new road construction
- ii. Frequent floods hindering road construction and maintenance works
- iii. Lack of OM budget
- iv. Weak linkage between RHD and upazilas resulting in less organic and harmonious road network development

(3) Growth Center

- i. Low lease charge and inadequate money collection which can not ensure maintenance of Growth Centers and *hats*
- ii. Insufficient functions as marketing center because of lack of such facilities as godowns and cold storages
- iii. Lack of sanitary facilities such as drains, garbage pits, latrines, etc.
- iv. Weak linkage between rural markets and either district or national markets

(4) Drinking Water Supply

- i. Poor accessibility resulting in imbalanced distribution of HTWs
- ii. Lack of mechanics for maintenance
- iii. Competitive use of groundwater with irrigation
- iv. Lack of awareness of rural people in public health and sanitation
- v. Weak linkage between agencies concerned, e.g. BRDB, BADC and DPHE

(5) Rural Electrification

- i. High electricity charge due to high system loss
- ii. Low system reliability, e.g. fluctuation and sudden drop of voltage
- iii. Paucity of local funds
- iv. Insufficient power distribution line

(6) Communication

- i. Inadequate operation and maintenance of telecommunication system resulting in low reliability of the system
- ii. Paucity of budget for replacement of old telephone system and telephone line network
- iii. Insufficient distribution of post offices
- iv. Poor facilities of telecommunication and post office

3.8.3 Cooperative Activities

(1) Organization and management staff

- i. Officers of UCCA and primary societies are mostly posted by influential persons in the localities. Accordingly, the cooperative activities do not always reflect willingness and needs of the cooperative members. This fact is implicated in their inactivity, considerable drop-out of members and stagnation in formation of primary societies.
- ii. The service periods of management staff of cooperative are short: one year for UCCA and two years for primary societies. As a result, the present cooperative activities are limited to short-term programmes.
- iii. The formation of primary societies are stagnant in four Upazilas. Especially, the participation percentage of relevant farmers in BSS/MBSS is as low as seven percent. The sanctioned post at the Upazila office of BRDB is eight of which some are not posted in the four Upazilas resulting in insufficient support for organizing primary societies.

(2) Activities

- i. The activities of KSSs are limited to cooperative credit, especially on crop loan, and irrigation related activities. There are no other common activities in KSSs. The joint-marketing is not carried out due to shortage of the members' understanding, insufficient management capabilities of officers, lack of operation funds, etc.
- ii. The activities of BSS, MSS and MBSS are widely ranged, but those are done by the specific societies. The reasons are same as the case of KSS mentioned above. Supporting services for the promotion of cooperative activities by Upazila RD officials and UCCAs' officers are insufficient.
- iii. The capital formation is stagnant in every primary society. This is a major constraint for activation of cooperatives. Especially, UCCAs as well as primary societies are affected by delayed repayment of credit due to insufficient capital and decreasing those members.

3.8.4 Credits

- i. Paucity in credit fund,
- ii. Delay in placement,
- iii. High cost of counterpart fund,
- iv. Inefficient credit planning and its implementation system,
- v. Lack of proper assessment,
- vi. Lack of proper supervision and follow-up of credit,

3.8.5 Marketing and Support System

- i. Poor accessibility for transportation
- ii. Indirect farmers' participation to marketing activities
- iii. Lack of marketing support activities by government agencies
- iv. Limited officials concerned
- v. Insufficient technical knowledge of officials

CHAPTER 4

APPROACH TO PLAN FORMULATION

CHAPTER 4 APPROACH TO PLAN FORMULATION

4.1 Development Model

Most of the rural development projects in Bangladesh are planned and implemented under the financial arrangement of the GOB's development budget, of which fund sources are derived mainly from the foreign donors. Therefore, the development framework tends to be drawn by development strategies and intention of donors. In fact, some of the projects are formulated for human resource development, while some are for infrastructure development. There are no guideline for plan formulation of rural development in Bangladesh. It is necessary to set up basic concepts of rural development in order to avoid over-investment and development-imbalance among the projects.

The human resources development is of utmost importance for rural development in Bangladesh. The human resources development has been realized by primary education and diversity of skills training. The Study pays a special attention to training of participants of the projects to ensure adequate development of production sectors and income generation activities to be newly introduced and expanded under the project.

The constraints prevailing in the rural area are complex and inter-related each other and the integrated development approach is attempted in most of rural areas. However, dislinkage between agencies is a crucial issue in most cases. More communication among central administration, local governments and villagers is required in all the stages from plan formulation to project operation. Poor organization, staff quality and budget of local government hinder the access to rural mass and monitor their "voice" implying development needs. The particular emphases are placed on integrated infrastructure development under well-linked coordination of executing agencies, local government and villages. In this regard, the roles of cooperative as a representative body of villagers are highly important.

Comilla is historically the center of cooperative activities in Bangladesh. During last three decades, the two-tier system of cooperatives led the rural development of Comilla as well as the country. The geographical position of Comilla has incidentally affected to the development of the region. Comilla has been developed as food supplier for Dhaka and the regional economy of Comilla has been above the national average. The region is now expected to be more developed as a gateway to Chittagong. Reflecting such specific inherent conditions, the Study sets up the "Model" master plan for Comilla, of which basic concept would be applicable for the adjacent Districts and Upazilas under similar local conditions.

4.2 Basic Consideration

4.2.1 Integrated and Stepwise Development

Under long-term development plan, firstly, MRDP II is prepared as a compound of development programmes and expected supplement those programmes each other. In view of project cost and fund availability of local government, secondly, all the programmes of MRDP II is arranged within the certain time-scale in phased implementation schedule, by which development target can be set up in phase and achieved stepwise.

4.2.2 Production Sector Activation

The development programmes are divided broadly into two, i.e. (i) programmes for activating production sectors and (ii) programmes for making up basic human needs. Around the concept of poverty alleviation emphasized in FFYP, the priority is attached to programmes which can contribute directly to production sectors and economic growth. By activating the regional economic activities, employment opportunity will also be generated and capital formation will be encouraged among rural poors.

4.2.3 Human Resources Development

The particular emphasis is placed on human development through skills training which directly contribute to employment. In line with the BRDB's training policy to rural poor, institutional training programmes are taken up in MRDP II. The rural development in Bangladesh has been executed by "grass-root" activities of a diversity of governmental and non-governmental organizations (NGO). As can be seen in training activities for rural women in development, achievement of NGOs is noteworthy. The Study examined the past experiences of not only governmental project but also NGOs' activities in MRDP II.

4.2.4 Target Group Oriented Development

It is important to define the target group of beneficiaries in order to direct expected benefits to right beneficiaries. Target group can be categorized into some classes according to their current economic activities and size of asset, e.g. assetless rural poors and small farmers. Their educational and economic ability for participation in economic activities varies with such classes. The programmes should be set up adequately to each class. The Study pays much attention to appropriate credit and training programme for target group.

4.2.5 Institutional Development

For successful implementation of MRDP II, organizational set-up is the most important. The executing agencies of each programme are selected and discussed in terms of linkage to the parent ministries, authority and responsibility, budgetary and staff arrangement.

In connection with human development, cooperatives are central channels to transfer advices and technical message to rural mass. In parallel, the cooperatives should expand their activities to more business fields as autonomous body, in which enlargement of employment opportunities and training for skills can be expected. In MRDP II, the substantial parts of the project implementation will be allocated to cooperative operation.

4.3 Economic Macro-Framework

4.3.1 National Targets

To set up the development targets or goals of MRDP II, the economic macro-framework was analyzed. The study area has developed as agricultural zone. Although gradual development is recognized in industrial and service sectors in Comilla, the study area will be developed predominantly with growth of agricultural sector for years to come. In view of the study objective, i.e. formulation of rural development project for the selected upazilas, the attempt was made to examine the economic macro-framework of agricultural sector in line with FFYP (1990-1995). FFYP is formulated a part of the long term Twenty Year Perspective Plan (1990-2010). FFYP set up the targets for national economic growth and employment projection as follows.

I. Economic Growth (1990-1995)

Unit: %

Sector	Share of GDP	Annual Growth
1. Agriculture	36.8	3.6
2. Industry	9.1	9.1
3. Power, Gas, Water and Salinity Services	1.43	11.0
4. Construction	6.2	8.8
5. Transport & Communication	10.0	5.4
6. Trade & Other Services	22.9	5.1
7. Housing Services	9.1	3.5
8. Public Services	4.3	3.9
Total	100.0	5.0

II. Employment Projection (1990-1995)

Sector	Projection (million man-year)	Annual Growth (%)
1. Agriculture	14.0	1.8
2. Manufacturing	3.6	7.2
3. Construction	1.8	14.0
4. Power and Gas	0.1	9.0
5. Transport & Communication	2.8	5.4
6. Trade & Other Services	2.9	6.4
7. Housing Services and Public Administration	3.2	8.7
Total	28.3	4.0

The GDP growth during the past plan periods ranges from 3.5% p.a. to 4.0%. In FFYP, 5.0% of GDP growth is targeted. The rapid growth is envisaged for such sectors as electricity and gas, industry, construction, transportation & communication, and trade. By keeping the rather conservative target of 3.6% p.a., the share of agricultural sector will continue to decrease to 36.8% in 1994/95, whilst it was 39.4% in 1989/90 and 43.3% in 1984/85.

The national population size is projected to increase from 113 million in 1990 to 125 million by 1995 with annual increasing rate of 2.0%, while labour force is to expand from 37 million to 44 million at 3.4% during the same period. The FFYP aims to expand employment opportunity at 4.0% p.a. by 1995. In the past, agriculture sector played a dominant role in generation of employment opportunities in the economy. Although the sector is likely to retain its position as one of principal contributors to additional employment, its relative importance would gradually decline. With expansion of livestock and fishery, causal employment of hired labour would increase its more importance. Small and cottage industries is also expected to increase their employment opportunities.

4.3.2 Agricultural Value Added in the Study Area

(1) Target Years

MRDP II will be implemented through three (3) phases: (i) 1990-1995, (ii) 1996-2000, and (iii) in and after 2001. The economic framework is formulate for coming decades, namely both Fourth and Fifth Five Year Plan periods. With the base-year of 1990, the target years are set to be 1995 for the first development phase and the year 2000 for the second phase.

(2) Principles and Conditions

The agricultural value-added consists of value added of three sub-sectors, i.e. crop production, livestock and fishery. Value added is estimated at farm gate, i.e. raw products. The principles and conditions for calculation are summarized below.

i. Crop production sub-sector

- No horizontal expansion of rainfed farmland is considered.
- Only minor irrigation development is taken into account: 6,500 ha by LLP and 2,000 ha by fractional pumps (FP) by the year 2000. LLP is assumed to irrigate rice, while FP to such upland crops as potatoes, mustard, and pulses.
- Unit yields are conservatively projected without large usage of farm inputs.
- Local varieties of rice are to be replaced by high yielding varieties.

ii. Livestock sub-sector

- Animal population is estimated to be 110% of the present population (1990) by 2000.
- Livestock products counted are meat, milk and eggs.
- Increase of meat and milk production is assumed to depend on live-weight of bovines and small stock: they are conservatively estimated.
- Draught power is not counted in both value added of livestock sub-sector as well as crop production cost of crop sub-sector.

iii. Inland fishery sub-sector

- Closed water fishery is more emphasized with expansion of fish ponds of 280 ha in each upazila by the year 2000.
- Open water capture fishery will be promoted by organization of fishermen and provision of fishing boat and net.

(3) Agricultural Value-Added

The agricultural value added was calculated for each sub-sector. The crop production in 1995 and 2000 is calculated on the basis of changes of cropped area and unit yields as presented in Table 4.1. The results are presented in Table 4.2 and summarized below.

Sub-sector	Value-Added (Tk million)			Annual Growth Rate (%)	
	1990	1995	2000	1990-1995	1995-2000
Crop Production	1,786	2,182	2,546	4.1	3.6
Livestock	166	203	239	4.1	3.4
Fishery	367	455	671	4.4	8.1
Agricultural Sector	2,319	2,840	3,456	4.1	4.0

The overall growth rates of agricultural sector are 4.1% in 1990-95 and 4.0% in 1995-2000, which are higher the national targets. The agriculture sector will significantly contribute to the regional economy of the study area. To attain well-balanced economic growth, other sectors are expected to be developed keeping good pace.

4.3.3 Employment Projection

For crop production, livestock and fishery sub-sectors, employment projection was made. The results are presents in Table 4.3 and summarized below.

Sub-sector	million man-day (MD)			Annual Growth Rate (%)	
	1990	1995	2000	1990-1995	1995-2000
Crop	21.1	27.6	30.7	5.5	2.1
Livestock	41.1	43.1	45.0	0.9	0.9
Fishery	6.6	7.5	8.5	2.8	2.4
Agricultural Sector	68.8	78.2	84.2	<u>2.6</u>	1.5
Total Population (1000)	1,300	1,447	1,610	2.2	2.2
Labour Force (1000)	416	492	581.0	3.4	3.4
Labour (Million MD)	104.0	123.0	145.0		
Employ. Opport. (%)	66	64	58		

Employment opportunity generated by livestock sector is large absorbing considerable portions of women's self-employment. The analysis clarified that employment opportunities are expected to increase 2.6% per annum during the period from 1990 to 1995, which is higher than the national target of 1.8% in employment generation by agricultural sector.

At present, 66% of the total labour force is engaged with agricultural sector (employment opportunity: 66%). In 1995 and 2000, it is estimated to be 64% and 58%. The other related sectors will be developed as a result of development of agricultural sector, e.g. post-harvesting, OM of irrigation facilities, marketing activities, construction of rural infrastructure, etc.

4.4 Development Concepts and Strategies

4.4.1 Production Sector

(1) General

The economic macro-framework analyses clarified that the study area can contribute to achievement of the national targets in economic growth of agricultural sector and generation of employment opportunity. To realize such regional targets, however, diversity of development programmes have to be accomplished by joint efforts of central administrations and local governments according to the well-scheduled long-term implementation plan. MRDP II is formulated as multi-programmes necessary for achievement of the said economic framework.

FFYP aims mainly at development of production sectors, namely crop production, livestock and fishery, under the diversity of development strategies. In particular, FFYP focuses on improvement of institutional measures including price policy, marketing, and research and extension. Taking the current conditions of the study area into consideration, the master plan is formulated around the following development concepts and strategies.

(2) Crop production

- Promotion of irrigation farming
- Crop intensification and diversification with crops of high value
- Expansion of farm inputs supply
- Development of marketing system and facilities
- Promotion of strategic grain storage for food security in the rural area
- Agricultural research for improved farming practices
- Agricultural extension and training

(3) Livenessock

- Training and extension of improved animal husbandry
- Introduction of improved breeds with high productivity and improved animal health treatment
- Effective use of limited feed sources
- Expansion of non-ruminant stock and poultry rearing

(4) Inland fisheries

- Training and extension of improved fishery techniques
- Introduction of semi-intensive culture on proper management
- Conservation and development of open water for inland fishery
- Integrated fishery development linking with other production sectors, i.e crop production and livestock
- Supply of inputs and credits

(5) Agro-Industry

- Promotion of small agro-processing of paddy, wheat and oil crops
- Introduction of agro-processing techniques for other crops of high values
- Maximum use of by-products for livestock and fishery sub-sectors
- Selection of applicable technology level
- Training for skills
- Support system, especially credit for both initial investment and operation

4.4.2 Rural Infrastructure Sector

The rural infrastructure plan is formulated for (i) direct contribution to increase of agricultural production and enhancement of regional economy, and (ii) implementation of urgent works under responsibilities of local government. The contribution to employment opportunity creation for rural poor is also taken into account in formulation of construction plan as well as OM plan of rural infrastructure.

(1) Development of physical infrastructure including roads and markets

- Priority is attached to improvement of existing roads and markets and no extension works are considered.

- Land acquisition is minimized for early and smooth project implementation.
- Navigation network is taken into consideration in the road improvement plan. Canal re-excavation is envisaged not only for irrigation and drainage development but improvement of existing water way.

(2) **Irrigation, drainage and minor flood control works**

- The plan is formulated taking into consideration the inter-relation between irrigation, drainage and minor flood control works.
- Priority is given to minor irrigation development including re-excavation of existing secondary canals and provision of LLP.
- Mitigation of poor drainage conditions and flood damages is also envisaged by re-excavation of existing canals and provision of bridges and culverts of roads.

(3) **Production and Employment Programme (PEP)**

- Rural infrastructure sector aims also at encouragement of economic activities for rural poor through improvement of accessibility and irrigation development.

4.4.3 Cooperatives

The basic development concepts of cooperative societies are:

- Management ability of UCCA will be strengthened by technical support and credit services in collaboration with government agencies concerned.
- Support services to primary societies is to be strengthened through promotion of UCCA's capital formation and improvement of government credit schemes.
- Increased enrollment of assetless cooperatives.

4.4.4 Institution and Supporting Services

Rural development has been implemented for development of physical infrastructures, promoting cooperatives and training etc. Upazila parishads are expected to play a central role in rural development with the following objectives.

- Increasing qualified manpower in Upazila
- Skill training

- Establishment of coordination committee for rural development with organization concerned
- Strengthen project monitoring in terms of technical and financial management

4.4.5 Marketing

Marketing development plan should be formulated to increase farmers' bargaining powers as well as create employment opportunities for assetless and marginal farmers. The group formation and coordination for joint activities will be a key element in a marketing development. In line with the government policy, the following aspects are basic concepts of marketing plan for stabilization and maximization of producer's benefits under cooperative activities.

- Promotion of strategic reserve of foodgrains
- Promotion of joint marketing

CHAPTER 5

MODEL RURAL DEVELOPMENT PLAN

CHAPTER 5 MODEL RURAL DEVELOPMENT PLAN

5.1 Crop Production Sector

5.1.1 Irrigation Development and Drainage Improvement Programme

(1) Endowed Irrigation Water Resources

i. Surface Water Resources

The study area depends mainly on its irrigation water resources upon three major rivers and their tributaries, i.e. the Titas, Gumti, and Dhanagoda rivers, major tributaries of the Meghna river.

Of the total surface water passing through the region, it is estimated that some 60% originates as cross boundary flow from India. From an irrigation water resources viewpoint, the dry season flows are the most concerned. It was assessed in the recent study that internal water resources endowed in the study area have been fully developed and utilized in the dry season. The future surface water irrigation development in the study area should be dependent upon the transfer of water resources from the Meghna river. The drought discharge with 5-year probability in each river can be tabulated below:

River	Upazila concerned	Drought discharge
Meghna	Four(4) Upazilas	98 m ³ /sec
Gumti	Debidwar	10 m ³ /sec
Titas	Nabinagar & Ban'pur	Not Available
Dhanagoda	Kachua	Not available

ii. Groundwater Resources

The groundwater resources of the study area have been recently investigated by the MPO and the BADC. The MPO has developed a number of mathematical models to evaluate the resources.

As illustrated in Figure 5.1, the existing groundwater development in the study area is rather variable. The National Water Plan estimates that about 35 % of the irrigable

area could be irrigated by groundwater, with a mixture of deep tubewells and deep set shallow tubewells. However, the estimated present coverage is about 11 %. The following table presents developments potentials of deep set shallow tubewells and deep tubewells in the study area.

Development Potential	(Net volume in MCM/1,000ha/annum)			
	Kachua	Debidwar	Bancharampur	Nabinagar
Deep Set Shallow Tubewell	0.7	1.4	1.3	0.5
Deep Tubewell	2.2	3.9	4.5	1.9

As shown in both figures, the groundwater potentials in a part of Debidwar and Kachua Upazilas have a constraint in water quality and three (3) Upazila excepting Bancharampur have a constraint in quantity. In view of the groundwater development potential, Bancharampur Upazila is endowed with the highest potential - 1.3 MCM/1000 ha/annum for the deep set shallow tubewells and 4.5 MCM/1000 ha/annum for the deep tubewells.

(2) Land Resources

There is a vast potential land resources of about 84,000 ha suitable for irrigated agricultural development in the study area. Out of them, about 30,000 ha have been irrigated so far by both surface water and groundwater resources, and about 54,000 ha of the remainder have been under rainfed and upland condition as broken down below:

Land Resource	(Unit : ha)				
	Kachua	Nabinagar	Bancharampur	Debidwar	Total
i. Potential	19,100	27,400	18,500	19,600	84,600
ii. Irrigated	5,400	9,700	7,300	8,200	30,600
iii. Irrigable	13,700	17,700	11,200	11,400	54,000

(3) Selection of Irrigation System

In comparison with the vast irrigable land resources, irrigation water resources are extremely limited. In the light of the assessment above, three (3) Upazilas excepting Bancharampur have a crucial constraint in both the quality and the quantity of the groundwater resources. Irrigation development in these three (3) Upazilas should be made by LLPs dependent upon the surface water transferred from the mainstream of the Meghna river.

In the meantime, Bancharampur has a favorable potentials for the groundwater development as assessed above. This Upazila is, however, located close to the main stream of the Meghna river which has an abundant flow even during the dry season. Taking suce local conditions into consideration, LLPs should be promoted more to ensure the maximum use of surface water in these Upazilas.

(4) Selection of Irrigation Area

Irrigated agriculture plays an important role in cereal crop production in the study area. A high proportion of this irrigation is based on LLPs. In Debidwar, BWDB executed large scaled Gumti Irrigation Project Phase-I of 28,900 ha in net. In spite of the large scale irrigation project, the on-farm irrigation in this project is dependent on the introduction of LLPs. Following the Gumti Phase-I, the BWDB has recently formulated the Gumti Phase-II of about 107,000ha. It should be noted that there is currently a high coverage of LLPs in Debidwar, which corresponds to a significant proportion of the Gumti Phase-II area.

In addition the current crop intensity in Debidwar is as high as 231 % followed by 201 % in Bancharampur, 189 % in Nabinagar, and 147 % in Kachua. From these two viewpoints, irrigation development plan would not be formulated in the Debidwar.

For the selection of irrigation area in the Kachua, Nabinagar, and Bancharampur Upazilas the following considerations are set forth:

- i Main objectives of the irrigation development in these areas are to increase the production of the dry season Boro rice. The LLPs would be therefore exclusively operated for the Boro during the limited dry season.
- ii In view of dependable water resources, the irrigation area would be delineated possibly close to the Meghna river in Bancharampur and Nabinagar, and the Dhonagoda river in Kachua.
- iii The irrigation area would be delineated within narrow strips of about 750 m along both banks of existing river channels in due consideration of lift and bore of the LLP units.
- iv The existing river channels would be desilted from bottom without any widening of the channels. Land acquisition would not be made for the channel improvement.

- v The channel improvement by the desilting works would aim not only at concentration of irrigation water resources during low water season but also improvement of drainage condition during flooding season.
- vi The irrigation area would be delineated so as not to affect the operation of the existing LLPs and DTW schemes.

In accordance with the basic consideration mentioned above, the irrigation area of 6,500 ha in three (3) Upazilas is delineated as listed in Table 5.1; 2,200 ha in Bancharampur, 3,200 ha in Nabinagar, and 1,100 ha in Kachua.

(5) Drainage Improvement

i. Existing Flood Control Project and Future Improvement Plan

The study area is the most densely populated region in Bangladesh, and highly blessed with agricultural development potential even though the area is rather vulnerable to regular flooding. In order to mitigate such flooding damages, the GOB have executed large scale flood control projects, such as Meghna-Dhonagoda, Chandpur, Muhur, Gumti-Phase-I, and six (6) Polder-59 Projects since early 1970s. Among these flood control projects, the Gumti-Phase-I, which is still on-going at present, covers most of Debidwar.

Furthermore, the BWDB has recently executed the Feasibility Study for the Gumti Phase-II under the financial assistance by the World Bank; this flood control project is located northward the Phase-I project area, and cover Nabinagar and Bancharampur. After completion of this project the both Upazilas might be fully protected from floodings.

In 1989, FAP for the entire territory of Bangladesh was endorsed at the meeting of GOB and the donors concerned; the FAP comprises twenty six(26) components and supporting activities. Among the plan, FAP-5 deals with the flood control in the left bank area of the Meghna river. and it may cover the whole study area. The feasibility study for the FAP-5 also has recently commenced under the financial assistance of the World Bank.

Likewise the existing flood control projects in and around the study area, all these projects envisages flood protection with a large scale enclosed polder dike. After completion of these projects, together with the existing flood control projects, the

intensive monsoon floods caused mainly by the backflow from the Meghna river and flash flood caused by the rivers originated from the eastern Indian border would be fully protected. Nevertheless, the floods caused by sporadically local rainfalls or poor drainability in the area would not be eliminated even thereafter.

ii. Improvement of Internal Drainage Networks

As aforementioned, internal drainage improvement are essential even after the full implementation of FAP-5. Three basic measures would be envisaged for the improvement as mentioned below:

- a) Dredging of drainage channels,
- b) Increase of crossing structures under roads, and
- c) Provision of retarding basin

Sporadically poor drainage is usually caused by shortage of drain capacity of drainage channel and shortage in number of road crossing structures. Both measures would surely improve such sporadically poor drainage conditions.

In addition to these measures, a considerable scale of retarding basin is also essential for regulation of such a localized flooding in the area which is enclosed with polder dike. A number of existing fish ponds also have a fairly function of such a retarding basin. To supplement the retarding function by fishpond, a retarding basin would be exclusively developed for each drainage basin.

Main features and earthwork quantities for respective measures by Upazila are roughly estimated as given below:

Measures	Ban'pur	Nab'gar	Debidwar	Kachua
1 Dredging				
1.1 Channel Length(km)	90	130	110	140
1.2 Earthwork(1000 m ³)	1,400	2,000	600	1,300\
2 Cross Structures				
2.1 Cross Drain(Nos)	340	410	340	440
2.2 Side Drain(km)	237	284	236	305
3 Retard. Basin				
3.1 Basin(Nos)	4	6	4	4
3.2 Capacity(million m ³)	0.5	0.5	0.5	0.5
3.3 Earthwork(1000 m ³)	320	480	320	320
3.4 Regulator(Nos)	4	6	4	4

5.1.2 Fractional Pump Promotion Programme

(1) General

The Programme will be launched as a pilot project of irrigation development by exploiting under-utilized water bodies scattering in the study area. This is the "first step" to involve assetless societies, i.e. BSS/MBSS, directly in irrigation activities in the rural areas of Bangladesh. The Programme is proposed in parallel to expansion of irrigation farming with LLP.

The LLP irrigation is set up around same concept of the nationwide tubewell project. LLPs are privately procured, owned and used only by farmers, while there have been no chances for assetless rural poor to participate irrigation activities. The Programme will enable assetless to take part in actual irrigation activities although they will not be producers of crops, but pump operators.

Under the Programme, firstly, 200 units of handy fractional pumps with capacity of 0.5 cusec will be procured by four (4) UCCAs through either availing long-term loans or provision from donors. Pumps will be rented out to the BSS/MBSS members among which pump operators will be selected and deploy water supply services for supplemental irrigation and other production activities. The average coverage is some 5 ha per pump. Some 60 farmers will be covered by one unit of pump: overall average of farmland is 0.2 acre per farmer in the study area.

The work flow of the Programme is illustrated in Figure 5.2, in which the work flow of the Programme is indicated by numbers in parenthesis.

- (1) UCCA's technical guidance to be given to KSS/MSS as water users and BSS/MBSS as operators/mechanics by obtaining assistance by Project Supporting Unit (PSU)
- (2) Training provided by PSU
- (3) Operation request from KSS/MSS
- (4) Operation schedule prepared by UCCA
- (5) Irrigation water supply to KSS/MSS by BSS/MBSS
- (6) Payment of water charge by KSS/MSS
- (7) Wage to BSS/MBSS
- (8) Provision of maintenance services

The Programme will be introduced on pilot basis. The irrigation area and number of fractional pumps to be introduced under the Programme are 1,000 ha and 200 units, which are to be evenly distributed to each of four (4) Upazilas. The development period will be four (4) years from 1993 to 1995 when the FFYP will end. Frequent monitoring will be carried out to identify the technical constraints and management difficulties for further expansion of the Programme.

By operating 200 units of fractional pumps, the Programme will need some 600 BSS/MBSS members as operators cum mechanics. This means that 14.4% of the total BSS members in the study area, i.e. 4,186 persons, will obtain job opportunity through this Programme.

(2) Management Organization

Under control by BRDB, the Programme will be operated at village level by full-use of the two-tier cooperative system, i.e. UCCA/primary societies. UCCA will function as core management body for coordination between irrigation beneficiaries (KSS/MSS) and pump operators (BSS/MBSS).

In order to support the Programme, PSU will be organized. At the central management level, i.e. BRDB, one Project Adviser (PA) will be appointed as a counterpart of the Director General of BRDB. Under the PA, one Team Leader will be based at the Upazila level for provision of both administrative and technical assistance to the four (4) UCCA Chairmen and for supervision of the technical staff team of PSU. The technical staff will consist of one Agronomist, two (2) Extension Workers and two (2) Mechanics.

It should be noted that all the activities will not be performed under any management board such as coordination committee. Technical support and advises from other ministries and government agencies will be requested directly by the Project Manager as far as the PM recognized necessity of external input from other organizations.

BRDB

All the activities will be under the Project Manager (PM) to be selected among the Director General and the relevant senior staff of BRDB. The task force will be established under his responsibility for detailed project formulation. The members of task force will include the selected senior staff, at least, for planning, project monitoring, training and credit by attaching concurrent (additional) posts to them. The task force will also be responsible for advising and monitoring the Programme

and acting as liaison linking between the Programme, other government agencies and external authorities in Dhaka. Advised by the task force, the PM will be responsible for decision making on staff arrangement and procurement which will be taken into account for annual budgetary arrangement of BRDB.

UCCA

UCCA will avail to the existing credit schemes to procure fractional pumps according to the direction by BRDB and keep the entire ownership of pumps as far as the Programme is undertaken. UCCA will supervise in day-to-day operations in close contact with chairman of primary societies concerned. Upazila Management Committee will play the key role in entire management of the Programme and will be responsible for judging the qualification of primary societies and confirming or rejecting them accordingly. To support the chairman, UCCA will employ one Project Administrator whose qualification is to be B.Sc. in Social Sciences or its equivalent enough for dealing with all the administrative and financial issues.

Technical guidance and training of cooperative members are arranged by UCCA. At the UCCA office, PSU will provide technical guidance to the selected BSS/MBSS members, who will be candidates of pump operators.

The operation and maintenance of pumps will be ensured by UCCA. Attached to the UCCA office, the workshop will be operated for periodical overhaul of all the pumps. The workshop will keep the spare parts in its own store and maintain an appropriate inventory of spare parts. In addition to the workshop, UCCA will deploy a sort of mobile workshop units in the field. Mobile workshop units will be sent to the field according to the regular operation schedule as well as requests by operators.

BSS/MBSS

BSS/MBSS are to be borrowers of pumps. The chairman will submit application to UCCA. About three (3) to five (5) pumps will be allocated to a society. In response to approval from UCCA, the chairmen will select 15 competent members among society. Under the responsibility of chairman, five (5) operation groups will be organized. One group will consist of three (3) members. In the initial years, employment of pump operators will be selected mainly for the BSS members.

Project Supporting Unit (PSU)

The main tasks of Project Supporting Unit (PSU) are to provide (i) advice to BRDB necessary for important decision making and (ii) training and management know-how to UCCA and primary societies.

(3) Training

Training is a matter of the utmost important for successful performance of the Programme. The following training courses will be required.

- i. Training through parallel management for the UCCA staff
- ii. On-the-job training for pump operators and mechanics of BSS/MBSS

In the first year, the UCCA chairman and his Project Administrator will be provided training by Team Leader of PSU through parallel management. According to "Operation Manual of the Programme" prepared by PSU prior to commencement of the Programme, Team Leader will work closely alongside the UCCA chairman and his Project Administrator. A major part of training will consist of designing and installing suitable financial and management accounting and reporting system.

All the training for selected candidates of pump operators cum mechanics will be carried out according to the yearly procurement schedule of pumps. The first procurement will be not more than 10 pumps for one UCCA (40 for four Upazilas) taking management and operation ability of BSS/MBSS members into consideration. Instruction of pump operation and daily maintenance techniques will be given to 30 members by Agronomists and Chief Mechanic at the UCCA offices and the workshop. Following indoor training, 10 groups will be organized for 10 pumps. Field Superintendents will demonstrate operation and maintenance at the field through intensive training in the Rabi season. By 1995, 40 pumps will be added to each UCCA. Finally, 150 operators for 50 pumps will be employed and trained in each Upazila.

(4) Facilities and Equipment Requirement

The following equipment will be required.

- Diesel Engine (150 kg)
- Pump (0.5 cusec, 60 kg)
- Base Frame

- Coupling
- Pipe (50 mm x 10 m long)
- Tool Kit

5.1.3 Crop Intensification and Diversification Programme

The GOB places a great emphasis on increased cereals production, i.e. mainly rice and wheat, to enhance a degree of self-sufficiency. As a result of substantial increase of rice and wheat, Bangladesh has now reached close to 90% in self-sufficiency of food grains. The first priority will continue to be given to both crops. Apart from cereals, crop production sector has not caught up the rapidly increasing demand of non-cereal crops which are also important diet for Bangladesh. The followings are diversification-oriented crops in this regard.

- Increasing a degree of self-sufficiency in edible oils - mustard and sesame
- Increasing root and tubers components of the diet - potatoes
- Enhancing protein quality in the Bangladesh - pulses

The Programme will include the farm input supply combined with extension and credit. In connection with promotion of FP, the above-mentioned crops will be expanded in each Upazila according to the following schedule.

Unit: ha				
Crop	1993-1995	1996-2000	2001-2010	Total
Potatoes	300	400	300	1,000
Mustard	400	300	300	1,000
Pulses	300	300	400	1,000
Total	1,000	1,000	1,000	3,000
FP (no.)	200	200	200	600

5.1.4 Farm Input Supply Programme

Increased rice production will be the pivotal task of agricultural sector as it is. For this purpose, farm input supply is essential. The Programme will consist of (i) multiplication and distribution of paddy seeds and (ii) procurement of fertilizers under UCCA management supported by BRRI and BADC.

(1) Seeds

Paddy seeds in the study area are seriously contaminated with off-type plant, weed seeds and disease-affected seeds. This may be caused by continuous cropping of paddy on same farm plots. In addition, farmers in the study area believe that risk for crop failure due to outbreak of plant disease and other unfavorable natural hazards can be reduced by mixing rice varieties. Due to elongated maturity period, however, this often results in low yield and low grain quality by mixture of unripping and overripping grains. The Programme aims at expansion of improved paddy seeds of high yielding varieties for T. Aus, T. Aman and Boro. The following table summarizes annual seed requirement between 1993 and 2010.

Crop	Unit: ton		
	1993-1995	1996-2000	2001-2010
T. Aus (HYV)	250	250	250
T. Aman (HYV)	140	140	140
Boro (HYV)	180	120	120
Total requirement	570	510	510

Although it is ideal to use certified seeds in every crop season to increase productivity and quality of paddy grains, it is highly difficult to realize it under the current institutional set-up without seed multiplication farms and facilities in the study area. The frequency of seed renewal is targeted to be once for two to four seasons. This means that the actual seed requirement is 50% to 25% of the total requirement in the above table.

Seed preservation techniques can be transferred to individual farmers through T&V system of DAE. Alternatively, seed multiplication can be introduced as group activities of KSS/MSS with support of UCCA. At village level, for instance, the seed preservation technique is to be introduced to the selected cooperative members who will be responsible to produce and release pure seeds to other members. Frequent elimination of off-type plants and disease-affected plants is the primary practices for them. Farm inputs supply to seed producers will be performed by UCCA. To support their activities, variety selection and foundation/certified seeds production will be continuously carried out in the Comilla station of BRRI.

(2) Fertilizers

The fertilizer requirement is 260 kg/ha of urea, 130 kg/ha of TSP and 66 kg/ha of MP, which are equivalent to 120 kg of N, 60 kg of P_2O_5 and 30kg of K_2O . The total requirement will amount to 18,100 tons of urea, 9,000 tons of TSP and 4,600 tons of MP in 1995. In view of

higher response to unit yield, first of all, supply of urea should be stabilized. Taking fertilizer requirement for fish pond into consideration, fertilizer business has to be developed more.

5.1.5 Tree Nursery Development Programme

The Programme aims at provision of tree seedlings maintained at nursery station to be managed under local governments or UCCAs. Those trees will be planted for the following purposes.

- i. Fruit tree crops are expected to be additional income sources if they can be maintained in homestead.
- ii. In connection with feeder and rural roads construction, trees are planted along the roads and maintained mainly by upazilas and unions.
- iii. Fuel wood supply to local farmers

5.1.6 Intensified Homestead Crop Production Programme

The Programme is set up mainly for participation of women in rural development. The crops to be planted are vegetables such as tomatoes, potatoes, brinjal, pumpkin, lady's finger, etc. The basic farm inputs including seeds and fertilizers are to be supplied by extension workers when they will visit group of village women. The main constraint is lack of female extension workers. As can be always observed in NGO's extension activities, e.g. Caritas, training for female extension workers has to be carried out in parallel to the Programme.

5.1.7 Model Farm Credit Programme

(1) Scope of Programme

There are a number of institutional rural credit schemes in Bangladesh. Long term credits are applicable for fixed and depreciable assets including procurement of farm land, while short term credits are utilized for procurement of such consumables as farm inputs and fuel for plant operation. The Programme aims to establish well-functioning rural credit schemes for short term financial operation, i.e. shorter than one year. Taking the ample experiences obtained through the past credit operations in the country into consideration, the particular attention is paid to effective utilization of credits and realization of high recovery rates.

In crop production sector, short term credits play an important role. Farmers can ensure procurement of improved seeds, fertilizers and agro-chemicals by obtaining short term crop loan. Demand of crop loan is extremely high, i.e. 97% of borrowers of cooperative credit

availed loan for the purposes of procurement of farm inputs in 1989/90 although credit amount was limited to 38% of the total cooperative credit. About 80% of the total cooperative credit is allocated to crop loan (38%) and irrigation equipment (42%). This means that credit for agricultural sector is highly crucial for farmers.

To support the production sector programmes of MRDP II, the short term credits will be expanded in four Upazilas. The expected borrowers of this short term credit scheme are producers group organized under the primary societies who have farm activities of not only crop production but also animal husbandry and fishery. The scheme will be established with emphases on the following conditions.

- i. Timely disbursement
- ii. Close linkage with technical support
- iii. Higher recovery rates
- iv. Credit without collateral will be especially important
- v. Set up financing section within UCCA for smooth sanction

(2) Organizational Set-up

The Model Farm Credit Programme will be managed fully under BRDB. At the headquarters of BRDB, the Credit Operation Section will be established. Because of lack of experience in loan sanction, the external technical support is indispensable. For this purpose, Project Supporting Unit (PSU) will be attached to BRDB. PSU will be organized by Senior Credit Expert who will act as Adviser for DG of BRDB, and the technical field staff who will transfer the farming and fish culture techniques to credit's borrowers, i.e. cooperative members.

The day-to-day credit operation will be undertaken by UCCA. UCCA will recruit competent credit experts who have preferably ample experiences of NGO's credit schemes such as Grameen Bank and BRAC. Upazila RD Officers will carry out frequent monitoring of credit operation to identify the constraints arising from daily credit operation and report to Credit Operation Section of BRDB. BRDB will be responsible for record keeping and auditing. Given the technical and administrative advice by PSU, the credit sanction and technical arrangement at field are expected to be elaborated. The keen issues are "how to enhance recovery rate of loan".

The representatives of borrower groups will be responsible for loan repayment. His ability will be a key of the Model Farm Credit. Intensive training to group representative will be performed under the responsibility of BRDB. His salary should be covered by loan interest.

The sufficient technical support is essential to realize the project benefit. The technical staff of PSU will act as adviser to UCCA/primary societies as well as extension workers. In association with Department Agriculture Extension (DAE) and Department of Fishery (DOF), the technical extension will be assured in parallel to the Programme.

(3) Package Credit and Fund Requirement

The Programme will be carried out in parallel to the minor irrigation development with LLP and semi-intensive fish pond culture. To enhance the credit function and higher recovery rate, the Programme places particular emphases on group and package loan concept. The loan conditions, i.e repayment period and interest, should be set up by further in-depth study. The main idea of Model Farm Credit Programme is spelled out below.

Model Farm Credit-1: Package crop loan supporting LLP Irrigation Development

To secure farm input supply for newly planted Boro rice under LLP Irrigation Development Programme, the crop loan will be available for both individual farmers and farmer's group (average LLP water users group will be organized by 60 households). The crop loan will cover cost of (i) improved seeds, (ii) fertilizers, (iii) insecticides, and (iv) water charge. The package crop loan will be disbursed from September, i.e. one month before planting of Boro rice, and repaid by June when harvested. The loan amount is to be Tk 8,700/ha at 1991 current price.

Item	Q'ty (kg/ha)	Unit Price (Tk/kg)	Amount (Tk/ha)
Seed	40	8.3	332
Urea	260	5.2	1,352
TSP	130	5.7	741
MP	66	5.2	343
Chemicals	LS		1,200
Draught Animals	LS		600
Water Charge			5,000
Miscellaneous (5% of the above)	LS		411
Total			8,632 (8,700)

Under LLP Irrigation and Drainage Improvement Programme with the total command area of 6,500 ha at ultimate stage, the annual fund requirement will amount to Tk 56.6 million. With anticipated yield of 4.5 tons/ha of paddy and unit price of Tk 5.2/kg, the gross revenue would be Tk 23,400/ha. This means that the proposed package loan of Tk 8,700/ha is equivalent to

37% of the gross revenue, which is likely to be within capacity to repayment even the anticipated yield could not be fully harvested.

Model Farm Credit-2: Package fishery loan supporting Semi-intensive Fish Pond Culture Programme

Fishery loan will become available under the Model Farm Credit Scheme. The loan will be disburse to fishermen groups (30 households/group) organized under the primary societies. One group will manage 5 ha. The fishery loan will cover cost of (i) fingerling, (ii) fertilizers, (iii) lime, (iv) chemicals, (v) embankment OM, and (vi) other consumables. The seasonal loan will be disbursed in the months from June to September with repayment period of one year. Prior to pond culture, the existing ponds will be mobilized by construction of embankment in the first year. The amount of construction cost will be added in the initial year. The repayment of this first loan amount will be repaid during the following five years. In and after second year, only running cost will be covered by loan.

Item	Q'ty per ha	Unit Price	Amount (Tk/ha)
1. 1st Year			
Embankment of 1 ha pond	3,200 m ³	15	50,000
Total for group (5ha)			250,000
2. 2nd Year and onward			
Pesticide	LS		3,000
Lime	200kg	3.0	600
Fingerling	7,000 nos.	0.45	2,700
Urea	250 kg	5.2	1,300
TSP	150 kg	5.7	890
Cowdung	5,000 kg	0.75	3,750
Total per ha			12,240
Total for group			61,200
Total for group (5 ha/ 30 members)		1st year	311,000
		2nd year onward	61,000

The loan amounts are estimated to be Tk 311,000 for one group in the first year and Tk 61,000 in and after the second year, which are equivalent to Tk 10,400 per member and Tk 2, 000, respectively. Under Semi-intensive Fish Pond Culture Programme, 280 ha of ponds will be developed by 2000. The total fund requirement will be Tk 14.0 million for embankment and Tk 3.4 million for operation and management.

5.2 Livestock Sector

5.2.1 Feed and Fodder Production Programme

The shortage of feed and fodder crops is crucial for further livestock development in the study area. The Programme will include:

- i. To establish a demonstration/multiplication plot for HYV fodder grasses in each Upazila. The promising grass species are (i) Napir, (ii) Para, (iii) Splendida, (iv) ipil-ipil, etc.
- ii. To establish community plots on embankment, road side, government land for high yielding grasses production
- ii. To train and motivate the farmers for grazing fodder and grasses on their own land
- iv. To produce some quick growing fodder between two food crops and cash crop

5.2.2 Semi-intensive Poultry Development Programme

Chicken and duck rearing plays an important role in the study area giving (i) additional cash incomes, (ii) provision of animal protein, and (iii) employment opportunity especially for women in villages. The Programme aims at introduction of semi-intensive techniques for poultry production under technical supervision of Directorate of Livestock (DOL). On farm level, firstly, chicken sheds will be extended more. In parallel, introduction of modern breeds will be attempted to the trial scale. Collection of by-products from post-harvest plants, i.e. rice and wheat brans, oilseeds cake, etc., will be assured by UCCA and primary societies. The products will be traded under the cooperative's joint-marketing programme to be set up under MRDP II.

5.2.3 Veterinary Service Expansion Programme

There are only limited number of veterinary dispensaries and artificial insemination (A/I) centers at upazila level. To encourage the regional livestock industry, those services have to be expanded to every corner of the study area. The additional requirement for veterinary services is represented by:

- Establishment of union veterinary aid center,
- Additional provision of facilities and equipment at veterinary and AI centers, and
- Training facilities

The livestock extension activities in the study area are insufficient. In connection with veterinary and AI services, the technical knowledge of animal husbandry is transferred to the farmers. Under the Programme, the training will be emphasized more.

5.3 Inland Fishery Sector

5.3.1 Semi-Intensive Fish Culture Programme

The present fish culture practice in the study area is neither systematic nor scientific - it is below semi-intensive level. As a result, the production rate is also very low (700 - 1500 kg/ha/year). Hence the ponds, even under culture, remain underutilized. The upazilas of Kachua and Debidwar are suitable for development of culture fisheries as these areas are not prone to normal flooding. While major parts of Bancharampur and Nabinagar are under low-lying floodplain areas and hence prone to flood; some areas (relatively high areas) are suitable for pond culture where the sequence of stocking and harvesting of fish have to be maintained in such a way that the fish can be stocked in ponds just after the flood and be harvested before the next possible flooding.

The proposed production technology is polyculture of major carps and Chinese carps on a semi-intensive level with fertilization of ponds. The proposed species are catla, rohu, mrigal, silver carp, grass carp and common carp, as these carps have complementary feeding habitats which will optimally utilize pond productivity. The estimated production, requirement of fingerlings and spawn and other conditions are shown in Table 5.2. In each upazila about 280 ha of ponds are expected to be brought under improved culture level by 70 groups of assetless people and marginal farmers at the end of tenth year. The estimated production from these ponds is 588 tons.

Hatcheries are not needed, as there are private and government hatcheries that can easily supply the required quantity of spawn and fingerlings. However, nursing of spawn to fingerlings will be carried out by members in areas where fingerlings are not available. This will also enable the members to produce their own fingerlings for timely stocking; and the excess can be sold to other farms.

5.3.2 Homestead Integrated Fish Culture by Women

There are a good number of small homestead ponds (200-1000 m²) in the project area, and most of these ponds, though fit for fish culture, remain unused or underused. These ponds which retain water for 4-7 months a year ranging in depth of 0.5 - 1.0 m are proposed for short-cycle culture of species such as Tilapia and Thai shorputi (Puntius gonionotus) by using

poultry dropping and kitchen wastes. Women are encouraged, either individually or collectively to adopt homestead fish culture in these ponds and seasonal ditches around households. A model plan for a pond size of 1000 m² is shown in Table 5.3

The use of perennial ponds for integrated fish culture with chicken or ducks is also proposed. Here too the emphasis is to develop low input technology suitable for rural poor that could fit their farming systems, and women can be encouraged to take up fish farming as means of additional income to families.

5.3.3 Open Water Capture Fishery Development Programme

There is a need for strengthening the organizational strength and activities of the Fishermen Cooperatives which are formed solely to get fishing/leasing rights of open waters. Particularly, for the fishermen in Nabinagar and Bancharampur, provision of credit support for purchase of fishing boats, nets, yarns (for making nets by women), fish drying platforms, storage facilities (dry and salted fish) is proposed.

5.4 Agro-Industry Sector

5.4.1 Post-Harvesting Plant Expansion Programme

The Programme is formulated for promotion of three major crops, namely paddy, wheat and mustard. The present processing capacities for these crops range from 25% to 35% of the total production. The Programme is envisaged to establish the further processing plants to cover 50% of the total production by the year 2010 as follows.

Processing Plant	Standard Capacity (ton/day/unit)	Working days (days/year)	Total Capacity (tons/year/unit)	Requirement (units)	Newly Envisaged Capacity (ton)
Per boiled rice mill	10.0	280	2,800	49	137,200
Flour mill	2.0	280	560	31	17,360
Oil mill	0.5	280	140	30	4,200

5.4.2 Cold Storage Installation Programme

This Programme aims at cold storage installation mainly for potatoes. The capacity requirement is summarized below.

Upazila	Existing Capacity (ton)	Newly Envisaged Capacity (ton)
Nabinagar	0	1,000
Kachua	0	2,000
Debidwar	3,000	2,000
Total	3,000	5,000

5.4.3 Homestead Food Processing Extension Programme

This Program is formulated for promoting home-based agro-processing as cottage industries to be performed mainly by women labour force for following purposes.

- making unemployed women labour force in the rural area get a higher labour productivity.
- making them to be trained for skilled works at homestead for enhancing the value added for their homestead products.
- making them to be income-generated by group production and marketing with a supporting system on finance and techniques.
- Improving their living conditions from the present deteriorating conditions.

The Programme will consist of (i) group formation (ii) training (iii) credit supply (iv) production support and (v) marketing support as follows.

- (1) Training for about 100 persons per upazila per year and forming them into groups.
- (2) After training, supplying credit to each group for these business-production, i.e. Tk 5,000. per group-member.
- (3) Supporting their production and marketing through BRDB facilities.

5.5 Marketing Sector

5.5.1 Upazila Food Grains Marketing Programme

(1) Overview

Upazila Food Grains Marketing Programme as shown in Figure 5.3 will be established under the UCCA organization through :

- i. Organization of a Village Marketing Group (VMG) comprised suppliers' groups and consumers' groups at village level,
- ii. Provision of marketing facilities such as storage facilities at village and local market levels and transportation means together with necessary processing facilities,
- iii. Promotion of village level food grains storage and handling activities between the suppliers' groups and consumers' groups, for establishment of secure food grains supply system,
- iv. Increase in farmers' bargaining powers and their income through village level joint-marketing activities both the peak harvest and lean seasons,
- v. Promotion of food grains processing, storage and trading activities for marketed surplus from the member farmers at local market level, which will be directly managed by the UCCAs,
- vi. Preparation of necessary credit schemes for promotion of cooperative marketing activities, especially for operation expenses as well as initial investment costs, and
- vii. Provision of training on marketing operations to member farmers at village level as well as the staff in the UCCAs.

(2) Requirement of Storage Facilities

For the estimation of required storage capacity, maximum production by union is identified. Home consumption, sale in peak harvest and lean seasons is estimated by scale of farm size. The marketed surplus of food grains is defined sale both in peak harvest and lean seasons excluding village level storage for home consumption. Required storage capacity at village level will be the quantity for home consumption till the next harvest season and sale in the lean season. The quantity sold in the peak harvest season will be the capacity at local market level. Required storage capacity at village and local market levels at present is estimated as follows :

Item/Upazila	Nabinagar	Bancharampur	Debidwar	Kachua
I. Village Level Storage (t)				
- Average per village	240	170	260	110
- Total	37,000	13,600	36,600	19,500
II. Local Market Level Storage (t)				
- Total	12,000	2,700	10,900	3,200

The future food grains production target in the year of 2000 for the study area will be 1.6 times of the present level with the annual production growth rate of 5.0%. Based on the assumptions

that the per capita consumption level will be the recommended intake of 165 kg, the demand growth of food grains will be estimated as follows :

Item/Upazila	Annual Growth Rate (%)			
	Nabinagar	Bancharampur	Debidwar	Kachua
1. Population	2.2	2.2	2.2	2.2
2. Per Capita Consumption	2.8	3.9	0.5	4.5
3. Total Food Grain Demand	5.0	6.1	2.7	6.7
4. Balance (5.0% - (3))	0	-1.1	2.3	-1.7

Nabinagar upazila could be self-sufficient on the food grains and Debidwar be surplus, while Bancharampur and Kachua be still deficit. For the future increase in food grain production, the storage capacities should be expanded at least 50% of the present requirement

(3) Type of Storage Facilities

For village level storage, godown type facilities with the unit capacity of 100 tons or metallic " Dole " and " Gola " made of plain tin sheet under a simple store house with roof and wall made of local materials is recommended. Godown type facilities with the unit capacity of 500 tons is recommended for local market godown. Beside storage facilities, concrete or brick paved sun-drying floor is necessary for assembling and drying purposes.

(4) Plan for Establishment of Storage Facilities

The target storage requirement up to the year of 2000 is set at around 10 % of the net food grain production in 2000, which account around 25 % of the total storage requirement in the peak season at present. The following number and capacity of godown are required for the realization of the target. The location of the local market godowns is shown in Figure 5.4.

Item/Upazila	Nabinagar	Bancharampur	Debidwar	Kachua
I. Village Godown				
- No. of godown	93	34	91	50
- Total storage capacity (t)	9,300	3,400	9,100	5,000
II. Local Market Godown (t)				
- No. of godown	7	3	6	3
- Total storage capacity (t)	3,500	1,500	3,000	1,500

(5) Management Procedure

i. Village Godown

The village godown with the capacity of 100 tons will be managed by one Village Marketing Group (VMG). One VMG could comprise 100 member suppliers and 200 member consumers. Each member supplier can store one ton of food grains equally. For the reduction of grain trading risk when the lean season price is not profitable, a half of the total storage should be consumed by the member consumers. The other half of storage could be sold at the highest price in the lean season. It is recommended that the sale price to the member consumers should be set at lower than the sale price in the lean season.

The grain storage could function as a kind of grain bank at village level. If the savings of primary societies are utilized or a kind of grain storage credit is applied, the marginal and small farmers could be suppliers. It is recommended that the UCCA or a bank should arrange a credit in order to increase the member suppliers from marginal and small farmers.

ii. Local Market Godown

The godowns in the local markets will be directly managed by the UCCA as well as the processing facilities for per-boiling, rice and flour milling. Food grains will be procured from the VMGs during peak harvest seasons. The UCCAs' management procedures are summarized as follows :

- The UCCA informs a buying price of food grains to the VMGs before harvest. The price should be higher than a prospect local market price.
- The UCCA informs a sale price of rice or flour to the consumers' groups of the VMGs and non-member consumers in the area. The sale price for the VMGs should be lower than a prevailing price in the markets, and cover expenses for grains procured, storage, handling, processing and the UCCA service charges.
- The UCCA contracts with the buyers on the quantity for sale as much as possible in order to reduce the risk of open market business.
- The processing facilities is operated not only for procured food grains but also for the outside customers like private traders, government agencies, informal farmer groups.
- Milled rice and flour as well as wheat grains is stored in the godowns until the lean season when a price will increase.

The UCCA operates the godowns and processing facilities effectively through the scheduled procurement of food grains, distribution of milled rice and flour, and custom milling services.

The financial viability on the management of village and local market godowns is examined by the balance sheets under three conditions as shown in Table 5.4. The first case is under no bank financing and no load of depreciation cost for godown replacement. The second case is under bank financing with annual interest at 8% and no depreciation cost. The member farmers get a credit for 90% to the amount of stored paddy valued at the price of harvest season. The two types of godown will be financially managed in any cases when the prices in the lean season will be increased more than 25% of those in the harvest season as follows :

(Benefit / Farmer)			
Price Increase/Case	Case 1	Case 2	Case 3
I. Village Godown			
60 %	2,170	1,860	1,690
40%	1,270	960	790
20%	470	160	-10
II. Local Market Godown			
60 %	2,150	1,840	1,640
40%	1,250	940	740
20%	450	140	-60

5.5.2 Joint Marketing Promotion Programme

Production of cash crops such as vegetables and oil seeds is seasonal and usually produced once a year. The storage of these crops is difficult and costly. Marketability of those products is still low due to low purchasing power of majority of people, hard accessibility to outside markets, lack of proper storage facilities as well as limited and unstable electric supply.

On the basis of the Agricultural Production Plan up to the year 2000 in the study area and the easiness for keeping the quality of products, priorities for the improvement of marketing system will be given to potatoes, oil seed, fish and poultry. Organizations for marketing of these products will be made same as the Upazila Food Grains Marketing Programme. The member farmers and fishermen could be organized by village as the Village Marketing Group (VMG).

The UCCAs' role is mainly coordination between the member producers and consumers within the upazila areas, and good dealers in terms of price. The local markets will be utilized for the assembling place. The collection yard with shed will be needed for this purpose. Scheduled

cropping is recommended for decrease in over supply and reduction of unfair trading with dealers.

For the processing of these products, oil mill is most applicable in the study area because oil seed is comparatively easy to store and the study area is short of edible oil. The member producers should be encouraged by favorable buying prices to increase their production. The following marketing facilities should be installed at the location of the Local Market Godowns selected and managed under the UCCAs :

- (1) Shed for assembling and trading,
- (2) Storehouse for vegetable, edible oil, fish and poultry, separate from the godowns for food grains, and
- (3) Oil mill together with rice and flour mills by multi-utilization of electric motors under the same plant house

5.6 Rural Infrastructure Sector

5.6.1 Feeder and Rural Roads Improvement Programmes

(1) Objectives

The road improvement programme emphasizes the betterment of accessibility to the following centers and institutions.

- a. Administrative centers such as Upazila and Union Head Quarters
- b. Markets such as Growth centers and rural hat bazar
- c. Health centers such as Upazila Health Complex, Union sub-health centers and family welfare center at Union level
- d. Educational institutes such as vocational centers, primary, secondary, high-schools and collage
- e. Production center such as irrigation, cottage industry and fishery areas

The area covered by the programme will receive following direct profits through the improvement of roads

- a. Encouragement to agricultural production activities and extension services
- b. Reduction of transportation cost
- c. Betterment of rural life

- d. Acceleration of extension project concerning with the basic human needs such as drinking water supply, sanitation improvement, family planning, etc.
- e. Support to maintenance activities for irrigation and drinking water supply facilities

(2) Selection procedure

There are no definite selection criteria and justification methods for feeder and rural roads in Bangladesh. Selection and justification have been done by the local government, international agencies or donors individually with their own criteria. As a result, some projects applied only economic feasibility tests, while other projects considered only social impacts as the only criterion for selection and justification.

MRDP II study applies three-steps selection procedure which will ensure that the selected roads are both economically feasible and have a high social impact. This procedure is developed through the ample experiences by the U.S. Agency for International Development (AID).

The three-step selection procedure consists of screening followed by socio-economic ranking and economic evaluation.

Screening

As the first step, screening is carried out to examine whether the roads proposed by each Upazila contributes to one or more of the rural development objectives or not.

The proposed road projects were examined based on the following screening items.

1. Road classification
2. Linkage to market and/or administrative center
3. Population Served
4. Availability of alternative transportation means
5. Priority prepared by Upazila
6. Environmental Impact

Socio-economic Ranking

Second step aims at assessing the proposed roads, which passed through first screening step, from both the value of economic and social factors. For this purpose, the economic and social factors are classified into two major categories of road impacts: economic activity and quality of life.

Economic Activity

Economic activity is sub-divided into four factors; (1) agricultural potential, (2) degree of access improvement, (3) existence of parallel development activities in the road influence area and (4) Linkage to local and regional market. The weight of each factor is established to represent the importance of each factor.

Quality of Life

Improvement of access to social services such as hospital (Upazila Health Complex and Union Health Center, etc.), vocational institute, schools and other services contributes to betterment of quality of rural life. In this context, accessibility to social services is evaluated.

Economic Evaluation

The economic evaluation of each road is made based on an assessment of development impact on agricultural production, improvement in personal mobility (user cost saving) and benefits arising from reduction in transport costs.

(3) Selection of Roads

Selection

MRDP II study takes up the roads which passed the screening step and have reasonable economic feasibility as the model development programme. The following table presents the summary of selection of roads.

	Kachua	Nabinagar	Bancharampur	Debidwar
Candidate roads listed by each Upazila				
Feeder Road B	2	2	3	7
Rural Road	36	43	21	13
Selected roads				
Feeder Road B	2	2	3	7
Rural Road	32	33	16	9
Dropped in first screening	4	10	5	4

Existing condition and MRDP II improvement plan for roads in each Upazila are presented in Table 5.5, and detailed summary tables of selection of priority roads are shown in Table 5.6.

(4) Project Works

Comprehensive improvement is planned for feeder road and its linking rural roads. The items to be improved are as follows:

- a. Embankment above the 20 year return period flood level plus 90 cm (slope gradient = 1 : 2)
- b. Bituminous pavement of road surface (width = 3.6 m)
- c. Tree planting (1,000 nos./kilometer)
- d. Turfing on the slope
- e. Construction and rehabilitation of bridges and culverts

Construction and rehabilitation of bridges and culverts are planned for selected rural roads.

The following table presents the summary of the MRDP II project works.

	Kachua	Nabinagar	Bancharampur	Debidwar
Feeder Road B improvement				
- Number of selected roads	2	2	3	7
- Length (in Km)	17.2	17.6	55.3	68.4
- Pavement Length (in Km)	17.2	17.6	55.3	68.4
- Tree Planting (in No.)	17,200	17,600	55,300	68,400
- Turfing (in Km)	17.2	17.6	55.3	68.4
- Number of Structures	28	6	41	82
Rural Road improvement				
- Number of selected roads	32	33	16	9
- Length (in Km)	5.5	33.8	-	-
- Pavement Length (in Km)	5.5	33.8	-	-
- Tree Planting (in No.)	5500	33,800	-	-
- Turfing (in Km)	5.5	33.8	-	-
- Number of Structures	368	242	98	127

Source of basic data : Upazila engineer in each Upazila

5.6.2 Growth Center Improvement Programmes

(1) Objectives

- a. Improvement of existing Growth Center (referred to as GC hereafter) area to encourage marginal farmers and/or rural poor who may gather to hat as temporary venders
- b. Strengthening of financial situation of Upazila by increasing lease money through improvement of facilities in market area

- c. Strengthening of self-reliance of Upazila for market development and maintenance by increasing lease money

(2) Project works

A three-stage improvement concept is applied for formulation of facility plan.

Stage 1 : Improvement of existing market area especially open and shed area with minimum standard

Stage 2 : Expansion of market area

Stage 3 : Comprehensive improvement including re-location and re-construction of permanent shops

Minimum facilities in Stage 1 level

The GCs are overcrowded in hat day. However, the GC areas have no open space for expansion. In this context, the improvement and construction of facilities will be planed in existing market area because the land acquisition takes long and complicated procedure and requires huge budget.

The minimum facilities can be defined as the facilities which are improved and constructed in existing market area. These facilities are broadly divided into following two categories:

a. Business Facilities

- Sheds for rice, fish, meat, vegetable, etc.,
- Open sale platform
- metalled paths with drainage ditches

b. Sanitation Facilities

- garbage pits,
- water supply system, and
- latrines.

Facility Plan in Stage 2 level

In addition to the minimum facilities, expansion of market area into the government own ponds is made. Because the government owned ponds are normally located

adjacent to existing market area and there is no procedure for land acquisition. However, water in these ponds is utilized by local population. Then market area is expanded limitedly to almost half of these ponds. Moreover, facilities such as godown, workshop, mills, etc. are constructed in GC area as UCCA facilities.

Facility Plan in Stage 3 level

Permanent shop's facilities are re-located to local government owned two or three stories market buildings to be newly constructed. The area created by re-location of permanent shops are used for shed and platform area for temporary vendors. The new market area is also expanded by purchasing land.

The construction and maintenance costs exceed existing Upazila financial capacity. The development in this stage is made when the strengthening of financial situation and managing system in Upazila is realized.

Facility Plan under MRDP II

GC improvement is planned up to stage 2 level considering present Upazila financial situation and managing system. The principal feature of major facilities plan for GCs are presented in Table 5.7 and summarized below.

Name of Market	Project Area (in m ²)	Shed (in m ²)	Internal Road Pavement (in m ²)
Kachua	18,000	4,700	13,000
Debidwar	11,000	3,800	7,400
Bancharampur	18,000	4,500	13,000
Nabinagar	13,000	3,800	8,800

5.6.3 Other Programme

Other programmes are composed of following seven (7) components.

- Drinking Water Supply Development Programme
- Sanitation Improvement Programme
- Rural Electrification Extension Programme
- Communication Improvement Programme
- Cluster Formation of Rural Housing Programme
- School Buildings Improvement Programme

- Training Facilities Development Programme

Drinking Water Supply Development Programme

Safe drinking water supply is one of basic human needs. Department of Public Health Engineering (PHE) has been promoting installation of hand tubewells (HTW) in the study area under the UNICEF nation-wide programme named "Rural Water Supply Project".

The on-going programme has met difficulty in well balanced distributing of the HTWs. PHE has made every efforts to select the location of the HTWs. These selection takes long time and procedure. In addition to this, long term maintenance activities are crucial for steady water supply.

In this context , the MRDP-II study will not take up this components as short-term project and also will not formulate the project as the long term project because of avoiding overlapping of the similar project in the same area.

Sanitation Improvement Programme

Improvement of sanitary condition in the rural area is one of the major items in the basic human needs. As part of sanitation improvement programme, distribution of latrine unit projects launched in 1954. Since then many trial have been made in the study area. The empirical data shows that free distribution of latrine to rural poor is not always effective to change the sanitation condition and promotion of the project requires well trained field visitors for public hygiene and health education.

The rapid spreading of latrine will not be achieved without the improvement of flood condition in the low land lying areas.

In this circumstances, the rapid improvement of sanitary conditions will not be expected and on-going project has been operated in the study area. Therefore, MRDP-II project will not formulate the project plan because of avoiding overlapping of the similar project in the same area.

Rural Electrification

Promotion of rural electrification will bring about the cost effective irrigation and rural industries in the rural area. From this point of view, promotion of rural electrification for production sector will be useful.

The distribution line extension programme plan and facilities plan such as transformer should be formulated in line with the irrigation and agro-industry plans. Therefore, the rural electrification plan will be formulated in further study after the related project plans will be defined.

Communication

The numbers of communication facilities are not sufficient in the rural area. However, the main constraints lie in their operation and maintenance at national level. These constraints such as poor equipment for telephone exchange can not be solved at Upazila level and this project component will not contribute much to alleviation of rural poor. For these reasons, MRDP-II project will not formulate the improvement plan for this components.

Cluster Formation of Rural Housing Programme

This is the nationwide programme called "Operation Thikana" conducted directly by presidential office since 1988. The objectives of this project is "to settle homeless and landless in cluster village located on government land and to help the Thikana families to become self-reliant through promoting and supporting income generation and social welfare activities." (FFYP)

To meet the objectives, large area of government land will be required near the Upazila Head Quarters or along the Feeder roads for receiving social welfare services. However, the government land is usually located in inconvenient areas such as flood plain and appropriate land is very limited comparing with the target population.

Moreover, criteria for selection of Thikana Family is not clear enough. It is reported in the field that emotional conflict was observed between Thikana Family and small farmers around the cluster village. Local government will be not always willing to support to this programme.

From above reason, the promotion programme will not be able to formulated in MRDP-II study.

School Buildings Improvement Programme

Although, there are 503 primary schools in four Upazilas, the numbers of schools and capacity of the existing buildings are insufficient. Moreover the numbers of schools will be scarce absolutely when the BOG programme for compulsory primary education will be launched.

In addition to the insufficient numbers, the school buildings and facilities are in very poor condition in the study area. Some schools were damaged by extraordinary floods occurred in 1987 and 1988.

From above reason, entire improvement and development plan formulation will be very necessary. However, the entire development plan will be out of the basic concept of MRDP-II. Moreover, selection of schools on priority basis will not satisfy the GOB policy. In this context, school improvement plan will not be formulated.

Training Facilities Development Programme

The training facilities in Upazila is highly required for successful implementation of the Programmes under MRDP II. First of all, however, more emphases should be placed on training programmes to be held there. The Programme aims at establishment of skills training programmes through daily on-the-job training. For instance, training for mechanics can be given at the well-equipped workshop for LLP and post-harvest plants rather than ordinal training rooms. Extension for farm techniques for intensified homestead production will be transferred to women at villages. The physical facilities requirement for skills training will be examined through the further study.

5.7 Selection of MRDP II Programmes

5.7.1 Objectives

MRDP II is multi-purpose development plan based on aforementioned single programmes. Each programme is essential for achievement of the targeted economic macro-framework and can individually be implemented by the relevant organizations. In line with the principles of Twenty Year Perspective Plan (1990-2010), the long-term implementation schedule is to be prepared to achieve each programme of MRDP II stagewise. The evaluation in this context aims at selection of eligible programmes, which would be taken up as components of MRDP II. The general workflow is illustrated in Figure 5.5.

5.7.2 Selection Criteria

The on-going rural development programmes were formulated with the great emphasis on enhancement of rural living standard through creation of employment opportunity for facilitating the participation of rural poors to substantial economic activities in situ. MRDP II is also formulated with a particular attention to rural poor in each of the sector programmes. Group activity is of extreme importance for rural poors in terms of stable capital formation and easy participation to income generating activities. In this regard, cooperative movement is expected to play a pivotal role in the rural societies. The existing two tier cooperative system, however, function only as sole lender of cooperative credits, and its performance is far below the expectation of central administrations and rural people.

It is obvious that cooperatives have to be the central agents throughout the rural areas of Bangladesh. The Government's Production and Employment Programme (PEP) for the rural poor was conceived as a package of formation of BSS/MBSS (1985-1990), skill training and credit for their participation to income generation activities. In the TFYP period, 16,000 BSS/MBSS including informal groups were organized with 376,000 members. In line with PEP, FFYP also focuses on greater employment opportunities for the rural poor for productive employment in both farm and non-farm sectors of the economy.

The two tier cooperative system has to be developed more through activation of UCCA as an apex of rural societies as well as further formation of primary societies. The Study attaches the first priority to strengthening the UCCA/primary societies system. All the programmes under MRDP II are envisaged to activate cooperative activities or to be realized by reinforced cooperatives themselves.

To sustain the appropriate cooperative activities, the roles of local government are crucial. Rural infrastructure indispensable for rural economic activities is mostly under the management of local government, i.e. Upazila parishad. There are clear administrative demarcations in infrastructure development between the central government and local governments. Selection criteria of priority projects are also drawn from the current roles of local government, i.e. supporting regional economic activities.

MRDP II aims at directing the selected Upazilas to the appropriate goals with aspiration. The goals will be achieved through an enthusiasm of all the partakers in the rural societies. The priority projects are selected and formulated as a first step of MRDP II. Firstly, the priority was examined among the sector programmes formulated under MRDP II taking the following conditions into consideration.

- i. Programmes suitable for UCCA's economic activities
- ii. Programmes for income generation of cooperative members
- iii. Programmes for generation of employment opportunities
- iv. Programmes to contribute to large mass of beneficiaries directly and indirectly
- v. Programmes for local government with suitable fund requirement
- vi. Programmes with high expectation of supplemental and multiplier effects
- vii. Programmes not covered by the other existing programmes to avoid technical conflicts

5.7.3 Eligible Programmes

The comparison was made among the programmes under MRDP II from each viewpoint mentioned above as presented in Table 5.8. The results are presented in Table 5.9 and indicate higher priority of the following eligible 11 programmes which form MRDP II.

MRDP II Programme		Selection
(1)	LLP Irrigation Development and Drainage Improvement Programme	Eligible
(2)	Fractional Pump Promotion Programme	Eligible
(3)	Crop Intensification and Diversification Programme	Eligible
(4)	Farm Input Supply Programme	Eligible
(5)	Tree Nursery Development Programme	
(6)	Intensified Homestead Crop Production Extension Programme	
(7)	Model Farm Credit Programme	Eligible
(8)	Feed and Fodder Production Programme	
(9)	Semi-Intensive Poultry Production Programme	
(10)	Veterinary Service Expansion Programme	
(11)	Semi-Intensive Fish Pond Culture Development Programme	Eligible
(12)	Homestead Integrated Fish Culture Programme	
(13)	Open Water Capture Fishery Development Programme	
(14)	Post-Harvest Plants Expansion Programme	Eligible
(15)	Cold Storage Installation Programme	
(16)	Homestead Food Processing Extension Programme	
(17)	Upazila Food Grains Marketing Programme	Eligible
(18)	Joint Marketing Promotion Programme	Eligible
(19)	Feeder and Rural Roads Improvement Programme	Eligible
(20)	Growth Center Improvement Programme	Eligible
(21)	Drinking Water Supply Development Programme	
(22)	Sanitation Improvement Programme	
(23)	Rural Electrification Extension Programme	
(24)	Communication Improvement Programme	
(25)	Cluster Formation of Rural Housing Programme	
(26)	School Building Improvement Programme	
(27)	Training Facilities Development Programme	

CHAPTER 6

PROJECT IMPLEMENTATION

CHAPTER 6 PROJECT IMPLEMENTATION

6.1 Cost Estimate

6.1.1 Basic Conditions

Project cost for MRDP II is estimated based on the preliminary design and following conditions:

- i The construction cost integrated by unit costs is estimated on the basis of the standard schedule of rate and unit prices in Comilla District prepared by LGEB for the financial year 1989 - 1990, and of the current market price in Dhaka in May 1991.
- ii Preliminary design of the rural infrastructures for the cost estimate is based on the standard design prepared by LGEB.
- iii Administration cost, 5 % of the direct cost, is included in the construction cost. The physical contingency related to the work quantities, 15 % of the direct construction cost, is also included in the construction cost in view of the preliminary nature of the estimate.
- iv Engineering services is taken as 15 % of direct construction cost.
- v Price contingency is considered at annual escalation rate of 10 %.

6.1.2 Cost Estimate

The total construction cost of the project over a 18-year period and the stagewise disbursement schedule, which is worked out based on the construction schedule, are shown in Table 6.1 and summarized below.

Project Works	Work Quantity	Amount (million Taka)
I. Direct Construction Cost		
1. Irrigation Development and Drainage Improvement		<u>54.7</u>
1.1 Channel Re-excavation	246.5 km	32.5
1.2 Low Lift Pumps (LLP)	325 units	19.5
1.3 Workshop for LLPs	3 places	2.8
2. Fractional (FP) Pumps Promotion	600 units	<u>27.0</u>
3. Feeder and Rural Roads Improvement		<u>2,771.3</u>
3.1 Feeder B		
3.1.1 Road Embankment	156.7 km	383.5
3.1.2 Bridge and Culvert	157 nos	654.3
3.2. Rural Road		
3.2.1 Road Embankment	39.3 km	133.1
3.2.2 Bridge and Culvert	835 nos	1,600.1
4. UCCA Complex Establishment		<u>440.8</u>
4.1 Parboiled Rice Mill	49 units (2 ton/hr/unit)	54.9
4.2 Flour Mill	31 units (0.4 ton/hr/unit)	31.0
4.3 Oil Mill	30 units (0.1 ton/hr/unit)	32.5
4.4 Godown(100 ton)	19 places	133.9
4.5 Godown(500 ton)	268 places	67.9
5. Growth Center Improvement		<u>69.9</u>
Sub-total (1 to 5)*		<u>3,345.7</u>
II. Administration		167.3
III. Physical Contingency		501.9
IV. Engineering Services		501.9
Total (I to IV)		<u>4,516.7</u>
V. Price Contingency		6,314.7
VI. Grand Total		<u>10,831.4</u>
VII. Model Rural Farm Credit		
1. Short Term Credit		<u>61.4</u>
1.1 Crop Credit for LLP Project	Annual cropping for 3,440 ha	58.0
1.2 Fishery Credit for Pond Culture	Annual maintenance of ponds	3.4
2. Long Term Credit		
2.1 Fishery Credit for Pond Culture	Embank. of Ponds (280 ha x 4 upazilas)	<u>14.0</u>

* : This amount is excluding Value Added Tax which has been introduced from 1st July, 1991.

6.2 Implementation Schedule

6.2.1 Concept

MRDP II will be implemented according to well-balanced investment schedule. The implementation schedule is prepared on the basis of the following conditions.

- Suitable fund requirement in line with long term investment schedule
- Time requirement for monitoring and evaluation of programmes including financial review

- iii In accordance with the general concept of the MRDP-II, structures and facilities should be as much as possible of moderate size and conventional manners in consideration of the use of local materials, the availability of skilled labour, labour intensive construction works and simplicity in operation and maintenance.
- iv Time requirement for human resources development
- v Time requirement for appropriate institutional set-up and capital formation of UCCA and primary societies

6.2.2 Organization and Institution

Implementation and operation of MRDP-II will involve various organizations such as UCCA, User's group, BRDB, LGEB and etc. In order to adjust interministerial issues, a coordination committee should be established. All the construction works will be managed by LGEB and BRDB. Operation and maintenance of Feeder B, rural road and canal re-excavation will be managed by Upazila Parishad. UCCA related activities such as low lift pump, fractional pump and UCCA Complex will be managed by UCCA under the supervision of BRDB.

6.2.3 Implementation Schedule

MRDP-II will be implemented by a stagewise development method considering the economic and social condition. It is recommended that the 18-year development plan for this MRDP-II will be divided into three stages, namely Phase-I, Phase-II and Phase-III. Projects which encourage economic activities and improve social life of rural population significantly will be taken up in the first stage, Phase-I, from 1993 to 1995. Figure 6.1 shows a provisional implementation schedule of MRDP-II.

6.3 Operation and Maintenance Plan

6.3.1 Concept

- Operation and maintenance of project facilities will be conducted by local level organization such as Upazila Parishad and UCCA using their own budget.
- Existing organization of O&M in local level should be fully activated. In this content, at initial stage of O&M, technical assistance such as mechanic, management expert and etc will be required for training of local staff.

Simplification of O&M organization will be important for smooth operation and budgetary arrangement.

6.3.2 Organization and Institution

For success of the project, three tier level organization is recommendable.

Central Level Central Coordination Committee will be formed in Dhaka, where headquarters of BRDB and LGEB are located. The function of the Committee are coordination at central level and monitoring, advising and etc. For the convenience of execution, project managers will be nominated in LGEB and BRDB respectively.

Local Level In local level, Upazila Engineering Committee and Upazila Production and Employment Committee will be formed. The main function of Engineering Committee is project implementation regarding roads and canal re-excavation.

Village Level In village level, there are primary society, some groups and farmers as grass root level

CHAPTER 7

PRIORITY PROJECTS

CHAPTER 7 PRIORITY PROJECTS

7.1 Selected Priority Projects

The scope of the priority projects are optimized by implementation period and management ability of current organizational set-up. The completion year is to be 1995 and promising executing bodies are Upazila and UCCA.

The priority projects should be formulated to be "project sets" around the concept of "integrated" rural development. By integration of the programmes, they enhance supplemental and multiplier effects between the programmes. The integrated project sets derived from the selected programmes are outlined below.

(1) Irrigation Development and Drainage Improvement Project

Under the LLP Irrigation Development and Drainage Improvement Programme, this Project is set up in corroboration with Farm Input Supply Programme and Model Farm Credit Programme. The Project envisages virtual integration of essential inputs for Boro rice, namely irrigation water supply, improved seeds of high yielding varieties and chemical fertilizers. Minor irrigation development is one of the most important cooperative activities under IMP. The UCCAs in the study area have an experience of technical and administrative management. To avoid competitive use of domestic water supply, low lift pumps (LLP) will be promoted for Boro rice under the Project. Farm input supply should be integrated to irrigated rice production to enhance and stabilize unit yield and grain quality of irrigated paddy. The Project will include re-excavation of the existing canals of 123 km and introduction of 173 low lift pumps with 2.0 cusec capacity for irrigating 3,500 ha of Boro rice. To support irrigated rice farming, short term package crop loan will be supplied under Model Farm Credit Programme.

(2) Fractional Pump Promotion Project

This is the pilot project to sound applicability of fractional pumps for irrigation purposes by lifting up water from under-exploited ponds and other water bodies scattering in the study area. The more intention is given to participation of BSS members to substantial irrigation activities. In view of pump capacity, they will be used for supplemental irrigation for upland winter crops. The Project will be introduced with promotion of oilseeds, potatoes, and pulses selected under Crop Intensification and Diversification Programme. The Project will introduce 200 fractional pumps with 0.5 to 0.75 cusec capacity for a command area of 1,000 ha.

(3) Feeder and Rural Roads Improvement Project

The Project emphasizes urgent improvement of the most important feeder roads type "B" which are now fully under the responsibility of local government. The biggest constraint of the Rural Road Improvement Programme is its extremely huge fund requirement.. Not only construction but also maintenance is the largest load of Upazilas. The Programme will be realized in line with long-term strategy. The Project will undertake rehabilitation of the most important feeder road B in each Upazila. The total length of road rehabilitation is estimated to be 98.5 km.

(4) Growth Center Improvement Project

The Project aims at improving existing market facilities to encourage small business to be made by marginal farmers and/or the rural poor and at strengthening self-reliance of Upazila for market development and maintenance by increasing lease money. For this purpose, four growth centers in each Upazila are taken up. The growth center at Upazila headquarter is called Model growth center. In the Model growth center, UCCA facilities such as godown, workshop for LLP are constructed and expansion of hat market area is considered.

(5) UCCA Complex Establishment Project

This Project aims at integration of Post-Harvest Plants Expansion Programme and Upazila Food Grains Marketing Programme in collaboration with Growth Center Improvement Programme. The Project envisages the establishment of UCCA complex within the growth center located in the Upazila headquarters. This will act as the future "Model" growth center.

In view of food security, strategic reserve of staple food grains should be realized at farm level, village level, upazila level and national level, respectively. The systematic approach will largely contribute to stabilization of grain prices and reduced storage loss. UCCA is in the best position to own and manage godowns at village level by controlling the terminal management to be done by primary societies. As a first step of strategic grain storage, typical conventional warehouses will be build. Beside the storage, rice mills and flour mills will be attached. UCCA will operate those mills according to well-scheduled operation programme and release final products to domestic markets. In addition to grain mills, oil mills can also be attached. UCCA will also control purchasing raw materials, i.e. paddy, wheat, and oilseeds, from KSS. All the employees will be BSS members.

(6) Semi-Intensive Fish Culture Project

In view of huge development potential of pond culture, the Project aims at development of animal protein sources for the region as well as income generation of rural poor. Under the Project, the comprehensive approach is made on coordination with DOF, formulation of assetless to BSS members, re-activation of existing ponds, provision of training, supply of materials and fry/fingerling. The Project will also envisage the proper management of lease ponds owned by the Government. The Project emphasizes the establishment of management system, and will include no large investment such as establishment of new hatchery. The total command area of fish ponds in each upazila is 280 ha.

7.2 LLP Irrigation Development and Drainage Improvement Project

7.2.1 Selection of Project Area

(1) Concerns to Rural Roads Improvement Project

Accessibility to LLPs project site should be regarded in view of transfer of pumping units, and desilting works of water resource channel. Therefore, the priority LLPs project area would be selected in connection with the rural road improvement project which is one of the eligible components in the priority project.

(2) Accessibility to Market

From economical viewpoint, the priority LLPs project area should be located in the vicinity of marketing area as far as possible in due consideration of purchase of agricultural inputs and marketing of agricultural production.

(3) Convenience for Operation and Maintenance

Maintenance of river channel for intake of irrigation water is technically much laborious and economically costly for LLPs project. In this regards, flood-free area should be eligibly selected as far as possible

(4) Stable Intake of Irrigation Water

Surface water resources in internal river channels in the study area are extremely limited during the dry season. The priority LLPs project should be therefore located close to the most stable irrigation water sources, paying a special attention to the existing LLPs schemes.

Table 7.1 summarizes the priority LLPs irrigation project selected under the Bancharampur, Nabinagar, and Kachua Upazilas. The priority LLPs project selects 3,500 ha of irrigation area as follows.

Upazila	MRDP II (1993-2010)			Priority Project (1993-1995)		
	Sub-scheme (no.)	Area (ha)	LLP (no.)	Sub-scheme (no.)	Area (ha)	LLP (no.)
Kachua	11	1,100	60	5	550	28
Bancharampur	11	2,200	110	6	1,150	58
Nabinagar	12	3,200	160	6	1,740	87
Total	34	6,500	330	17	3,440	173

7.2.2 LLP Pumping Units

Centrifugal pumping units of 6 inches bore and 10 m lift with 15-18 horse power engine drive would be selected for the priority LLPs irrigation project in consideration of topographic condition, operation hour limited within the dry season, and project economy. The pumping unit with a delivery of 2 cfs would command about 20 ha taking into account of unit requirement of the Boro paddy rice. Thus, 173 pumping units would be installed for the 17 sub-schemes commanding 3,440 ha in total.

Water level of suction side in Nabinagar and Bancharampur Upazila is estimated at 1.10 m (PWD) based on the hydrological data observed at 298 Nabinagar Water Gauging Station; that in Kachua Upazila, 0.7 m (PWD) based on the data observed at 79 Maltab Bazar and 58 Hajiganj Stations. Taking into account of the average ground level in the selected sub-schemes and the above -mentioned water level at suction side, the actual lift of each pumping unit is roughly estimated at range of 3 to 6 m. The selected pumping unit of 10 m in total lift is much favorable for the operation of the Boro irrigation during the dry season.

7.2.3 Water Source Channel Improvement

As aforementioned, the channel improvement has dual purposes, i.e collection of irrigation water from more dependable water sources and improvement of sporadically poor drainage condition caused by local rainfall. As illustrated in Fig 7.1 the channel improvement would be made by desilting works at channel bottom without any widening of channel due to conflicts of land acquisition.

The desilting works along the respective water source channels would be limited within one(1) meter more or less for slope stability of the existing water source channels. The channel length for the desilting works along the selected 17 numbers of the channel totals 123 km; the volume of the desilting works reaches 770,000 m³ in total. The table below summarizes the channel improvement works by Upazilas:

Upazila	Channel Numbers	Channel Length to be desilted (km)	Desilting Volume (1000 m ³)
Bancharampur	6	40	250
Nabinagar	6	45	280
Kachua	5	38	240
Total	17	123	770

7.2.4 Operation and Maintenance

(1) Operation and Maintenance of LLP

The Boro paddy crop season usually starts in October. The operation of the pumping unit for each sub-scheme also starts at the same time for pre-watering for land preparation. Then, the unit would be operated for about 1,000 hours almost throughout entire cropping season of the Boro paddy.

Off season of irrigation, each pumping unit would be shifted to the workshops in the UCCA concerned for repair, change of spare parts, and overhaul. The UCCA would take the responsibility for the maintenance works. At the onset of the Boro crop season, all the better-maintained units would be distributed to water users' groups which are composed by KSS basis. The mechanics dispatched by the UCCA would make circuit-visit for technical guidance to each LLPs' operation site throughout the Boro season.

(2) Maintenance Works for Water Source Channels

A considerable silt might be deposited during the flood season at the bottom of the water source channels. The desilting works along the channels should be periodically made prior to the commencement of the Boro season. The works would be executed by so-called FFW or voluntary services by the beneficiaries concerned.

(3) Water Charge

The current water charge ranges 2,500 to 3,200 Tk/ha in 1990/91 according to upazila and BADC officers. Based on our calculation shown in below, the proposed water charge per ha of the LLPs project will be set with 2,500 Tk.

Items	Cost Tk/ha
1. Fuel	1,200
2. Personnel and Labour cost	500
3. LLP rental charges	400
4. Water Source Canal O & M	50
5. Works Shop O & M	100
6. Repair and Spare Parts	150
7. Others	100
Total	2,500

Sources : Annex K Table K.4.2

This proposed water charge will be occupied about 23% of the production cost for Boro HYV which is 11,000Tk per ha.

7.2.5 Organization for Operation and Maintenance

Three organization would concern to the operation and maintenance for the LLPs irrigation project. The operation and maintenance of the LLP unit would be made by so-called two tier cooperative - UCCA and KSS. In the meantime, the O/M of water source channels would be made by Upazila office.

The UCCA would own all the LLPs and lease them to Water Users Association (WUA) composed by the KSS. The UCCA would collect water charges through the KSS and use them for the annual operation and maintenance, and the renewal of the LLP units in the future.

The Upazila office owns all the existing water source channels which are used for the LLPs project, and takes the responsibility for the maintenance for the dual purposes, irrigation and navigation. The Upazila office would receive a part of water charges from the UCCA for the maintenance of the channel by Food for Works.

7.3 Fractional Pump Promotion Project

As mentioned above, the Project will be introduced on pilot basis. The irrigation area and number of fractional pumps to be introduced under the Project are 1,000 ha and 200 units, which are to be evenly distributed to each of four (4) Upazilas. The development period will be four (4) years from 1993 to 1995 when the FFYP will end.

7.4 Feeder and Rural Road Improvement Project

7.4.1 Objectives

- Improvement of accessibility to markets, administrative centers and other social services
- Encouragement to the agricultural production activities and extension services
- Reduction of transportation cost
- Support to maintenance activities for DTW,STW,HTW and LLP

7.4.2 Project Works

The priority projects are selected based on the socio-economic ranking, the results of economic evaluation and capacity of maintenance budget in each Upazila. Technical and construction time limitation for construction of large scale bridge is also considered. The following table presents the list of priority roads and summary of work volumes.

List of Priority Roads

Name of road		Name of Road	
Kachua Upazila		Nabinagar Upazila	
FB	Kachua-Sachar G.C.C Road	FB	Nabinagar-Bancharampur
FB	Kachua-Upazila Parishad Road	RR	Mohesh Road-Goali-Rasulpur
RR	Sachar-Amirabad Road	RR	Link Road (RH-Mohesh Road)
Bancharampur Upazila		Debidwar Upazila	
FB	Homna-Marichakandi	FB	Madhya-Companygonj
FB	Bancharampur-Nabinagar	FB	Kalikapur-Istagram
RR	Bancharampur-Dariachar	RR	Debidwar-Istagram

Project Work Volume

	Kachua	Nabinagar	Bancharampur	Debidwar
Feeder Road B improvement				
- Number of selected roads	2	1	2	2
- Embankment (in Km)	17.2	12.9	41.6	35.0
- Pavement Length (in Km)	17.2	12.9	22.4	18.2
- Tree Planting (in No.)	17,200	12,900	22,400	18,200
- Turfing (in Km)	17.2	12.9	22.4	18.2
- Number of Structures	28	4	27	36
Rural Road improvement				
- Number of selected roads	1	2	1	1
- Embankment (in Km)	5.5	19.5	-	-
- Pavement Length (in Km)	5.5	19.5	-	-
- Tree Planting (in No.)	5,500	19,500	-	-
- Turfing (in Sq.m)	5.5	19.5	-	-
- Number of Structures	9	29	8	14

The location of the priority roads are shown in General Plan.

7.4.3 Operation and Maintenance

At the Upazila level, Upazila Engineer and his staff should be responsible for periodic inspection and supervision of construction and maintenance activities receiving the technical advice from the LGEB district office. For the activation of the routine inspection activities and supervision of both construction and maintenance, provision of transportation means is essential.

Labour contracting society (LCS) implements the maintenance on a contract basis as much as possible. LCS concept is developed by NORAD/SIDA project in Faridpur, etc. and meets good results from the view point of quality of job, cost saving and job creation to poorest segments. LCS is formed by vulnerable women's, landless labours and informal groups who do not need overhead to the contracted job. In parallel to this LCS, women's group activity under RMP should be continued for minor maintenance.

Raising fund for the maintenance is crucial. To take the burden from Upazila, maintenance cost in initial period, which may be three years period after completion of earthwork, is shared by donor and Upazila Parishads, because the embankment is unstable in initial period and requires high rate of maintenance cost.

7.4.4 Organization

Organization for maintenance proposed by LGEB has many advantages:

- a. Systematic approach in planning, implementation and maintenance is established.
- b. It is easy to know where the responsibility lies.
- c. Technical control by Upazila Engineer office is facilitated for both earthwork and structure works.

Therefore, this proposed organization should be supported. The organization chart is shown in Figure 7.2.

7.5 UCCA Complex Establishment Project

7.5.1 Objectives

The higher income for the farmers and fishermen will arise from the proper market arrangement for reduction of intermediates, minimization of transportation cost, increase in bargaining powers, increase in sales value, etc. Market functions should be utilized more for farmer producers. The joint - marketing activities by organized groups are a basic key element in the marketing development. This approach to access markets could benefit directly marginal and small farmers. The organization of UCCA as well as primary societies should be fully utilized for this purpose.

Agro-processing of food grains and oil seed can increase the value of products than the sale of raw products. Farmers' income will be increased through the joint - utilization of processing facilities. Godown operation can reduce storage losses and largely contribute to increase farmers' income through the sale in the lean seasons. Livelihood of rural poor can be stabilized through proper management of storage and distribution.

There are no joint - marketing activities organized by the UCCAs in the study area. The UCCAs' joint - marketing programmes should be executed step by step. The Village Marketing Groups set - up is indispensable for the programmes, while a very laborious task. Without coordinated group activities, the programmes will fail. It is also required several assistances and support services for the programme execution. The establishment of marketing facilities

should be carefully done and not at once. The UCCA Complex Establishment Project aims at the following objectives :

- 1) Increase in members' bargaining power to food dealers,
- 2) Reduction of transportation costs from village to the local markets,
- 3) Reduction of food grains storage losses,
- 4) Increase in products value through processing,
- 5) Increase in producers' income,
- 6) Stabilization of members' livelihood through stable supply of food grains and reduction of food grains expenses in the lean seasons, and
- 7) Creation of employment opportunities through joint - marketing and processing under the UCCA

7.5.2 Project Works

The UCCA Complex will be established at the growth centers in the respective upazila headquarters. The Complex will handle the following priority products using the market facilities :

- 1) Priority Products :
 - Food grains ; paddy and wheat
 - Cash crops ; potatoes, mustard
 - Fish ; fish culture, catch
 - Livestock ; poultry
- 2) The Complex Market Facilities :
 - Godown with 500 tons capacity together with paved assembling and sun-drying yard for food grains,
 - Rice, flour and oil mills with those plant house, and
 - Storehouse and shed for cash crops, fish and poultry

The processing facilities with appropriate capacities and specification is introduced. The proposed facilities per UCCA Complex consists of:

- Rice mill 10.0 ton/day x 2 units
- Flour mill 2.0 ton/day x 1 unit
- Oil mill 0.5 ton/day x 1 unit

The electric motors can be multiutilized for milling, flouring and extraction processes by each harvest season.

7.5.3 Organization

The existing primary societies comprising the KSS, MSS, BSS and MBSS at village level will be organized into the following groups as a Village Marketing Group (VMG) under the UCCA.

(a) **Village Suppliers' Group**

This group could be organized with the medium or large scale member farmers of KSS and MSS for food grains and other crops, and marginal and small farmers of BSS and MBSS for poultry and fish. Food grains, suppliers' member can store some products at the local market godown until lean seasons.

(b) **Consumers' Group**

This group will be organized with the assetless, marginal and small farmers members for food grains and crops. They have no own products or can't store. In case of food grains, they have to purchase always or purchase back at a higher price, especially in lean seasons.

The Village Marketing Groups (VMG) for the Project will be organized at the unions around the location of the the UCCA Complex, the upazila headquarters, taking the accessibility to the headquarters into consideration. The VMGs should be organized as one group by village for the several commodities. The VMGs for the food grains will be organized at the unions under the marketing catchment area as shown in Fig. 5.3. Around five (5) VMGs could be organized under the godown comprising 100 member suppliers and 200 member consumers by one VMG. The godown will be initially operated for the future establishment of the village godowns (100 t).

The UCCAs' managing body need to be strengthened for the organization of the VMGs and management of the UCCA Complex as follows :

(a) **One manager, operators and record keepers and laborers at required numbers for :**

- Operation of the complex market facilities, and
- Coordination activities with the VMGs under the service area of the complex market facilities.

(b) The existing UCCAs' managing staff need to be strengthened in terms of numbers and abilities for :

- Proper management of complex market facilities,
- Formation of the VMGs, and
- Market development to collect market informations and find good buyers.

7.5.4 Operation and Maintenance

The godown with 500 ton storage capacity at the Complex will be managed directly by the UCCA marketing staff as well as the processing facilities for per-boiling, rice and flour milling. Each member supplier can store one ton of food grains equally.

The grain storage could function as a kind of grain bank for the producers. The participation of marginal and small farmers as suppliers' members could be realized by the following financial arrangement :

Food Grains Storage Loan for Marginal and Small Farmers

- Financing to the UCCA
- Term ; Six(6) months
- Loan amount ; 90% of the products valued at the government procurement price
- Interest ; 16% per annum year

Food grains as well as other products will be procured from the VMGs. Transportation should be jointly done by the organized transportation group at village level. The UCCA should provide the common transportation means such as a bullock cart, country boat, etc for encouragement of joint - handling and transportation. The UCCAs' management procedures for food grains are summarized as follows :

- (1) The UCCA informs a food procurement schedule and buying price of food grains to the VMGs before harvest. The price will be set at a government support price with the loan arrangement.
- (2) The UCCA informs a sale price of rice or flour to the consumers' groups of the VMGs and non-member consumers in the upazila headquarters. The sale price for the VMGs should be lower than a prevailing price in the markets.
- (3) The UCCA contracts with the buyers on the quantity for sale as much as possible in order to reduce the risk of open market business.

- (4) The processing facilities are operated not only for procured food grains but also for the outside customers like private traders, government agencies, informal farmer groups.
- (5) Milled rice and flour as well as wheat grains is stored in the godowns until the lean seasons when a price will increase.
- (6) The UCCA operates the godowns and processing facilities effectively through the scheduled procurement of food grains, distribution of milled rice and flour, and custom milling services.

The other products, i.e. oil seed, potatoes, poultry and fish are jointly assembled at village level and transported to the Complex by the VMGs. The oil mill could be utilized effectively through scheduled procurement from the VMGs. The storehouse is used for temporary storage and bulk trading with dealers. The products can be sold to individual consumers at the shed.

The trading of the products procured as well as operation and maintenance of the Complex is done by the UCCA staff. The VMG producers should pay the service charges from the sale amount to the UCCA. The UCCA should save the charges for the O & M costs. The UCCA is required strong coordinating functions among the VMGs and high abilities for marketing and processing operations. The present UCCA staff should get the proper training programmes. The technical staff should be recruited from the private sector at the trial period, at least three (3) years.

7.6 Growth Center Improvement Project

7.6.1 Objectives

- a. Improvement of existing Growth Center area with minimum facilities as an urgent project to encourage small business to be made by marginal farmers and/or rural poor who may gather to act as temporary vendors
- b. Strengthening of self-reliance of Upazila for market development and maintenance by increasing lease money

7.6.2 Project Works

Selection of Growth Center

GCs are selected in national level taking into consideration of regional balance, and investment of feeder roads is concentrated on GC connecting road. Moreover, the improvement and upgrade of GCs are urgent needs of GOB. In this context, improvement of all GCs are taken up as a priority basis.

Facility Plan

The GC with stage 2 level facilities and UCCA facilities is planned to establish in Upazila Head Quarter where the management and maintenance may be easier than remote area. This type of GC is called the Model Growth Center in MRDP-II study. The remaining GCs are planed to be improved by minimum facilities of level 1. (Refer to section 5.6.2) The existing GC areas and improvement plans for Model GCs are illustrated in Figure 7.3.

The following table shows the main feature of GCs and level of improvement.

Name of Market	Improvement Level	Project Area (in m ²)	Shed * (in m ²)	Market Place Pavement (in m ²)
Kachua				
Kachua	2 (Model)	10,400	1,500	8,900
Sachar	1 (Minimum)	650	400	250
Palakhal	1 (Minimum)	900	540	360
Rahimanagar	1 (Minimum)	1,200	680	320
Debidwar				
Debidwar	2 (Model)	4,700	1,100	3,600
Pirganji	1 (Minimum)	600	400	200
Mohanpur	1 (Minimum)	600	400	200
Jafargonj	1 (Minimum)	500	270	230
Bancharampur				
Mouilagonj	2 (Model)	11,100	1,600	8,500
Marichakandi	1 (Minimum)	450	270	180
Jibonganj	1 (Minimum)	900	540	360
Ujanchar	1 (Minimum)	1,200	410	770
Nabinagar				
Nabinagar	2 (Model)	4,200	800	3,400
Bholachong	1 (Minimum)	1,300	540	720
Sreeghar	1 (Minimum)	1,400	540	900
Markuti	1 (Minimum)	1,100	540	590

Note : * Shed including open platform for small vendors

Details are presented in Table 7.2 and location of GCs are shown in Genral Plan.

7.6.3 Operation & Maintenance Activities and Organization

The following maintenance activities are required for GC:

a. Sanitary maintenance

- Cleaning of latrine, drainage ditches, internal roads, shed and platform areas and garbage pits

b. Facilities maintenance

- Structural minor maintenance for sheds, pavement of internal road, etc.

Although the budget for maintenance is limited, above mentioned maintenance activities are essential for keeping good sanitation condition and durability of facilities. To minimize the maintenance budget and to alleviate the poverty, periodical sanitary maintenance should be carried out by vulnerable women's groups at least twice a week at the next day of hat day. Maintenance for facilities is sublet to local contractors when needs arise.

These activities should be managed and controlled by Maintenance Committee (proposed) headed by Upazila chairman. Maintenance Committee (MC) consists of Upazila chairman and four (4) Chairmen of Unions where the Growth Center are located.

7.7 Semi-Intensive Fish Culture Project

7.7.1 Objectives

The objective of this project is to organize the rural poor, the fishermen and the pond owners through rural institution in order to provide them inputs and credit as well as to create job opportunities to generate income.

The programme is designed to sustain and continue fisheries activities in the project area. The rural landless and assetless men and women will be mobilized to form groups (for example; Resourceless Fish Farmers Groups - RFFH) of their own to enable them to have access to various support and services in order to undertake income generating activities. The objective is also to produce sufficient fish to meet local demand and to supply fish to markets outside the study area.

The project shall focus on closed water bodies i.e. ponds, tanks, dead rivers, etc. as they have high development potential for the rural poor. Irrigation canals, roadside ditches, etc. will also be considered. Emphasis will be placed on increasing production from cultured and culturable ponds as any efforts to rehabilitate derelict ponds for fish culture would diffuse the impact of the executing agency's limited resources.

The proposed production technology is polyculture of major carps and Chinese carps on a semi-intensive level with fertilization of ponds. The proposed species are catla, rohu, mrigal, silver carp, grass carp and common carp, as these carps have complementary feeding habitats which will optimally utilize pond productivity.

7.7.2 Operation Flow

The programme is designed to be implemented by resource-less/asset-less fish farmer groups within the farmers cooperative (KSS) and landless cooperative (BSS), and management by UCCA. (They are referred to as groups rather than cooperatives because these groups can be managed under BRDB, and not under the DOC).

Under the programme a group of about 30 members consisting of ten families will be formed to cover ponds amounting to less than 4 ha. in area. A leader and a co-leader will be selected from each group to be trained in semi-intensive and integrated fish culture (fish cum poultry culture). These leaders will in turn, transfer the knowledge gained, to the other members (trickle down approach).

The inputs for the programme are as follows:

- Re-excavation and embankment of ponds
- Operational funds/credit for feed, fertilizer, extension materials, training, transport
- Programme Adviser (Aquaculture expert on long term)
- Extension agents

7.7.3 Development Output

The following development outputs are expected for each Upazila.

- Improved semi-intensive techniques can be introduced up to an estimated area of 280 ha of ponds.
- Increased yield of fish in the study area and thereby increased income