

### 3.2 Using Gender Analysis in Floods

In all societies roles are to a great extent determined by gender. In all societies roles in crisis situations are also determined by gender. Floods in Bangladesh are no exception although seldom are the roles women play in major floods part of the analysis and documentation that follows these natural disasters. Much attention has been focussed on women in post-flood rehabilitation but prior to and during floods scant consideration is given to the roles of women.

For the purpose of this analysis it is necessary to define the gender roles that form the basis of it. These definitions are derived from the work of Moser and Levy at the London School of Economics Developmental Planning Unit. There are four roles that are utilised in this analysis:

**REPRODUCTIVE ROLE:** Child-bearing and rearing responsibilities and also taking care of all who form the family kinship group;

**PRODUCTIVE ROLE;** Work done for pay in cash or kind. It includes anything with a potential exchange value, whether for sale in the market place or use in the home;

**COMMUNITY MANAGING ROLE:** Activities done for the community to ensure its needs in terms of water, health care etc. This is voluntary and is often seen as an extension of the reproductive role;

**COMMUNITY POLITICS ROLE:** Activities in the community which relate to national or local politics such as Union Chairman or the Salish (traditional community arbiter). These roles are usually rewarded directly or indirectly through cash or status.

In Bangladesh it is almost universally the case that women perform three of these roles but in very different magnitude depending on the role:

Reproductive - Almost totally performed by women

Productive - Small numbers of women fulfil this role

Community Management - Large numbers of volunteer women

Community Politics - Almost not at all (the tiny exception would be the rich urban elite).

A survey of 100 women from six different villages in the northwest region demonstrated that during the peak agricultural season only eighteen of them played a productive role with cash remuneration while during the flood season the total number was thirteen. These remunerative roles were in poorly paid occupations such as handrolling cigarettes, embroidering kanthas (traditional hangings and covers) and making and repairing fishing nets.

For rolling one thousand cigarettes the women would receive around two taka (Taka 75 = £1) and by utilising their children could make seven taka in one day. The women claimed they could only embroider four kanthas per year and received between forty and fifty taka per piece. Women making and repairing fishing nets said their annual remuneration was around two hundred taka.



In a country which has a woman prime minister, a woman-led major opposition party and a woman minister for culture it is virtually impossible to find a village woman who performs a community politics role.

Moreover women play a major role prior to floods in preparation which is both reproductive and concerned with community management. They make, or assist in constructing, the simple technologies that are vital to the safety of life in family and community during severe floods. The *macha* which is a bamboo sleeping loft constructed in the house above the flood level is part of their role as is the *agla chula* which is a portable stove made and maintained by the women. When the house is totally inundated the woman will sit on a raft made of banana-trees called a *bhela* with the children making sure they don't fall off and occasionally rowing away from the contamination of the house to fetch 'clean' water. They are also responsible for ensuring that dried food and dung for cooking fuel are stored in a safe place for feeding the family during the floods. These are clearly essential reproductive and community management roles yet like so many aspects of women's roles in Bangladesh they have gone unrecorded or unmentioned.

Before comparatively analysing the reproductive and productive roles of women in flood and non-flood seasons it is necessary to list the types of tasks a woman will be expected to carry out. On the vertical axis of the figures which follow the number of tasks in any two hour period (the horizontal axis) may comprise the following:

#### REPRODUCTIVE

- Caring for children, the sick and older relatives
- Tending and feeding animals eg chickens, goats etc.
- Food and spice preparation
- Cooking and feeding family members
- Cleaning cooking utensils, house and homestead area
- Fetching cooking and drinking water
- Grazing and milking cows and goats
- Collecting vegetables and wild fruit
- Bathing herself and children
- Cleaning household lamps
- Managing the household
- Bringing in livestock for night
- Putting the children to bed
- Check security of household before sleeping herself.



## PRODUCTIVE

- Making muthas (cowdung pats) for fuel
- Vegetable gardening
- Drying, winnowing and threshing crops
- Husking and parboiling rice
- Storing crops
- Making muri (puffed rice)
- Making and repairing fishing nets
- Drying small fish
- Making handicrafts
- Embroidering kanthas (traditional covers and hangings)
- Handrolling cigarettes

(all of these household and remunerative tasks (cash or kind) are done in or around the homestead thus preserving to a large extent the concept of **purdah** which keeps the women out of the public domain as much as is physically possible)

Figures 10 and 11 compare the reproductive and productive roles of women in agricultural households ( 52 respondents) during the peak agriculture and flood seasons while figures 3 and 4 do the same for non-farming families ( 48 landless respondents) which mainly comprise people who are day labourers, fishermen, rickshaw pullers or do petty trading.

The first significant fact about Fig 10 is that the reproductive roles played by women of agricultural households do not differ much in volume between peak cropping seasons and seasons of flooding. Apart from midday and six in the early evening the number of tasks performed is roughly similar. The heaviest number of tasks is performed between eight and ten am and around six pm when typically a woman will be carrying out more than four jobs.

For productive roles, however, the difference at any time of the day is greater and as might be expected are much lesser in volume than those of a reproductive nature. As Fig 12 clearly shows the peak during the cropping season is two tasks while that of the flood season is just over one. This is often less than four times the number of reproductive tasks carried out during the same season and in some cases the difference is even greater.

Figs 12 and 13 indicate the same phenomena for non-agricultural households and a similar pattern emerges. If we take eight am for instance a women will be attempting to carry out nearly five reproductive tasks while doing less than one of a productive remunerative nature during the peak cropping season. (It should perhaps be reiterated at this point that productive remunerative roles will most often not involve cash but eg the production of vegetables for home consumption. That is they have a potential cash value but are consumed rather than sold).



If we compare Figs 11 and 13 we find that in the non-agricultural households the women are always doing less than half the productive roles than those from agricultural households whatever the season. And in the flood season when productive remunerative roles for cash or kind are desperately needed for survival the women's activity statistic is less than one in non-agricultural homes. Yet the volume of reproductive survival roles in floods continue at the high levels they achieve for other times of the year.

Figs 11 and 13 also demonstrate the importance of even the smallest piece of agricultural land to the Bangladeshi family. Women from agricultural households will always have more opportunities for productive remunerative roles. They will have access to land for vegetable growing and for roles involving crops. For those with no land the flood season often means starvation and the women, as the field surveys have revealed, will always be the first to make the drastic sacrifice in floods of not eating at all or as some of them explained only eating when they can gather wild fruit.

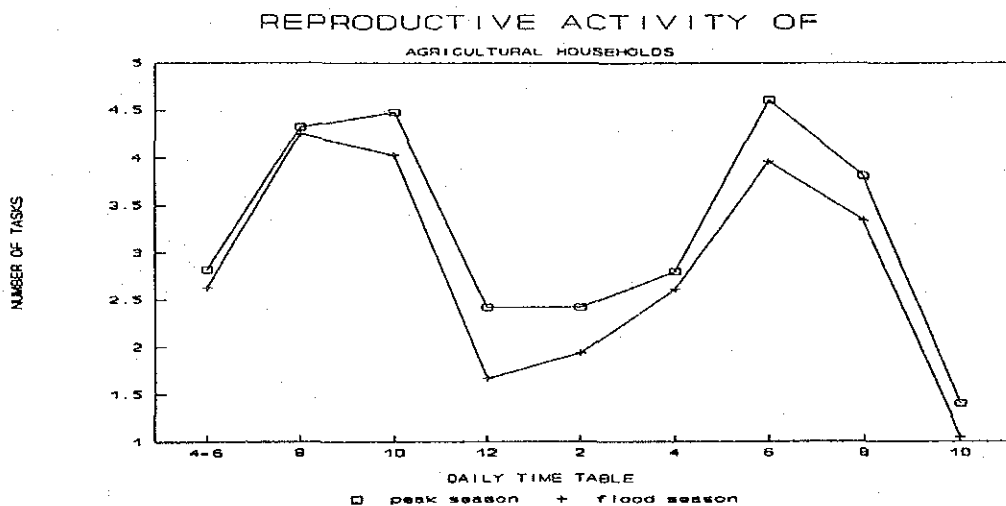


Figure 10

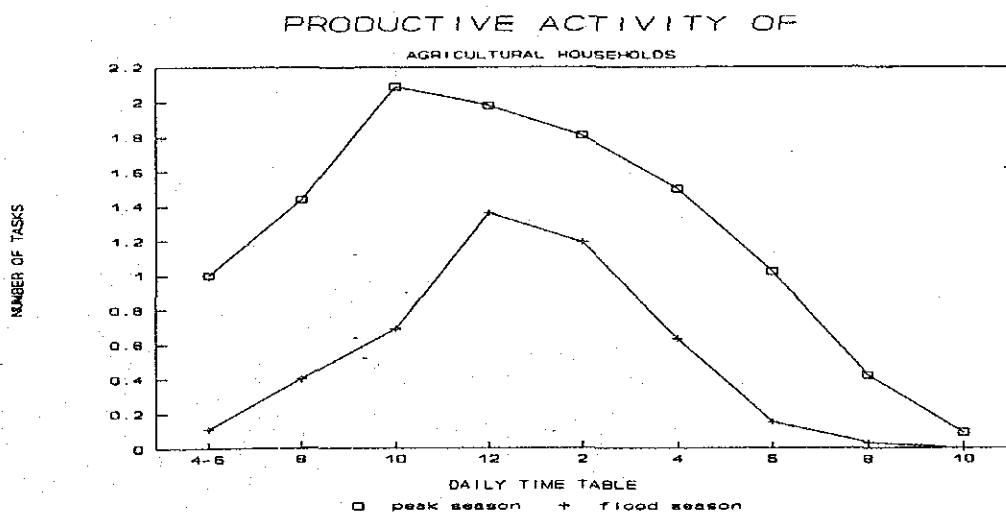
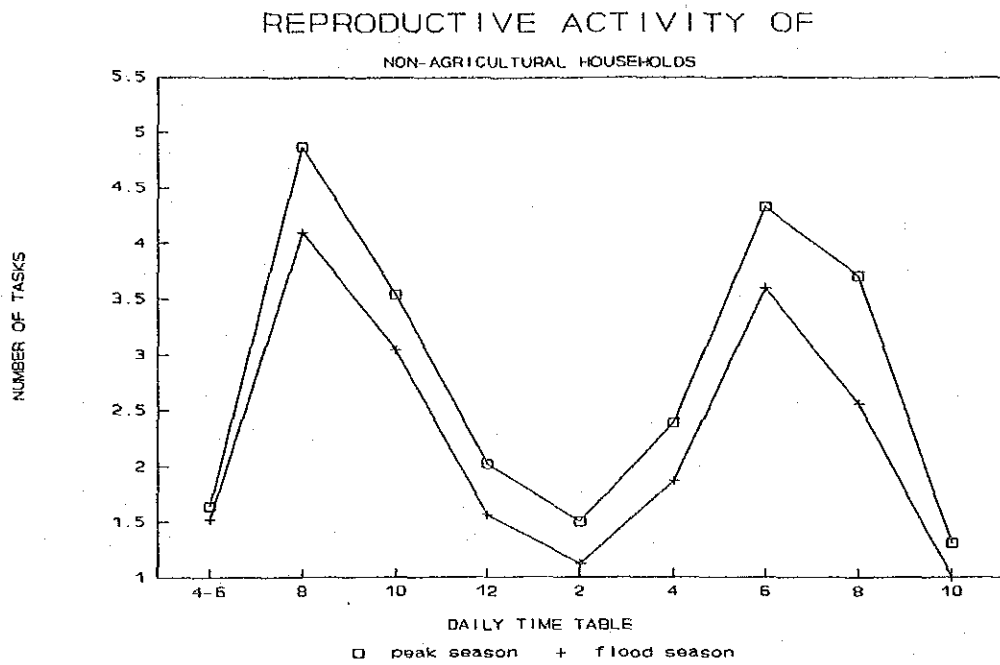


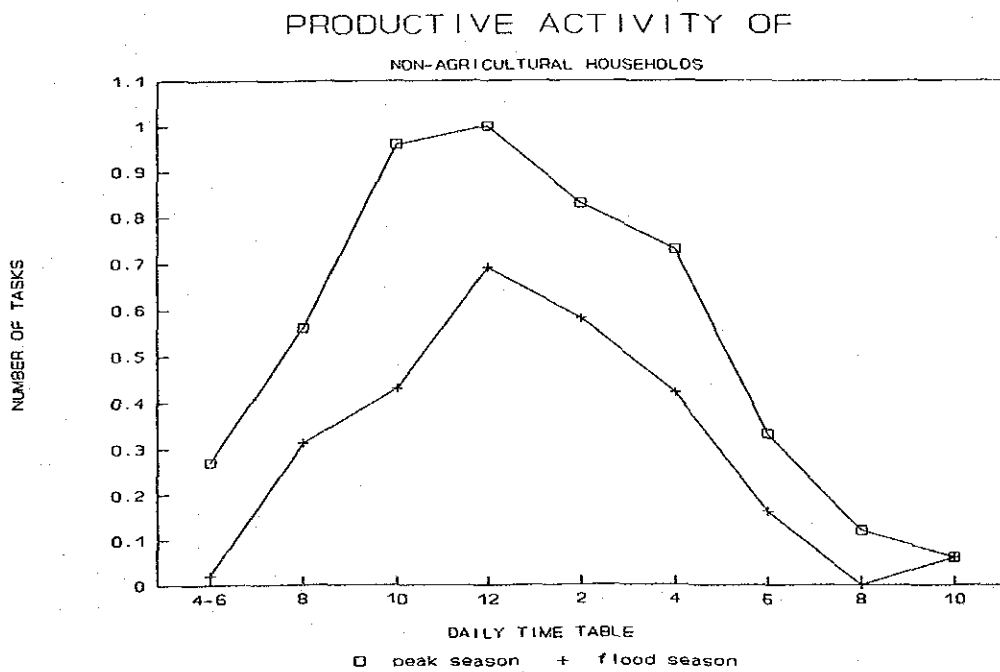
Figure 11







**Figure 12**



**Figure 13**



To conclude the analysis it is necessary to look at these roles in terms of the gender needs of women. Moser and Levy have differentiated between what they term practical gender needs and strategic gender needs. Those of a practical nature relate to her work as a woman in any of the roles she is required to perform. Strategic gender needs relate to her status in society and in Bangladesh to her lack of access to resources and the heavily subordinated roles she plays in all aspects of life.

In terms of flood action planning any support to the reproductive and community management roles which women play is highly desirable. This may mean the provision of sanitary latrines and clean drinking water sources in convenient locations for women or a village dry storage area above the highest flood levels to which women have easy access. These simple changes will help women to carry out their reproductive roles much more effectively. They will, however, do little or nothing to alter the status of women in society in general

During the flood season the productive role of women could be improved by the provision of paid employment which for women from landless families would be a considerable boost to the survival strategies they adopt at present. These strategies included the extreme one of self-starvation to enable dependents to receive whatever food is available. Employment initiatives could include maintenance of existing flood protection structures like embankments or running community stores with relief materials when floods are particularly severe. It could be the running of a simple clinic supplying essential drugs for flood-related diseases like diarrhoea and dysentery.

If these productive roles are remunerated in cash and take women out of purdah then the changes that are necessary to recognise the vital role that women play in floods will, perhaps slowly, take place. It will also improve the position of women in changing their strategic needs which is vital if women are to have improved access to societal resources. In the longer term it may assist Bangladeshi women in overcoming the subordinate status, which with great fortitude, they presently endure.



## CHAPTER 4

### FLOOD SURVIVAL STRATEGIES

As a result of research carried out in different types of communities and described in chapters two and three the following sections list the strategies used during and after floods. There are, however, generalisations that can be made about strategies which occur in nearly all communities. These are:

- Borrowing money usually at high rates of interest
- Selling labour and sometimes migrating to do so
- Selling livelihood or domestic assets
- Mortgaging or selling land

These strategies may vary from community to community but they are fairly widespread in attempting to deal with severe floods.

#### 4.1 Char Dwellers

Char dwellers in the Brahmaputra are amongst the most vulnerable communities to flooding in the entire northwest region. It has been estimated by FAP 3.1 that on the reach of the Brahmaputra between Gaibandha and Jamalpur there is a char population of around 600,000 while on the Brahmaputra as a whole something of the order of just over one million people live on these islands and sandbanks some of which are perennially surrounded by water while others are attached to the mainland during the dry season between October and June.

In a number of household surveys and rural appraisals carried out on the chars the NWRS attempted to elicit flood survival strategies of these river dwellers and how they thought their lot could be improved. All of the communities were either marginal farmers or landless families who had moved to the char due to the loss of land and possessions in floods elsewhere. Indeed in two perennial char areas, Rahmatchar and Par-Diara, near Gaibandha fifty percent of them said they had migrated to the char from the same place on the mainland.

Both the residents at Rahmatchar and Par-Diara said they had never been officially warned when floods were imminent but have their own method of gauging the strength of the southern winds which when coupled to lightning in the northeast indicates to them that serious floods are coming. When these conditions are present they move their families to the embankment on the mainland collectively either using rafts or motor boats which they hire. They said they were treated like outcasts in the mainland communities who regard them with disdain.

If they stay on the char during heavy flooding they use a macha (bamboo sleeping platform constructed high inside the house) on which to sleep while the women have an agla chula (portable stove) with which they cook for their families. If the house is totally submerged the man will perch on the roof while the women and children sit on a raft made of banana trees called a bhela. This is regarded as safer than the roof. The women are responsible for making sure the children do not fall off the bhela and for rowing it away from the contamination of the house to collect water for drinking.



To summarise the char dwellers survival strategies:

#### During Floods

1. Act collectively;
2. Perch on roof of house with family on **bhela**;
3. Sleep on **macha**;
4. Cook on **agla chula** if food is available;
5. Collect drinking water using **bhela**;
6. During severe floods move to embankments by hiring boat.

#### After Floods

1. Men migrate for work;
2. Take informal loans at high rates of interest;
3. Reduce food intake.

### 4.2 Agricultural Communities

Many of the existing FCD/I structures and projects in the country have been designed to improve the productivity of agricultural communities and to some extent this has happened. It has, however, sometimes brought disbenefits and flooding problems to other agricultural communities outside the FCD/I interventions.

If you are landless in these communities, which many of course are, the lack of work is the major problem. This requires that during floods you reduce your intake of food drastically with many reporting starvation as a survival strategy. But the sale of domestic assets and taking loans at high rates of interest are the normative strategies.

#### Flood survival strategies of agricultural communities:

1. Shift from T to B amon;
2. Raise ground for cash crops;
3. Patrol embankments;
4. In severe floods sometimes cut embankments;

#### After Floods:

1. Plant a winter boro crop;
2. Take informal loans at high rates of interest;
3. Reduce food intake;
4. Work on rich farmer's land;
5. Mortgage land for cash from moneylender;
6. Sell agricultural assets.

### 4.3 Fishing Communities

The northwest region has traditionally been one of the largest inland water capture fisheries in the country with the major rivers like the Padma, Brahmaputra and Teesta forming part of the landscape





and a network of lesser rivers comprising over 130,000 hectares. It also comprises beels and floodplain which can vary from 17,500 to over 23,000 square kilometres. As such it is an important fishing region and has historically supported a large number of traditional fishing communities which now report that their livelihood and cultures are being threatened by increasing FCD/I interventions in the region. This in turn leads to overfishing so the communities are caught in quite a vicious downward spiral.

During floods fishermen adopt the following strategies:

1. Migrate to find work (in the case of Hindu communities some go to India and do not return leaving their families behind);
2. Rent fishponds at high rates of interest;
3. Reduce food intake in some cases starve;
4. Mortgage themselves to rich men who control fishing rights.

After floods the survival strategies are:

1. Borrow money at high rates of interest from mohajons (moneylenders);
2. Sell fishing equipment;
3. Sell domestic assets;
4. Leave fishing permanently and migrate to urban areas.

#### 4.4 Women's Flood Survival Strategies

In a survey of 200 women in two different districts they explained not only the strategies they adopt in floods but also perceptions of them. Since women have clearly defined roles prior to floods (see chapter three) they did watch for signs of them. This may have been observing river levels, talking to local fishermen and in a number of cases listening for warnings on the radio.

Strategies prior to floods include:

1. Storing dried food and fuel for cooking;
2. Making or maintaining the agla chula;
3. Storing food for livestock and chickens;
4. Helping to make or repair the macha.

During floods their roles are:

1. Moving livestock to high ground and looking after them;
2. Looking after children sometimes on the bhela;
3. Feeding the family using the agla chula;
4. Reduce food intake especially for themselves;
5. Fetching clean water for drinking.

Women do not play a major role in post-flood situations since loans and relief and rehabilitation are usually the province of their menfolk. Recently, however, women have been working in rehabilitation programmes usually run by NGOs and earning cash or food. In essence this takes them out of *purdah* at least for the duration of the rehabilitation programme.



#### 4.5 Embankment Dwellers

Embankment dwellers, as explained above, probably live in the safest place of all when severe flooding occurs. Their houses tend to be constructed on narrow berms just below the crest of the embankment and the house will only go fully under water when enormous floods occur. They are truly landless, usually having lost their land to previous floods, and as such have difficult times in heavy flood conditions.

Their strategies for survival during floods are:

1. Move to the crest of the embankment;
2. Go back to the house at night to sleep on the macha;
3. Go inside the embankments to fetch clean water from tubewells;
4. Try to catch fish in the river;
5. Cook on the agla chula on the top of the embankment;
6. Reduce food intake or starve which frequently is the case.

After floods the following strategies occur:

1. Men migrate to find work;
2. Women occasionally get credit at local *dokan* (shop);
3. Take informal loans at high interest rates;
4. Sell domestic assets.

#### 4.6 Conclusions

The problems of floods and how to survive them varies enormously depending on where your community happens to be. The simple raised platforms deemed acceptable as a flood survival strategy by char dwellers differs enormously from the permanent embankments on the BRE wanted by the villages of Sariakandi and Dhunot. But from whatever standpoint strategies and structures are looked at acceptability in sociological terms is based on what the families and communities state to be their problems and the solutions they perceive to be in their best interests in improving their lives during severe floods. This may differ from what engineers think is the best solution and maybe even what they think the particular flood problem is but sociological inquiry faithfully reports what the families and communities reveal.

It can also reveal certain aspects of social behaviour which may assist flood action planners in deriving options and plans which have a human dimension since all options and plans will not be based exclusively on technical interventions. Suggestions that options may be based on early warning systems utilising village women is one example of this. The need to provide tubewells and latrines on the embankments is another example. Inter-community conflict (which is dealt with below in a succeeding chapter) is another example.

One aspect of the FAP2 sociological inquiry which did emerge from the surveys and rural appraisals and which may be of use to planners is the issue of social cohesion. Apart from the chars there was little indication of communities acting collectively, except in the very important case of cutting embankments, when threatened by floods of a severe nature. On chars they helped each other to dismantle their homes and move possessions onto the platform prior to severe flooding; in Rahamtchar they told the field workers that the infirm, the old and the very young were assisted by the entire community when severe floods threatened. But on the embankments and villages on the mainland



flood survival strategies are very much carried out by individual families. Questions attempting to elicit collective responsibility to combat the dangers of heavy flooding met with negative responses. This issue has important ramifications for anyone attempting to find community solutions to flood survival strategies. It also has important ramifications for future operation and maintenance of flood control systems since collective action by communities will be necessary for this aspect of the flood action plan.



## CHAPTER 5

### PUBLIC PARTICIPATION IN THE NWRS

#### 5.1 The Rationale

"I was pleased to see that the villagers confirm what the hydraulic model is telling us for the area around Masankura and Mirganj. I have been unable to visit that location to observe what is going on on the ground."

Dr Charles Reeve  
Hydraulic Modeller FAP2

This quotation appropriately sums up one aspect of the rationale for involving the public in the flood action plan. As will be seen below in the field reports villagers frequently have a deep knowledge of the hydrological conditions in their immediate locality. All too frequently during the fieldwork carried out by FAP2 in the Gaibandha area sceptical technologists were finding out that villagers' analyses of flooding problems and potential solutions to a large extent mirrored their own which had been derived from sophisticated hydrological and engineering concepts.

This should not surprise us since people living on a floodplain have an enormous vested interest in understanding both the benefits and devastation that water can bring. In Bangladesh water is the most important element in the lives of over ninety percent of the population and has to be understood in the same way that a Kalahari bushman understands the desert. It is at the most basic level a question of survival and in such situations knowledge of the environment in which you live is often the difference between life and death.

This principle of the necessity of environmental understanding can also be applied to local government officials who were included in the rural appraisals carried out in the Gaibandha area. At the most local level officials such as union chairmen are mixing daily with the people they serve and represent. In doing so they are frequently listening to the problems people face in dealing first hand with their environment and the problems it can cause. They, therefore, build up a picture of the local area that no official in Dhaka will ever supplant. They are, therefore, an integral part of any public participation exercise and as such were included from the level of Deputy Commissioner down to village officials in the study.

The third sector of the local community which needs to be involved is the non-government organisations (NGOs) which are usually close to grassroots development. Since many of them are involved with the communities which are the poorest sectors of society, and who generally have least to gain from the flood action plan at least in economic terms, their participation in the process was desirable.

Another element in the rationale for public participation was that previous FAP studies, principally in agricultural and operation and maintenance of FCD/I structures, found that local people would not participate when it was crucial that the success of the project depended on their involvement. A major reason for this is that communities are all too frequently invited to participate when the project has been planned and implemented without their involvement and indeed in some cases without their





knowledge. The fieldwork carried out by FAP2 came up against this problem on a number of occasions and nowhere more vividly than in the case of operation and maintenance of embankments. The field-workers would be told 'the embankment is a WAPDA (government) structure -why should we get involved?' This even in situations where the good functioning of the embankment was crucial to the safety of their village.

Furthermore in a democratic society decisions and in this case options for flood control measures should not be taken without the widest possible consultation and involvement of those whom the decisions and options will affect most. Whether this is meaningful or merely cosmetic will be argued elsewhere but as a first principle a dialogue between FAP personnel and the people living in the project areas must be an essential prerequisite of any planning process. To circumvent this process is to negate the the principles of the democratic society the people of Bangladesh have fought so hard to establish.

Finally in circumventing such participation planners will fail to take advantage of the local understanding of the environment which is, as has been frequently demonstrated, superior to that of the remotely based technical expert.

## 5.2 The Methodology

The decision was taken to concentrate fieldwork efforts initially in Gaibandha district where FAP2 has a special improvement project. It must be stressed, however, that socio-economic surveys implemented anywhere in the region always carried a section which attempted to elicit community problems and solutions in relation to flooding.

A principle reason for localising the fieldwork was that few of the multi-disciplinary teams which carried this out were familiar with the processes. Guidelines were issued by FPCO but these in many senses were also exploratory since this level of community consultation/participation had not previously been a feature of projects in Bangladesh outside of the non-government organisations (NGOs).

Previous surveys which had asked questions about flood problems and solutions had experienced difficulty for two major reasons. First communities were unused to being seriously asked opinions about their problems far less being asked an opinion as to how to solve those problems and were reticent about getting involved with complete strangers. Secondly there was a lack of context and questions were frequently being asked in a vacuum since the fieldworkers had no prior knowledge of what problems the community was facing. In order to overcome these difficulties a contextual model was drawn up containing the following steps:

- a. Initial meetings with communities, officials and NGOs would be conducted to determine their perceptions of flooding problems and their solutions to these;
- b. Where communities were concerned these meetings might be pre-arranged or take the form of transectional walks in rural areas;
- c. This information would be taken back to Dhaka and analysed and compared with existing data within FAP2;
- d. The engineers and hydrologists would draw up options based on this information or refute the community solutions using technical data;



- e. The community or official options or rejections of them would be taken back to the same communities and officials and a full discussion would ensue.

It was decided for the initial meetings that the minimum composition of the teams would be as follows:

**Official Meetings**

Team Leader FAP2  
Institutional Specialist (Local)  
Engineer (Local)  
Engineer (Expat)

**Community Meetings**

Sociologist (Expat)  
Sociologist (Local)  
Engineer (Local)  
Economist (Expat)

NGOs would be the subject of separate interviews as would village women who would be interviewed by women sociologists.

It was also decided that in order to comply with the contextual model in the Gaibandha special project area the first two sets of meetings would exclusively be listening experiences and only then would analysis of village and local officials' problems and solutions take place and during a third set of meetings these would be presented to the communities and officials.

In briefing the teams it was stressed that they must initially listen and make no attempt to intervene or direct the dialogue.

For the community meetings or transectional walks a skilled Bangladeshi sociologist would instigate the discussion and would ensure that the villagers views took precedence over all others.

### **5.3 Public Participation Findings**

There were a number of findings in the GIP which were supported by all the communities in the public participation sessions (for a full detailed account see Appendix B). There were also a number which were determined by much more local needs. The process involved taking both sets of findings back to the FAP2 office and analysing them in relation to the hydraulic model and to concepts being derived from engineering principles. The next stage which coincided with the third and fourth sets of public participation meetings was to offer options to the same communities derived from both the communities views and those derived by hydrologists and engineers.

The findings which produced a consensus in all areas were as follows:

- a) Effective sealing of the Teesta Right Embankment;
- b) Effective sealing of the Brahmaputra Right Embankment;
- c) Stop the overspilling of the Ghagot;
- d) Make the drainage at the Manos Regulator effective.



Finding d) produced two sub-options which were determined by the geographical relationship of a particular community to the regulator. They were:

- d 1) Increase the ventage of the Manos Regulator;
- d 2) Remove the regulator and allow free passage of water to the Brahmaputra.

Findings determined by local considerations were as follows:

- e) Re-excavate the Ghagot;
- f) Dismantle the EIP embankment on the left bank of the Ghagot;
- g) Construct an embankment on the right bank of the Ghagot;
- h) Re-excavate the Alai Kumari;
- i) Improve drainage through the Sonail Embankment;
- j) Re-excavate the Alai;
- k) Rehabilitate khals in the Masankura and Mirganj area;
- l) Improve access of water and fish from Ghagot to GIP beels.

All of these community-based options were analysed by NWRS staff and a full comparative analysis was carried out. At team meetings the options offered by the communities were explained to the professional staff of FAP2 and a debate on them ensued. This process resulted in a series of option being drawn up by FAP2 staff to take back to the communities and officials for a third and fourth series of meetings.

The options which emerged as a result of the public participation process were as follows:

- i Effective sealing of the Teesta Right Embankment;
- ii Effective sealing of the Brahmaputra Right Embankment;
- iii Removal of the Manos Regulator;
- iv Backwater embankments on the Ghagot to prevent flooding from the Brahmaputra
- v Construction of a sluice gate where the Ghagot enters the Alai;
- vi A drainage khal (Bangali Floodway) to improve drainage from the area.

At village meetings these options were explained to communities and the process of arriving at them was also explained. This involved engineers acquainting villagers with the work of the hydraulic model which gave water levels for various options for the project. There was a general consensus that these options would go a long way to preventing extensive flooding of the GIP area and that areas adjacent to the project would also benefit from these options.



#### **5.4 NGOs in the Gaibandha Area**

A number of prominent NGOs are working in Gaibandha district including Nijera Kori, Bangladesh Rural Advancement Committee (BRAC), Grameen Bank and CARE to mention but four. As part of the public participation exercise they were interviewed in situ about their work in floods in particular and their approach to development in general.

##### **Nijera Kori**

This large NGO which works all over Bangladesh has an office in Palashbari. In line with its national programme it works almost exclusively with the landless and very small farmers that is people with only homestead land. They train groups to lease land from larger landowners and then for cultivate the land on a group basis. It has sixty groups working with it of which seventeen are women's groups.

They have training programmes on basic needs and advance training on leadership. More advanced courses are conducted on political awareness and human behaviour and development training. These courses are run for both men and women. A major aim in these courses is to make poor people aware of the mechanisms by which they are exploited.

A special project with the landless is helping them to form groups which will then purchase rickshaws and vangaris. These are owned by the group and there is an obligation for members to deposit part of their income from plying these vehicles into the group fund. Nijera Kori helps the groups to get credit to start these ventures.

Nijera Kori is a group primarily involved in the problems of marginalised people and does not undertake any special flood related activities.

##### **Gono Kallayan Kendra (GKK)**

This local NGO based in Saidullahpur has programmes which create awareness in its group members as to the problems of floods and how to undertake rehabilitation measures afterwards. One of the issues they use to motivate people to the dangers of flooding is health and the use of medicine for the various diseases and ailments associated with excess water.

Their main development work is in health education, primary education, reforestation, some village road construction and the provision of credit to poor farmers. They do also get involved in job creation through local works at community and village level.

By far their biggest impact in terms of flooding and related problems is in the provision of Labour Contracting Societies (LCS) for earthcutting. These are provided to the World Food Programmes on the embankments of the BWDB and the Early Implementation Projects associated with water and flood control. In this way they provide employment while contributing to flood control systems in the area where the LCS people live. GKK has no fewer than 72 LCS groups working in Gaibandha district.





### **Chinnaya Mul Unnayan Sangstha**

This small NGO is situated in Gaibandha Sadar and undertakes no special programmes related to flooding and its problems. Its main work is the provision of credit for poor people.

Other programmes include education, family planning and training for the blind. For women it has training in sewing, typing, sericulture and poultry and does provide follow ups when the women start small businesses in these types of activity.

By far their most relevant project in the water sector is the support for three fishing cooperatives. These three groups comprise between thirty and thirty five members and their ponds are between two and three acres. The fry and fingerlings are supplied by Chinnaya Mul which procures them from hatcheries for the group members. Credit support was given to these groups to get started. The ponds are rented and between twenty and twenty five percent of profit is given to the pond owner.

This is this NGOs answer to fishing communities which have lost their livelihood with the demise of capture fisheries.

### **Rural Development 9 (RD9)**

This is an NGO offshoot of the Rangpur Dinajpur Rural Service and has not been specifically involved in flood control or proofing measures. Again, however, it does get involved in assisting group members in fish culture as an income generating project.

Using the World Food Programme assistance the excavate beels and ponds with the groups to get the project started. Haldanga Beel is one such scheme. RD9 took the lease from the Department of Fisheries and had the beel re-excavated using group members with payment in grain from the WFP. It then stocks the pond with fingerlings, provides food for them and adds lime to the water prior to stocking to clean the pond. Cleaning the water and stocking is given free of cost.

The terms of the lease are that forty percent is repaid to the WFP, forty percent to the group and twenty percent to RD9. RD9s share will be used to invest in another scheme elsewhere. The NGO claimed this type of programme could be set up anywhere there was water the DoF was prepared to lease to disadvantaged groups of people.

RD9 also run programmes in small trading, livestock and poultry rearing and have groups of farmers organised around STWs provided by the Bangladesh Agricultural Development Corporation. In fact they claimed they would help finance any kind of development work providing the group was well motivated and could be trained.

### **Grameen Bank**

The GB adopts a number of strategies which are directly related to post-flood situations. These are clearly of interest to flood action planning in terms of survival strategies for flooded communities. They include the following measures to assist their clients:

- Repayment may be postponed for loans when people have suffered excessively from floods;
- Loans will be given for food stocks for emergency periods;



- Communities will be encouraged to build bamboo bridges to help communication;
- Loans will be given to repair housing damaged by floods;
- Loans will be provided to restart small business destroyed by floods;
- In the immediate post-flood situation food will be distributed but the communities will be expected to repay this when times improve.

The bank will also organise labour societies for work when flood damage needs to be repaired.

The water related activities of the bank revolve around fishing groups. It will support groups which wish to lease beels or ponds when these are available. It will provide motivational training for these groups which want to start fish cultivation. At one time the bank took the leases but found this unsatisfactory since the groups did not feel they "owned" the beel and as a result did not protect the investment from illegal fishing.

### **Gono Unnayan Kendra (GUK)**

This local NGO works in 26 different villages in three unions of Gaibandha district. It has received much of its support from Oxfam and is now involved in a whole range of development activities. GUK supplied much of the advice and some fieldworkers when FAP2 first started to do surveys in Gaibandha district.

GUK does run disaster preparedness programmes with special emphasis on health and sanitation. It has also run very effective (according to Oxfam) post-flood rehabilitation programmes. It has given training in emergency fund creation, homestead raising above flood levels and tree planting to provide compaction for dykes and embankments. Part of the disaster preparedness programme involves environmental awareness in order to prevent soil degradation and erosion.

Among its general development projects the following feature very prominently on its agenda:

- Children and adult education;
- Leadership training;
- Sanitary latrines and tubewell distribution programmes;
- Protection of women against violence and the provision of legal aid to women so violated;
- Credit support for income support and employment generation.

GUK would like to get involved in fish pond cultivation to alleviate the effect of the disappearance of much of the capture fisheries in the area but would require funding. The organisation of the fishing communities could become part of the group awareness and leadership training run for other types of groups in the district.



## CARE Bangladesh

This large foreign NGO has programmes all over the northwest region and is responsible for many of the village roads which criss cross the entire area. It does both disaster management and post-flood relief and rehabilitation work. In the period during floods and immediately afterwards it does provide medical help, dry food and shelter. At its centres it keeps a stock of utensils, rice and wheat and medical supplies for disaster situations such as floods. It also has a medical team with doctors who treat malnutrition and provide health advice.

As part of its work it also has a disaster committee of seven staff members. This body is used to assess the extent of disasters in areas which have been heavily inundated with water. It also advises on the types of preparation which should be undertaken by communities to minimise flood damage.

A large part of CARE's work throughout Bangladesh is the construction of village roads using landless and unemployed labourers from the areas in which the road is constructed. Women are also employed in this construction and also in the maintenance gangs which keep the roads viable. These roads are built on what CARE calls the Integrated Food For Work (IFFW) which in essence means the grain for the construction comes from the World Food Programme.

Training for women involves mother child health care and immunisation programmes for children. This is done using a community approach as opposed to individuals receiving services. The training impact is estimated to be more powerful if a group approach is used.

In the natural resource sector CARE provides training for farmers through a scheme called LIFT which means local initiatives for farmer training. This is run alongside what is called the IMP programme which is for integrated pest management. Part of these training programmes involves environmental issues.

One of the more exciting projects recently undertaken by CARE is the integrated rice and fish scheme which started in 1991 on an experimental basis. It has been tried with boro rice and it is hoped it will also be suitable for aman.

If the farmer has enough irrigation which in fact means twice the water levels required just for boro rice CARE will put three types of common carp spawn into his field. This until now has been supplied free of charge since it is still in the experimental stage. Early result indicate that if successful it is possible to grow fish to table size of 250 grams in just sixty to seventy days.

There are positive factors such as the farmer has to reduce the amount of chemical pesticide he puts on his fields. He also gets a crop of fish and of rice. Another plus is that with the large scale drop in capture fisheries in the region this new venture will help mitigate this problem. The other major development gain is that the farmers take part in the participatory action and research in partnership with the technologists.

There are drawbacks, however, which will have to be sorted out. These are:

- There is a high rate of predation mainly from birds and only one third of the spawn/fingerlings survive;
- The water levels required are more expensive than what the farmer would usually utilise;
- If any degree of pesticide is used the fish will suffer;



- The rate of return can be as low as 32 percent and as high as 75 percent.

If these problems can be sorted out CARE is very optimistic that the project will succeed.

### **Bangladesh Rural Advancement Committee (BRAC)**

This is perhaps the largest national NGO in Bangladesh and has a regional office in Gaibandha Sadar. It does not specially get involved in flood preparedness but will provide credit to rebuild community housing and structures in the post-flood situation.

BRAC covers most aspects of development in its Income Generating Programme with assistance to farmers and to people raising poultry and livestock. It has a woman's training centre and has been very prominent in spreading the oral rehydration method to village women everywhere. It also runs special vulnerable group development projects such as chicken and duck raising for really marginalised groups.

It helps farmers to organise into irrigation groups which share the benefits of deep tubewells. There is in addition social afforestation programmes to which BRAC supplies the trees from its own nurseries and plantations.

In the water sector fish culture in ponds and beels is given a high degree of support. It has no fewer than 36 ponds in the district covering an area of 25 acres in Gaibandha Sadar and 8 acres in Palashbari. It helps the groups to organise and provides institutional and technical assistance and will provide credit to these groups of fishermen. The fry and fingerlings are supplied from BRAC's own hatcheries which in this district number two

BRAC would like to extend its activities into the communities which live around existing beels and will do so if funding is made available. As there are a number of khas beels in the district this might be another NGO which can provide even more help in mitigating the loss of inland capture fisheries in the Gaibandha area.





## 5.5 Conclusions and Future

The major conclusion from the exercise is that it is in fact consultation at this level. Participation suggests community involvement at a far deeper level than that conducted by the NWRS. There is no doubt that villagers and officials did contribute to the process of analysing options but whether these are implemented on the basis of community acceptability or what the MIKE 11 model predicts remains to be seen.

Getting communities to participate in the operation and maintenance of flood action plans is the ultimate test and that can only be done by conscientising communities to the value of the plans. In turn it implies that there is greater cohesion between communities and district level officials responsible for flood control systems. This cohesion clearly does not exist at present.

In situations where communities told fieldworkers that their communities should be maintaining the embankments they did not believe that the BWDB would ever give them the resources to do so. Without adequate resources the communities will not get involved.

As to the process itself the contextual model worked well. For the first two phases the fieldworkers did listen very carefully to what the communities and officials were saying. The utilisation of the model to analyse options and predict flood levels which could be explained to communities also worked well. Villagers clearly understood the relationship between a particular option and levels of water in the rivers or on their fields as predicted by the hydraulic model.

A methodological problem at prearranged meetings was getting genuine opinions from villagers and not from the mastans (touts controlled by rich and influential men in the villages). By using a skilled Bangladeshi amateur the meetings were controlled in such a way that the widest possible opinions were sought even to the point of encouraging the most lowly villagers to contribute. The transectional walk was also a way of checking the validity of information collected at meetings. A transection would be an area where a meeting had taken place or was about to take place. These completely impromptu dialogues in fields or in randomly selected villages would confirm or refute what was heard at prearranged meetings.

Finally there is the problem of seasonal shifts. Asking questions in February and asking them during heavy flooding in eg September might produce different responses from both communities and officials. In the year in question the levels of water during the monsoon remained moderate. It might be necessary to conduct a longitudinal study of perceptions and attitudes to different types of flood control.

The next stage in the process is to institutionalise this form of public participation. Another of the FAP studies (number 14) will take this process forward. Institutionalisation requires that there is a change in attitude at all levels of society to this process. Hitherto government services both national and local have been run on a "service delivery model" usually determined by experts who traditionally have not consulted communities. The public participation process undertaken by the NWRS has demonstrated unequivocally that communities know what they want in terms of flood protection and they can articulate these needs when asked to do so.

One of the ways to proceed towards institutionalisation of public participation is to involve Members of Parliament in the process. If attitudes to public participation change at the highest levels the process may take root and become a part of community life in Bangladesh.



## CHAPTER 6

### SOCIAL IMPACTS

#### 6.1 Current Experiences

To predict what the social impacts of FCD options will be on any particular area or community, consideration must be given to the experiences of existing FCD/I projects. By doing so some method of measuring these impacts may emerge based on the community's perception of what a flood control or drainage structure means in terms of benefits or disbenefits. In the northwest region a number of existing projects do exist and FAP2 has done rapid rural appraisals and structured interviews in a number of communities affected by these projects.

As a general proposition there has undoubtedly been considerable inter-community conflict generated because of existing FCD/I projects. This conflict is at its worst in severe flood years but in some areas can happen even in normal flood years. The major reason is undoubtedly the lack of equity when flooding damage occurs. If you happen to live on the 'wrong' side of a sluice or embankment your community may be devastated while those on the 'right' side may have adequate protection.

It will be self-evident to even the most casual observer that part of the problem created by existing projects is their isolation from other hydrological phenomena in the geographical area in which they are set. The Early Implementation Projects (EIP) are frequently of this nature with the Sonail Embankment in the northwest region a good example of a relatively small area being flood protected and benefitted by increased agricultural production while larger areas outside it suffer enormously.

Of course the regional studies of the flood action plan are supposed to overcome this problem by looking at the hydrology and flooding problems of an entire region and devising options based on this wider knowledge. Even then some communities will suffer if structural interventions are made but perhaps regional planning can keep these these adverse effects to a minimum.

In the case of the Sonail Embankment projections of the BBS 1991 upazila populations indicate that at present it protects approximately 27,000 persons while it creates drainage congestion for nearly 115,000. According to villagers on the outside of the embankment the drainage congestion is drastic. In one village they claimed to be flooded for four and a half months every year and had not been able to grow amon since the embankment was constructed eight years ago.

In Pearapur in Fulbari upazila villagers said they were flooded for three and a half months and were demanding a drainage khal be built through the polder to release floodwater into the Brahmaputra. They claimed before the construction of the embankment the floodwater spread evenly over the whole area. Now the embankment forms a barrier and the combined effects of rainwater and spillage from the Alai river floods a much more specific and more densely populated area than was the case previously.

Every year the villagers have cut the Sonail embankment to relieve their plight. This action has destroyed the amon crop of the smaller population inside making the embankment in a sense counterproductive.

At the Sirajganj Integrated Rural Development Project (SIRDIP) embankment near the town of Taras the opposite is the case. The embankment in this general area demonstrates a trend showing flood protection for approximately 423,000 people close to it while disadvantaging just over 100,000 who live between it and Guraduspur.



Yet in 1991 the communities living on the 'wrong' side of it cut it creating a gap which was over one hundred metres long. This was in an embankment which is well compacted and has brick soling along its length. Furthermore it was done at night from small boats.

In another rapid rural appraisal on the Sib river on the western side of Chalan Beel polder D the effect of rainfall from the Barind was flooding the villages in Tanore upazila. The embankment of the polder was creating drainage congestion made worse by the fact that the Sib has no outfall to the south. The upazilas on either side of the polder D embankment have roughly similar populations, Tanore on the outside having around 130,000 while Mohonpur on the inside has 120,000. However, any similarity between them ends there as the embankment has resulted in very different conditions which are in turn the cause of conflict between the villages.

The villagers in Tanore cut the polder D embankment in a number of places in the floods of 1987, 1988 and 1991. This destroyed crops and property in Mohonpur which is supposed to be protected by the embankment of the polder. Yet these villagers told us it was necessary if they were not to lose their lives. One explained it in terms of when the water reached their waists and was still rising they had to do something and the embankment was the path of least resistance.

Rasulpur is a large village just inside the Brahmaputra Right Embankment near Gaibandha town and is protected by the twelve vent Manos regulator which is the main outlet from the district into the Brahmaputra. Demographic trends based on 1991 projections seem to indicate that around 15,000 people in the immediate vicinity of Rasulpur village are protected. Yet it apparently offers no protection to over 30,000 people in the next upazila to the north of this regulator. These communities cut the BRE to let water out into the Brahmaputra during heavy floods in 1987, 1988 and 1991. Inquiries in these villages revealed that the regulator had insufficient capacity to drain water which was flooding them.

The point that needs to be stressed from these examples of benefits and disbenefits is that even when a majority is receiving flood protection and increased farm yields it does not stop the minority cutting the embankment. Plans based on regional studies must recognise this fact and attempt to devise options which wherever possible cater for this contingency. It is of little value to project increased crop production from a particular FCD structure if neighbouring communities are forced to destroy it to relieve flooding.

## 6.2 Northwest Region Options and Social Impacts

FAP2 field studies and public participation meetings have revealed two major variables in the way a community defines acceptability of any flood control option. Protection of life and property is the obvious one but equally important in the way communities judge options is the amount of floodplain water that will still be made available for both agriculture and inland fisheries and also in many cases cheap and effective river transport for moving agricultural produce. In other words while they may want some degree of protection from severe flooding they require that it does not curtail their means of livelihood.

In the later phases of public participation meetings in the area of the Gaibandha Improvement Project the presentation of a particular option to a community would inevitably be followed by a debate on what depth of water would be in their fields if the option was implemented. Using predictions from the MIKE 11 hydraulic model the FAP2 engineers would state the results of the model in determining what depth of water would be in a river or on the floodplain given the presence of an option or a combination of them. If the water was too deep or too shallow, especially in the case of depths over



a padi (rice) field, villagers would point this out. They knew exactly how much water they wanted and said so.

In other instances where flooding problems were particularly severe as with the Barind Tract along the Sib river or the communities external but adjacent to the Sonail Embankment the criteria for acceptability were based more on the safety of life and property. In these communities the question exercising the minds of villagers when options were presented was what depth of water could they withstand in safety and for what duration. Answers to these questions would determine whether in future they would continue to cut embankments as community action.

The entire Chalan Beel system of polders which starts at the Sib river is a poignant example of a lack of water management which in severe floods causes a chain reaction. This not only affects the polders in the system but communities far to the east around the embankment at Taras. The MARS study (1992) recognised this when pointing out that polder D increases the flood risk for everyone in "what is now a contained active floodplain" by communities cutting embankments to relieve flooding.

The initial reaction is outside polder D when communities along the Sib river cut the embankment to save lives and property. The chain then pursues the following pattern (the following figures are based on BBS population statistics for 1991):

Polder D is flooded affecting the following numbers of people:

<u>UPZ</u>	<u>% Pop Affected</u>	<u>Number of People</u>
Manda	70	207,000
Mohonpur	80	95,400
Bagmara	40	278,500

The communities at the extreme eastern end of Polder D cut the embankment between them and Polder C and flood that polder with the following numbers of people inundated:

<u>UPZ</u>	<u>% Pop Affected</u>	<u>Number of People</u>
Bagmara	30	85,500
Natore	20	66,000
Atrai	50	85,000

The villages at the extreme end of Polder C then cut the embankment to let the water into the river Atrai but in severe years it then floods the communities between this polder and the SIRDP embankment at Taras with the following results:

<u>UPZ</u>	<u>% Pop Affected</u>	<u>Number of People</u>
Singra	80	135,000

The people in Singra are now inundated and trapped between Polder C and the Taras embankment which they have continuously cut with the following results:

<u>UPZ</u>	<u>% Pop Affected</u>	<u>Number of People</u>
Taras	80	104,000
Ullapara	70	240,000





This chain reaction happened in 1987, 1988 and 1991 and, at a conservative estimate from census data, resulted in the inundation of communities comprising 1.3 million people.

These cuts follow the natural drainage pathways which existed prior to the construction of the Chalan Beel polder system which is perhaps not surprising since since villagers are well aware of its direction. When FAP2 fieldworkers asked villagers on the Barind outside Polder D embankment why they made the cut in a particular place the answer invariably was that it was the logical place for quick drainage.

This history of inundation through and beyond the Chalan Beel system (it covers a distance of nearly 100 kms) suggests a very serious design fault in these interlinking polders. The misery is compounded by the fact that the system is full FCD/I causing the water to remain inside large areas of the polders after the floods have receded.

The root of the problem is clearly the lack of equity in absorbing floodwater. Because of these highly negative impacts on such a large number of people it is difficult for communities both inside and outside the polders to accept the logic of full FCD/I. Farmers inside polders D and C told fieldworkers that they want to return to cropping B amon rather than the higher yielding variety that the polder system was supposed to promote. This is because they have no control over the large amounts of water that rush into the polders when communities cut the embankments. They know that with the cuts the water comes into the polders in normal years at a gradual rate which allows them to grow B amon successfully.

Options being suggested to these communities are a drainage khal through polder D from the Sib following the natural drainage path that existed pre-polderisation and a system of weirs which allows water into the polders at a controlled rate. Farmers find these options acceptable since they have in recent years seen crop after crop destroyed by floodwater inundation. The benefits will also be felt far to the east of the Chalan Beel system where controlled flooding is a highly acceptable option to communities all the way to Ullapara.

In the case of fishing communities options were analysed in terms of a number of issues. In the case of villages making their livelihood from beels (inland lakes) the question whether the option would diminish or increase the size of the beel was crucial. The link between the beel and the nearby rivers was also critical since floodplain fish need migratory pathways into these water bodies.

Those communities which fish the main rivers wanted major sluices open at optimal times to allow fish to migrate into the smaller rivers and then onto the floodplain since it is critical to the life cycle of these fish.

Extremely marginalised communities like the landless people now living on the embankments of major rivers and those eking out a living on the harsh environment of the chars were more interested in access to land and employment opportunities. Would a specific option provide work for men on the embankments and stop the present long migration elsewhere in search of employment was a major factor in determining acceptability for embankment dwellers. Flood levels were very much secondary to employment and family stability.

On the perennial chars in the Brahmaputra simple flood proofing in the form of raised platforms and access to boats when flooding threatens life were extremely important. More pressing, however, are titles to the harsh land these people cultivate. They also want better access to health facilities and schools for their children.



In terms of specific options in the region the proper sealing of the embankments of the main rivers, Teesta and Brahmaputra, has been almost universally supported in the study area. The hydraulic model has shown that sealing the TRE has positive repercussions right down to the Hurasagar over 200 kilometres to the south. Put in its simplest terms the following scenario would be likely:

- ▶ decreased siltation in the Ghagot and as a result reduced levels of water in the river  
which will produce
- ▶ reduction of spillage into the communities situated on the Ghagot right bank;
- ▶ reduced flows down the Alai and therefore the Bangali and ultimately the lower Karatoya;
- ▶ less pressure from the Bangali on the Brahmaputra Right Embankment;
- ▶ less pressure on the Hurasagar where it enters the Brahmaputra from all the rivers directly to the north.

In all the agricultural villages of the participatory study these options were acceptable on the basis of a decrease in flooding over the fields. In the case of embankment dwellers the desire to maintain the present alignment of the existing embankments was paramount in their definitions of acceptability. They do not want to be pushed any further back from their present locations.

In communities which are already heavily disbenefitted from existing FCD/I structures acceptability would be anything that would reduce the water levels even during normal floods. Those villages suffering as a result of the construction of the Sonail Embankment were enthusiastic that a gated structure at the entry of the Ghagot into the Alai would help them. If it reduced the water levels to those predicted by the MIKE 11 model they would not have to cut the embankment which presently they do nearly every year.

Generally speaking, however, highly technological options were only acceptable where no other solution seemed appropriate. Improvements in drainage and existing embankments have a high degree of acceptability although community confidence in the district authorities to operate and maintain present systems is not very high.

In the fishing communities of the northwest region acceptability is based on arresting the drastic decrease in the availability of capture fish over the last decade. It is also based on stopping agricultural encroachment into water bodies which have been traditional village fishing grounds for centuries.

The decrease in capture fishery has been to a large extent the result of FCD/I structures blocking the migratory paths of fish onto the floodplain and from there into the beels which are a large feature of the region. Acceptability of new flood plans will only be possible if there is an increase in the availability of fish for capture in the beels and rivers.

Findings from the FAP12 study on the impacts of existing FCD projects confirm the serious nature of these to inland capture fisheries. Among their findings were:



- ▶ blockage of khals and inlets linking rivers to beels and as a result hindering migration of fish;
- ▶ decline in beel and river capture fisheries;
- ▶ emigration of full-time fishermen to other areas;
- ▶ traditional fishermen becoming part-time and having to do other jobs.

The problem of agricultural encroachment was found in all parts of the region and is a winter season phenomenon. As the beels dry out in the winter farmers fill in the edges with earth to create small fields for rice production. This in turn forces the fishermen to compete for smaller and smaller areas of water in which to fish. If you add to this the fact that rich men have taken over areas of the beels for fish traps and shelters then the position of the traditional fishermen, who were historically Hindu, becomes uneconomic.

One negative impact of this change in fishing patterns has been migration of Hindu male fishermen to West Bengal. In one village in Chalan Beel nearly half the men had recently migrated and as experience elsewhere has shown they do not usually come back for their families but remarry and settle in India. The social consequences of this are drastic for the families left behind.

There are also adverse nutritional impacts on poor communities who fish for small fish for consumption. Since poor communities eat little or no meat some intake of fish is important since it is high in protein, high in calcium if eaten whole which small fish are and can give vitamin A again especially if eaten whole. The negative nutritional impact especially on growing children and pregnant women is enormous if this source of food is removed by flood control measures.

Consumption of food and its effect on nutrient intake has been seriously diminishing in Bangladesh for a great number of years. This is especially true of fish and pulses which are fairly critical to village dwellers. Table 1 indicates the trend in intake of food items over a long period.

Table 1 : Trend of consumption of principal food item (1937-1982)  
Per capita per day in grams

Food	1937	1962-64	1975-76	1982
Animal Food	45.0	56.5	44.0	17.0
Pulses	40.0	28.0	23.8	17.3
Vegetables	284.0	142.0	125.7	120.1
Milk	88.0	19.3	16.7	14.3
Fish	51.1	27.7	22.3	17.7

(Source: Health Policy and Planning: 3(4) 325-328 OUP 1988)



The effect this decrease in intake of principal food has on nutrition is shown in Table 2.

**Table 2: Trend of nutrient intake in Bangladesh (1937-1982)**  
Per capita per day

Nutrient	1937	1962-64	1975-76	1981-82
Calories	2743	2251	2094	1943
Protein (g)	78.4	57.5	58.8	48.4
Fat (g)	19.7	17.7	12.2	9.8
Carbohydrate	562	476	439	412
Calcium (mg)	470	304	305	260
Iron (mg)	72	9.7	22.2	23.4
Vit A (IU)	1850	1590	730	763
Vit B1 (mg)	-	1.47	1.65	1.38
Vit B2 (mg)	1.42	0.5	0.5	0.68
Vit B6 (mg)	-	22.8	22.21	13.15
Vit C (mg)	86	39.6	9.5	13.26

(Source: *ibid*)

The study concluded that nutrition related morbidity, goitre in pregnant and lactating women and anaemia in children had increased enormously during the period as a result of diminishing intakes of healthy food. In the northwest region the decrease in capture fisheries may accelerate this trend if flood action planning does not cater for the communities who make a living from capture fishing in beels and rivers.

### 6.3 Impacts on Employment for the Landless

In the results of the surveys in Chalan Beel which appear in chapters two and three there was considerable evidence of migration for employment for large parts of the year. This has always been the case for landless families and it has seasonal causes. This section looks beyond the seasonality to demonstrate statistically both in days worked per month and remuneration for that work to show the crippling poverty that most landless families find themselves in for most months of the year.

The consequences for flood action planning are fairly obvious. Options should be influenced by attempting to increase employment opportunities for landless families. Increased employment not only decreases the possibility of nutritional deficiency in these families but may also maintain greater





stability in the family by permitting the household head to remain with his wife and children for longer periods of the year.

The survey was conducted in the homes of 100 families in five villages of the Chalan Beel system and its immediate surroundings. To get a cross section of all types of employment a fishing village was included. Men and women in each household were interviewed to prevent gender blindness and also to record those households in which the women were also employed on a remunerative basis.

Five categories of employment were utilised and these generally follow the types of occupation a landless person would find. They need some further explanation before proceeding to analyse the data in the graphs which plot both days worked per month and the wages received for these days. The categories are:

Agricultural Employment (AGEMP)	:	Day labour in someone else's field;
Fishery Employment (FISHEMP)	:	Fishing for yourself or for someone else;
Non-Agricultural Employment (NONAGEMP)	:	Rickshaw/Vangari Pullers Gorugari (ox cart) Drivers Boatmen Coolies;
Domestic Employment (DOMESTICEP)	:	Working in someone else's house or homestead;
Petty Trading (PETTYTRADE)	:	Dokanwallah Selling Vegetables Muree (puffed rice) Selling Barbers Selling Bangles and Baubles.

Figure 1 shows that in none of these occupations did anyone work a full month with the single exception of those in agricultural employment receiving twenty eight days work in December. This would coincide with threshing amon, making seed beds for boro and preparing the land for boro planting in January. This type of employment according to Figure 1 has a low of fifteen days in August when the full effects of the monsoon are felt and an average of around twenty two days from January to May.

By far the most volatile occupation in terms of days worked is petty trading which falls to a depressing low of around five days in January. This can be explained by the lack of employment for other categories of the landless in this and the following months. In other words there is very little money around and this affects everyone.

Domestic employment averages around one half of a month for most of the year but it should be stressed that in this category of landlessness the payment may be in food. This will normally be meals supplied while the person works and in a few instances enough grain to provide minimal food for the worker's family.

Figure 2 gives the daily wage rate for the different categories by month. At 1991 rice prices the minimum daily wage as decreed by the government at three and a half kilograms of rice was 39 taka. None of the landless occupational categories make this minimum or above it for most months of the year. Indeed in the worst case of domestic work the average for around seven months is less than half the legal minimum at fifteen taka and from August to November sinks to a low of ten taka.



The only occupation which is consistently close to the minimum and in some cases above it is in non-agricultural employment. Part of this can be explained by the fact that a large number of landless people in this category are involved in transportation which is needed all the year round and as the graph demonstrates it is during the flood months of July and August when movement is difficult that this category of worker falls below the legal minimum.

Agricultural day wage labour, which is by far the biggest employer of the landless, at no point comes near the daily minimum and in most months is fifteen taka per day less than it. Fisheries is also by and large below the national legal minimum dropping as low as twenty two taka in March and April and only getting upto and beyond the minimum from mid-September to October.

The nutritional and social costs of such poor standards of living are considerable. The nutritional consequences are explained above but in this and other surveys carried out in the northwest the social problems caused by these poor employment opportunities were stressed continuously. Women left behind while husbands strive to earn a decent daily wage elsewhere have enormous problems looking after home and family in distressing circumstances.

It is not easy to put a monetary value on this dislocation of family life but the social impact of poor nutrition and psychological stress is very evident to fieldworkers. A well designed flood action plan which has employment opportunities for the landless would help to relieve this social disruption to family life.



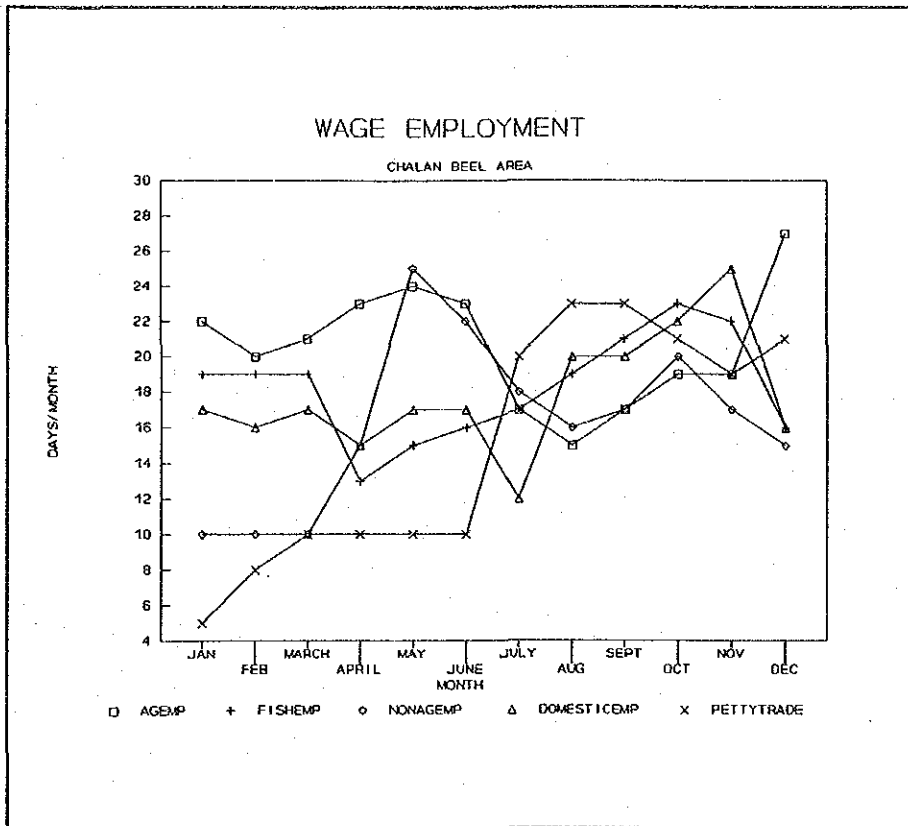


Figure 1

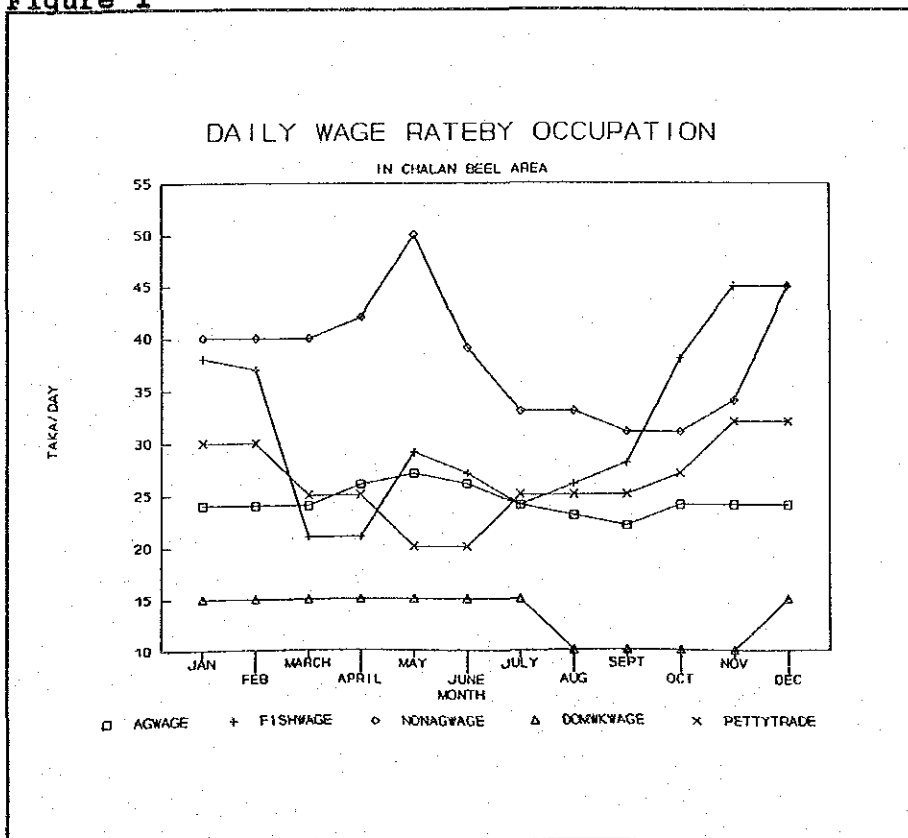


Figure 2



A sector which has been heavily hit by the construction of flood control systems has been river transportation. This sector of the economy has been a tremendous employer in the past. In Gaibandha district alone the number of country boats had diminished from over 5,000 in 1986 to under 1,000 at the present time according to the Kamarjani Merchants Association. At the national average of three men employed per country boat this represents a drop in employment in this sector in Gaibandha district from 15,000 to 3,000 in the short space of five years.

If the above figure is added to that of fisheries employment the position is even bleaker. A survey carried out by FAP2 revealed that in the same period 1986-92 the number of fishing boats operating in the Gaibandha district fell from nearly 1,000 to just over 200. This represents a drop in employment from nearly three thousand men to just under seven hundred. Reabsorption of these numbers of unemployed into the regional economy is extremely difficult but flood action plans should attempt to revive river transportation and reverse the negative social impact its demise has had in the northwest region.

FCD/I projects run by the Early Implementation Programme (EIP) have demonstrated that low income groups can be employed in projects through quotas of contracts for construction and maintenance of water related schemes. These groups are known as Landless Contracting Societies and are reportedly most effective when managed by NGOs. EIP has also reported that the quality of work done by them (especially women) is as good as, and often better than, that done by commercial contractors.

The social impact of involving landless groups in operation and maintenance of embankments and structures will contribute to better nutrition for these families. It will also stabilise family life which few of these families enjoy at present. Furthermore it may stimulate local economies and enhance service industries such as rickshaws, country boats and local markets.

This type of social impact, however, needs to be institutionalised. It cannot be implemented properly on an ad hoc basis as is presently the case with the Bangladesh Water Development Board (BWDB) where maintenance of existing flood control systems is only undertaken when money or grain from the Food For Work scheme is available. EIP has recently been rehabilitating projects it had built earlier since they had never been maintained. EIP has claimed that the bulk of BWDB's money is spent on staff salaries and office overheads and little is left for operation and maintenance.

And as the previous chapters have pointed out there is little community confidence in the authorities to carry out proper operation and maintenance even when money or grain is available. Perhaps the most effective way of institutionalising operation and maintenance is to transfer the function to the community. This will require in the first instance the training of communities not only in maintenance techniques but also in organisational skills that will allow them to set up proper human resource structures to manage the technical functions.

This will, of course, mean transferring financial resources to the communities. Given the present dismal record of operation and maintenance there is every reason to expect communities which benefit from flood control systems will manage them better than is presently the case. If donors are putting large amounts of money into new and better flood action plans they might do well to look beyond existing government structures when planning for the longer term operation and maintenance of whatever the plans produce.

Employment of the wives of migrant labour in embankment or sluice operation and maintenance will have considerable positive impacts on the families of these women. One of the major problems these women have in feeding their families in the absence of the husband is that he cannot get cash back to them on a regular basis. This was repeatedly reported to fieldworkers in surveys of landless families. In a minority of instances he had made credit arrangements with the local *dokan* (shop) to supply his wife but at high interest repayment rates when he did return. Malnutrition was the norm for the families of migrant workers.





#### 6.4 Options and the Gaibandha Improvement Project (GIP)

Flood control options for the GIP and their impact on local communities depend, as elsewhere, upon which part of the area your community happens to be situated. Before looking at individual areas, however, there are options which have impacts on the entire GIP area.

The sealing of the TRE has a positive impact on nearly all the communities in the GIP as evinced by the findings of all the fieldwork carried out. The main negative impact would be if sufficient care were not taken to allow fish migration from the river into the beels and khals of the northern part of the project area.

Rural appraisals in Mirganj and Masankura revealed that communities want the embankment sealed properly but they also want gates in the main embankment from which they can let water into and out of the area as required by flood, agricultural or fishing considerations. These gates could be the answer to fish migration but require human management which opens and closes them at the appropriate times.

Likewise effective sealing of the BRE will have positive impacts on most of the GIP area providing water which gathers inside the embankment can be released into the Brahmaputra. At present the regulator at Manos does not appear to be able to do this. If this problem can be solved the sealing of the TRE and BRE will potentially benefit over 600,000 people in the GIP area.

The sealing of these main embankments met with almost universal approval in all the surveys carried out. There is, however, the proviso that the MIKE 11 model is predicting accurate water levels both in rivers and over fields. In many instances acceptability of these major options (see chapter five) was based on communities being told by fieldworkers what the projected water levels would be in the new project situation.

The major contemporary problem is the Manos regulator which is slowly being destroyed by Brahmaputra bank erosion. It is generally the opinion of most communities in the GIP area, and indeed many to the south of it, that it never achieved its potential in relieving flooding inside the project area. These complaints come from nearly every thana in the GIP area apart from a few communities living close to it. The option to get rid of it and open the outfall of the Manos and Ghagot rivers to the Brahmaputra can potentially benefit 670,000 people.

This option also has the positive impact of allowing free migration of fish to and from the Brahmaputra and an improvement to the deteriorating river transport system that has been a feature of the area over the last decade. It will also allow the silt that builds up especially in the Ghagot river to reach the Brahmaputra thereby relieving some of the present high flooding which occurs along the length of the Ghagot. In the public participation sessions which were held in the area this option of opening of the internal drainage system to the Brahmaputra was warmly welcomed in nearly all of the thanas where meetings were held.

The option to continue the EIP embankment on the left bank of the Ghagot northwards raises the possibility of negative social impacts. The drainage from the areas between this proposed embankment and the main Rangpur road flows in a southeasterly direction. The proposed embankment would almost certainly impede this drainage. In a severe flood year with overspill from the Ghagot and high rainfall run-off the situation for the communities on the 'wrong' side of this embankment could be critical. Approximate demographic trends show embankment protection for 125,000 people living near the embankment with around 195,00 potentially negatively impacted by impediments to drainage. There is the danger of creating a Sonail situation whereby there is an increase in the probability of communities cutting the embankment to relieve their plight during floods.



The option for the Ghagot and Manos also allows for a regulator where the Ghagot enters the Alai. The social impact of this aspect of the GIP option will have positive impacts outside the GIP area. It will mean that water which previously in floods flowed down the Alai can be directed into the Brahmaputra by closing the gate on the Alai. Those communities on its right bank which have continuously cut the Sonail Embankment will be given a better degree of protection than any since the Sonail project was conceived. With this gate and developments to the south of the Sonail Embankment it is highly probable the cuts made by the public in the embankment will be a thing of the past.

Another area which is not in the GIP but which will have positive impacts as a result of the above options comprises the communities on the right bank of the Ghagot and to the east of the main Gaibandha to Saidullahpur road. These communities presently suffer from heavy siltation in the Ghagot much of which they claim comes from the Teesta. They also suffer because the EIP embankment on the left bank of the Ghagot acts as a drainage barrier when they are inundated by a combination of heavy rain and spillage from the Ghagot. Removal of the Manos regulator will increase the scouring in the Ghagot and reduce siltation permitting a greater volume of water to flow down the channel of the river.

## 6.5 Social Impacts and the Quality of Life

Much emphasis in the flood action plan has been placed on economic criteria and none more so than increases in rice production. The arguments for this have been powerfully stated and farmers would certainly support this view in terms of acceptability. But improvements in the quality of life go far beyond increases in food production whether it be rice or pulses or whatever. As the dictum states - **man cannot live by bread alone**. He needs decent shelter, decent health facilities, decent schools for his children, decent water to drink etc., etc.

In the many surveys, rural appraisals and village meetings carried out in the northwest region the respondents seldom placed flood protection as their highest priority when allowed to rank order their needs. It would have been easy for researchers to ignore issues which did not directly relate to flooding. To have done so, however, would have been to negate the dignity of the men and women who willingly gave information relating to their problems.

While improved agricultural production may increase employment opportunities for the landless other options to improve the quality of life must also be devised. The most poignant examples of this need are perhaps demonstrated by the people from the embankments. These are predominantly people who have lost land as a result of the behaviour of the rivers in the northwest region. While their kacha homes on the embankments probably give protection from floods which is better than most there is virtually nothing else. The *lojja* (shame) experienced by women who have no latrine must be excruciating. The problem of getting clean drinking water to prevent disease is an arduous task. The lack of medicine and clinics when their children are sick can be terrible.

It is perhaps not in the terms of reference of this study to respond to these problems but they cannot be ignored. Flood action plans must have a humanitarian as well as an economic ethos. To ignore the humanitarian issues was not conceivable to the sociologists and enumerators who carried out the northwest regional study.



## APPENDIX A

### INSTITUTIONS

#### 1. Introduction

In the northwest region of Bangladesh several organisations have been working in flood control and related water sectors. Though the Bangladesh Water Development Board (BWDB) has been playing the leading role in the government sector there are other organisations actively involved.

This report on the institutional aspects of the flood action plan examines the activities of those institutions particularly with regard to their present sphere of activities and their possible contribution in the various options to be recommended in the North West Regional Study. While reviewing the activities of these institutions both strong and weak points will be examined so that measures may be suggested for improving their contribution to the overall plan for flood control in the region.

Implementation of flood control and water management activities will require strengthening the institutional capacity of these organisations. In some cases re-structuring of these institutions may be necessary. The 1987 Flood Review Mission attributed the widespread failure of embankments to inadequacies in institutional capacity and the lack of public involvement in the planning and operation of the projects.

It has been pointed out in a number of recent studies of flood control in Bangladesh that one of the reasons for poor performance of existing projects is the lack of participation of the beneficiaries in different phases of those projects. A Flood Policy Study of UNDP (1989) stated that "flood policy demands at least two kinds of institutional support as a pre-requisite to successful implementation. The first is the urgent need for co-ordination of the activities of those agencies involved in it. The second the involvement of the beneficiaries in the planning, designing, implementation and maintenance of the flood protection infrastructure and facilities."

#### 2. Objective of the Study

Based on the Terms of Reference (TOR) the main objectives were:

- ▶ to identify and assess the capabilities of the institutions engaged in the implementation and operation of the flood control and drainage projects in the region;
- ▶ to assess the capabilities of institutions particularly in operation and maintenance of the projects;
- ▶ find out the possibilities for participation by beneficiaries and local organizations in O&M of these projects and to recommend ways of mobilizing local resources for O&M;
- ▶ recommend ways to ensure the long term sustainability of the proposed O&M system.



### 3. Scope of the Study

The scope of the study was designed on the basis of its objectives and with reference to the TOR. This includes:

- i) review and critically analyse the activities of institutions in flood control and water management in the region;
- ii) review existing O&M practices, regulations and procedures followed by these institutions and find out the reasons for any deficiency;
- iii) assess local participation particularly that of the beneficiaries and elected bodies such as the zila, thana (previously upazila) and union parishad and the rural poor and women in the projects;
- iv) review the participation of NGOs in the existing projects (see chapter four);
- v) suggest ways to increase local resource mobilization through participation of the beneficiaries and thereby improve the financial capabilities of the project;
- vi) recommend ways to ensure the long term sustainability of the O&M of the projects;
- vii) review prevailing legislation, acts and ordinances.

### 4. Methodology

#### *Secondary Sources*

This involved discussion with people in institutions engaged in the water sector to find out about the nature of their activities particularly in the operation and maintenance of water projects. Simultaneously a review was carried out of published and unpublished reports on subjects related to institutions, the strengthening of organizations and of O&M manuals in the water sector.

A survey was carried out to determine the results of experiments being carried out in different institutional approaches to O&M. A review of local beneficiary participation mechanisms and their legal framework for the water sector was undertaken. Finally the sphere of activities of the co-operatives and local government bodies was researched with attention to their association in larger projects.

#### *Field Investigation*

In order to collect information from the field visits were made to the lower Atrai Basin. During these trips information was collected from both people and institutions on the basis of pre-prepared checklists. This way the primary information needed for the study was collected and analysed in order to assess how the institutions worked in the field.





### *Data/Information Sources*

The sources of secondary information were:

- a) Ministry of Irrigation, Water Development & Flood Control - MPO, FPCO
- b) Bangladesh Water Development Board (BWDB)
- c) Bangladesh Rural Development Board (BRDB)
- d) Local Government Engineering Bureau (LGEB)
- e) Department of Agricultural Extension (DAE)
- f) Department of Fisheries (DOF)
- g) Department of Environment (DOE)
- h) Non-Government Organization Bureau
- i) ADAB
- j) Ministry of Local Government, Rural Development and Co-operatives.

The sources of primary data/information were:

- a) Local Office of BWDB
- b) Local of BRDB
- c) Local Office of NGO
- d) Zila, Thana and Union officials including Thana engineers.
- e) Beneficiaries
- f) Sluice/Regulator Kalashis (operators) where available.

A series of meetings were held with the officials at the district and thana level. In addition group meetings were held with the Union Parishad Chairmen in the Gaibandha Improvement Project (GIP) area.

### **5. Existing Institutions in the Region**

As mentioned above several organizations are involved in flood control, drainage and irrigation activities in the region. In addition a number of organisations directly relate to flood control activities. A brief note on the following institutions is given below:

- a) Bangladesh Water Development Board (BWDB)
- b) Bangladesh Rural Development Board (BRDB)
- c) Local Government Bodies
- d) Local Government Engineering Bureau (LGEB)
- e) Department of Agricultural Extension (DAE)
- f) Department of Fisheries (DoF)
- g) Department of Environment (DoE)

#### *Bangladesh Water Development Board (BWDB)*

Bangladesh Water Development Board (BWDB) is a semi-autonomous authority within the Ministry of Irrigation, Water Development and Flood Control. This organization is responsible for providing irrigation, drainage, flood control, erosion control, town protection and river training throughout Bangladesh.



BWDB is managed by a Chairman and five officers responsible respectively for Planning, Implementation, Operation & Maintenance, Finance and Administration. Day to day management is provided by a number Chief Engineers (C.E.), Superintendent Engineers (S.E.), Executive Engineers (E.Eng.), and Sub-divisional Engineers (S.D.E.).

The BWDB is divided into zones (headed by C.E.), zones into circles (headed by S.E.) and circles into divisions (headed by SDE). The present organizational structure of BWDB is given in Figure 1. The organization's portfolio allows for 18,032 posts but information provided by BWDB indicates that it employs just over 15,550 staff.

Since its inception in 1959 up until 1988 BWDB had completed over 400 projects and provided flood protection and drainage improvement for about 3 million hectares and irrigation for about 0.4 million. In the northwest region BWDB has a number of large projects such as the Teesta Barrage, the Brahmaputra Right Embankment, the Teesta Right Embankment, Bogra Polder, Chalan Beel Polders, Naogaon Polder, Hurasagar Project, SIRDP, Pabna Irrigation Projects and a large number of medium and small projects including about 20 Early Implementation Projects (EIP).

### *Bangladesh Rural Development Board (BRDB)*

Bangladesh Rural Development Board (BRDB) initially started as an Integrated Rural Development Programme (IRDP) under the Ministry of Local Government, Rural Development and Co-operatives. It was upgraded to the Bangladesh Rural Development Board in the early 1980s. The programmes of IRDP/BRDB are designed as a total (integrated) approach for rural development through different types of co-operatives.

Through their main function in irrigation projects (STW, DTW, LLP) they have been associated in Project Committees ( Identification and Implementation) of the BWDB from the 1970s. These have included large projects such as Barishal Irrigation Project, Chandpur Irrigation Project, Karnaphuli Irrigation Project, Muhuri Irrigation Project, Meghna-Dhonagoda Project and Pabna Irrigation Project.

BRDB assists the co-operatives (KSS) in arranging loans from branches of the Sonali Bank for the purchase of irrigation equipment. They also monitor the operation of loans through field offices. In addition to its normal activities in irrigation BRDB has undertaken a project named the Irrigation Management Programme (IMP) to intensify activities in the water sector. The IMP is in operation in eleven districts of the northwest region.

BRDB has an irrigation cell in its headquarters. The cell is manned by a Joint Director, two Deputy Directors and support staff. Field activities are carried out by BRDB offices in the districts and upazilas. BRDB has a training programme in water management for its own staff, KSS personnel and staff of the Department of Agriculture Extension at the Rural Development Academy at Bogra.

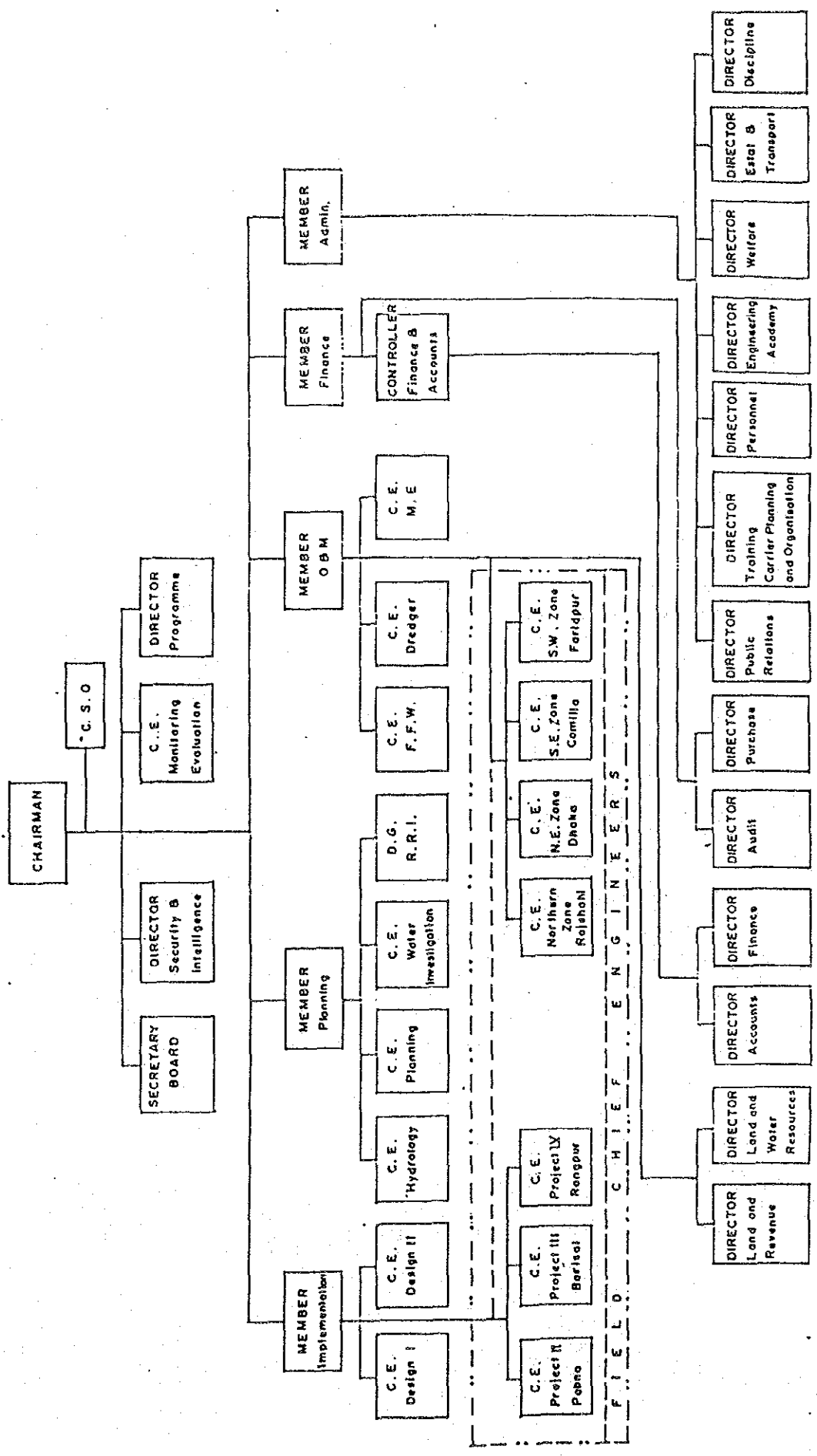
### *Local Government Bodies*

Local Government institutions have been in operation since the time of British rule in India. These bodies have played an important role in development activities for a long period though they have undergone structural changes several times during their one hundred year's existence. Initially these institutions started to train people in democratic principles and practice and only gradually became involved in development activities. They operate in many different spheres of national life particularly in the rural areas.



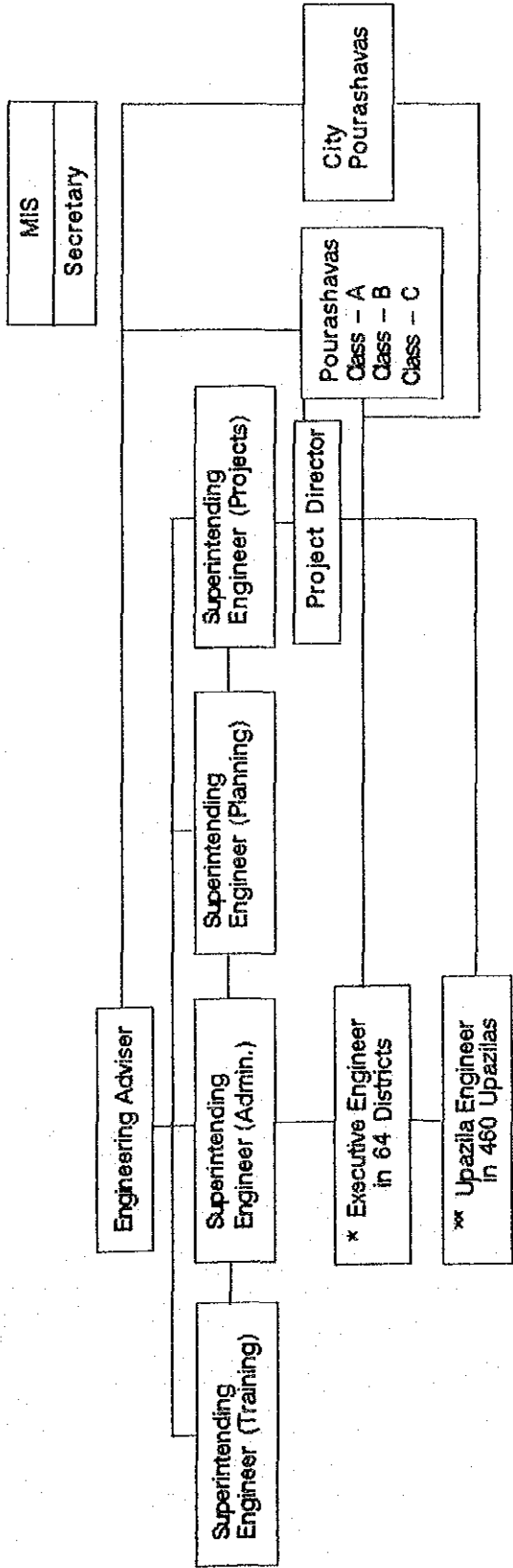
Figure-1

ORGANISATION CHART  
BANGLADESH WATER DEVELOPMENT BOARD





# Organization Structure of LGEB



### Deputation Reserve

Executive Engineer	-	4
Assistant Engineer	-	67
Sub - Asstt. Engineer	-	73
Surveyor/Work Asstt.	-	61
Total		= 205

<b>* Executive Engineer - 1</b>		
Staff		
SAE	1	
HA - Cum - Acctt.	1	
Steno - Typist	1	
Driver	1	
MLSS	1	
Total		(1 + 5) = 6
6 x 64		= 384

### Staffing

Engineering Adviser	1	
Supdt. Engineer	4	
Executive Engineer	68	
Assistant Engineer / Upazilla Engineer	464	
Sub - Asstt. Engineer	890	
Draftsman	462	
Surveyor	460	
Work Assistant	1840	
Accountants	525	
Office Assistant	921	
Store Keeper	460	
Electrician	460	
Clerk - Cum - Typist	464	
Other Supporting Staff	2068	
Total		= 9641

<b>** Upazilla Engineer - 1</b>		
Staff		
SAE	2	
Draftsman (SAE)	1	
Store Keeper	1	
Accountant	1	
Surveyor	1	
Work Assistant	4	
Electrician	1	
Office Assistant	1	
Clerk - Cum - Typist	1	
Accounts Clerk	2	
Chowkider	2	
MLSS	2	
Total		(1 + 19) = 20
20 x 460		= 9200





The participation of the people in development activities has been ensured through their elected representatives to these bodies. The tiers of local government have varied from time to time. At the early stage there were local government bodies at the union and district levels. In 1959 an additional tier at the thana level was introduced to formulate and execute development projects at this new level. From November 1982 the thana level was upgraded and renamed Upazila Parishad on the recommendation of the National Implementation Committee for Administrative Reorganisation and Reform (NICAR).

The Upazila Parishads became the focal point for all local development activities. The activities of the upazila were divided broadly into transferred subjects and retained subjects. Nation-building departments like Health, Agriculture, Primary Education and Engineering were brought under transferred subjects and delegated to the upazilas. The Judiciary, Thana Administration, Registration, Statistics etc., were retained by central government. The Upazila Parishad was given the power to plan and execute its own development projects.

No local government body except the Union Parishad is now functioning as originally intended. The administration and functioning of the Upazila Parishad was abolished by an ordinance in 1991. The socio-economic activities of the upazila until recently carried out by a democratic body is now vested in a set of government officials.

The government has a programme to effect major changes in all tiers of local government. A commission has been constituted to recommend necessary measures to streamline local government bodies in order to improve their capability to undertake development and other activities more efficiently. In the meantime an *ad hoc* arrangement has been made to ensure that existing development activities continue as scheduled.

#### *Local Government Engineering Department (LGED)*

Until recently this department was known as the Local Government Engineering Bureau (LGEB).

On the recommendation of NICAR in 1984 the government established a national level engineering body. The intention was to bring order and discipline, streamline the system and establish departmental control which would ensure smooth functioning of the upazila-level engineering efforts. The concept of LGEB was to create a pool of technical personnel whose services would be provided to the various tiers of local government such as Upazila Parishads, Zila Parishads and Pourashavas (Municipalities).

Their activities in the water sector are not substantial. They look after minor drainage, embankments and some irrigation projects. They prepare five year plans for the water sector in each upazila. These plans are initially prepared by the Upazila Engineering Office and checked by LGEB and finally ratified by BWDB.

In the water sector they have programmes in five greater districts of the northwest region. They are working in the greater districts of Rajshahi, Bogra, Pabna, Dinajpur and Rangpur. LGEB has a Rural Employment Sector Programme (RESP) of which an important element is an Infrastructure Development Programme). This programme has a water resource cell which assists in the design, construction and O&M of small scale (usually drainage and irrigation) schemes. The activities of this programme are concentrated in Faridpur but it is also operational with another employment project in Kurigram. This programme is funded by SIDA (Sweden) and NORAD (Norway). The organizational structure of LGEB including the Upazila Engineering Office is shown in Figure 2.



### *Department of Agricultural Extension (DAE)*

The Department of Agricultural Extension has an elaborate field level structure reaching out to remote villages through an extension network of block supervisors, contact farmers, co-operatives and other farmers groups. The Department is headed by a Director General at its headquarters in Dhaka. This Dhaka office is responsible for policy formulation and programme development for the national agriculture sector in order to increase food production and other crops.

The implementation of the policies and programmes is carried out by a network of 64 zonal (district) level offices, 464 unit (upazila/thana) level offices and 12,640 blocks. On average there are 27 blocks under each unit (upazila/thana). Each block is sub-divided into eight sub-blocks.

The zonal (district) level office is headed by a Deputy Director of Agricultural Extension (DDAE) for large districts and an assistant (ADAE) for smaller ones. This level is the most important point of the agricultural extension operation. In discharging his duties and responsibilities each DDAE is assisted by one Training Officer, four specialists and other supporting staff. The ADAE is assisted by two specialist officers. The unit [upazila/thana] level office is headed by an Upazila Agricultural Extension Officer (AEO). The UAO/AEO supervises the extension programme relating to the area under his jurisdiction. Each UAO is assisted by two specialists, one Assistant Agricultural Extension Officer, one Junior Agricultural Officer and other supporting staff.

At the lowest level a Block Supervisor covers a block comprising around 1000 farming families. The Block Supervisor is the lynchpin of the extension chain. He organises his work on the basis of a fortnightly Training & Visit (T&V) system. In the course of his work he uses the contact farmers groups as well as farmers in general for improving practical methods. He reports directly to the Upazila Agricultural Officer.

### *Department of Fisheries (DOF)*

The Department of Fisheries (DOF) is the government agency primarily responsible for development of the fisheries sector. Its functions are national fisheries management, development, extension, training, conservation, quality control, law enforcing, policy advice and information collection for the entire fishing industry. The DOF is the institution responsible for developing and implementing government programmes and projects in this sector. The director is supported by specialists at the headquarters in Dhaka to co-ordinate the activities at the district and upazila levels.

The District Office is headed by a District Fisheries Officer and the Upazila Office is headed by an Upazila Fisheries Officer. The department has 3,497 staff members paid by the revenue budget (domestically generated) and 635 people paid by the development budget (overseas aid). There are 2,280 employees working in the upazilas. The functions of the Upazila Fisheries Officer are:

- ▶ to collect and compile information on fishing ground (open as well as enclosed) production from natural and cultural fisheries;
- ▶ to plan and implement training programmes for fish farmers and for unemployed youth in pisciculture;
- ▶ to establish one acre model fish farms for scientific pisciculture;
- ▶ to supervise one or more fish nursery ponds, rear fingerlings and sell them to fish farmers;



- ▶ to protect fishing grounds from over exploitation and if necessary take legal action to prevent this.

### *Department of Environment (DOE)*

Environmental pollution control, environmental protection and management and attempting to strike an ecology balance are completely new concepts in Bangladesh. In 1977 the government promulgated the Environment Pollution Control Ordinance which is the only legislation covering environmental pollution in Bangladesh.

An Environment Pollution Control Board started functioning in 1977 but not as an independent body. It was a part of the Planning Commission with one of the members responsible for it. The main function of the Board was to lay down policies for control, protection and abatement of environmental pollution and to suggest measures to implement these policies. The responsibility for implementation was vested in what was called the Environment Pollution Control Cell.

Under this cell a project named the Environment Pollution Control Project was initiated in 1977 with manpower of 118. This continued until May 1985 when on the recommendation of the Government Re-organisation Committee a Department of Environmental Pollution Control started. This was subsequently renamed the Department of the Environment.

The DoE has its headquarters in Dhaka and has four divisional offices for four administrative divisions at Dhaka, Chittagong, Khulna and Bogra. The DoE is headed by a Director General. It does not have adequate manpower to handle the volume of work generated nationally.

## **6. Assessment of the Activities of the Institutions**

### *Bangladesh Water Development Board (BWDB)*

The BWDB started functioning in 1959 but it was only in 1974 that it took over the responsibility for O & M of water projects. A special post was created to look after O&M activities but since its inception there have been continuous complaints that these activities were being neglected. There was considerable pressure from international donors to correct this situation which is absolutely fundamental.

A shortage of funds, however, has resulted in inadequate field staff being assigned to operation and maintenance activities. BWDB claims it has been unable to recruit staff such as kalashis who are the basic operators of sluices and day to day maintainers of embankments. It also claims it cannot provide adequate facilities and logistic support for the staff assigned to field duties.

BWDB has a standard management model for the operation and maintenance of flood control, drainage and irrigation schemes. The model requires a gate kalashi to be assigned to each water control structure and an embankment kalashi for each mile of embankment. Supervising the kalashis is a hierarchical structure of Section Officer (SO), SDE, XEN, SE and CE responsible for O&M of BWDB facilities within a specified area. In addition there is a sluice gate committee from the project beneficiaries for each water control structure. This committee should advise the gate kalashi on water requirements and the operation of the structure.



But the actual position is far from the model. In some places the sluice committee has been formed but it does not function. The gate operations are frequently dictated by the more influential beneficiaries who stand to gain most from control of the water.

From the various review reports on the O&M of BWDB projects and from the field trip it is apparent that virtually all projects in the northwest region are having operating problems. This happens for a number of reasons including poor drainage facilities, embankments which trap water inside projects during heavy rainfall and also poor maintenance of existing structures.

During the field trip to the Atrai Basin it was observed that the operation of most of the sluices was not satisfactory as maintenance work had not been carried out for a long time. The Kasiabari Regulator of Raktadaha-Lohachura Drainage Project (an EIP scheme) was not operating properly because the spindles had not been lubricated. The kalashi said no lubricant was available. In the same vicinity the embankment was in an extremely dilapidated condition. From the state of it breaches were inevitable. The villagers had brought the matter to the notice of the BWDB authority but no action had been taken.

The most significant constraint to good O&M of BWDB projects is the shortage of funds. The O&M work is done through either a government cash allocation or under the Food For Works (FFW) programme. The extent of funding difficulties is contained in a report on "Project Delivery System for BWDB" by Jarigirdar and Islam. The report shows the demand and allocation for a five year period as follows:

		85-86	86-87	87-88	88-89	89-90
Wheat under FFW (million ton)	Allocation	0.109	0.107	0.104	0.139	0.114
	Demand	0.252	0.241	0.317	0.392	0.462
Cash (million Tk.)	Allocation	370.0	460.1	473.9	779.8	667.0
	Demand	616.0	696.5	647.3	810.3	1091.9

From the above figures it can be seen that the allocation of wheat is on average about 34% of the demand and for cash it is 60% to 70% of the demand. It is feared that with the increase in the number of new projects that the future situation will be even worse. It should be mentioned in this context that the establishment cost alone amounts to about Tk. 475 million annually. This leaves a very inadequate amount of money for actual maintenance work.

Other factors which are constraints to proper O&M activities are breaches made in the embankments by the public, putting fish-traps in drainage channels, illegal construction of dwellings and the grazing of cattle on embankments.

According to the BWDB system each project should have an O&M manual. This manual must be prepared by BWDB engineers assigned to a project during the first two years after the project is commissioned. This rule has not been complied with. In some BWDB projects O&M manuals have been prepared by external consultants but these are not available to the field staff. Furthermore these manuals prepared by the consultants are written in English and are of no use to the field staff if they are not translated into Bangla.

During the field trip it emerged that some of the kalashis are casual workers and some of them are working with no pay. Their only hope is that some day they will be brought contractually onto the





payroll. A kalashi who was working on a large regulator was an old man who said he had been working for several years without any pay. He was hoping that if he is not given full-time employment during his life-time his son eventually may get the job.

O&M activities require regular visits and checks by the officials at the top and mid-levels of the BWDB. This is the exception rather than the rule according to local people.

### *Local Government Bodies*

In recent years local government has undergone structural changes several times. As a result their sphere of activities have also changed. In 1983 the thana level was upgraded and renamed Upazila Parishad. These Upazila Parishads became the focal point for all development activities and officials of the main government development departments were deputed to the Upazila Parishads. These official carried out their function under the elected Chairmen who were the Chief Executives of their respective Upazilas.

The most striking feature was that the activities of the Water Development Board (BWDB) and the Bangladesh Agricultural Development Corporation (BADC) were kept from the Upazila Parishad Chairman. There was, however, some involvement of the Union Parishad Chairman in activities undertaken under the Food for Works Programme. This covered construction and maintenance of embankments, excavation/re-excavation of canals and other such activities. These local government bodies represent a potential means of local resource mobilisation and local accountability in development activities. This could be important for improving the O&M of FCD/FCDI projects.

Out of the three tiers of local government the activities of two bodies (Zila and Upazila Parishads) have been suspended. Only the Union Parishads are functioning. In order to bring a major change in all the tiers of the local government bodies, the government constituted a commission on reform which has recently submitted its report. It is expected that the government will formulate its policy on the basis of the recommendations of the commission and local government bodies at appropriate levels will be reactivated to undertake development activities in near future. The government may take this opportunity to delegate some activities of the water resource sector, particularly O&M, to local government bodies.

A thorough review of the performance of different agencies involved in this sector should be made before such delegation is decided. In recent studies on institutional aspects of the water resource sector Bastin (1992) has suggested a demand driven model involving local government bodies in the whole project cycle. Similarly, Zaman (1992) has strongly indicated the association of local government bodies in the identification, planning, implementation and O&M activities in this particular sector. Zaman further suggested that "the responsibility for the collection of water rates can also be given to local government. Water rates so collected can be deposited with the local government revenue budget to be spent for O&M of the project."

### *Local Government Engineering Bureau (LGEB)*

The Local Government Engineering Bureau (LGEB) has been gradually expanding its activities in projects related to water. In an 1985 policy decision LGEB was instructed to take responsibility for the O&M of small existing water projects constructed by BWDB but for reasons unknown this has not yet been implemented.



Some small scale water resource schemes are being implemented as a part of the Rural Employment Sector Programme (RESP) under LGEB. During the planning of water projects operation and maintenance committees were formed by the beneficiaries. The committees have provided useful information and advice during the planning and design stage of the schemes and have helped to resolve local conflicts during construction. Since many of these schemes have only recently been completed it is too early to determine their effectiveness in dealing with O&M.

It appears that the Upazila Engineering office has the potential to undertake O&M activities of flood control drainage and irrigation projects within the upazila. Some of reports on the O&M of the BWDB suggest that upazila engineers should be gradually inducted into the O&M activities of completed projects. According to a recent report the BWDB is the most competent agency in hydrological matters but the upazila engineers under the guidance of LGEB have started to become involved in water resource schemes and in the longterm the role of BWDB may change if the upazilas do become more independent and self-reliant.

During field trips this possibility was discussed with the Upazila Engineers and they mentioned that they would be able to undertake O&M activities provided they are given training in these matters.

During the field trips it was observed that there was no defined linkage or liaison between BWDB and LGEB. The only linkages between these two organisations were at the district level through the District Steering Committee and the District Co-ordination Committee. Beyond that there is provision for constituting an Upazila Technical Sub-Committee to review works under the Food For Works Programme and other development schemes.

It was gathered in the course of the field trips that the LGEB was trying to complete the Upazila/Thana five year plan reports. This is potentially an important endeavour as it could lead to infrastructure plans which would cover flood and drainage conditions and the possibility of the Upazila/Thana working in co-operation with BWDB. BWDB has provided guidelines and indications for linkages with the Upazila Engineering section of LGEB.

Before LGEB becomes extensively involved in drainage, embankments and irrigation activities the relationship between LGEB and BWDB should be better defined and clearly specified to avoid any conflict which could hamper operations of programmes in this sector.

#### *Department of Agricultural Extension (DAE)*

All flood control projects have a direct impact on the development of the agricultural sector. In view of this most of the project committees of the BWDB have a representative from the Department of Agricultural Extension (DAE).

The agricultural sector will be the leader in the economy for some years to come. To attain the objective of increased crop production the government has re-organised and strengthened the DAE. According to the XEN of the DAE, the Block Supervisor (BS) is the lynchpin of the the agricultural extension network. He organises the work on a fortnightly basis according to a Training and Visit (T&V) system. His activities are supervised by Upazila/Thana and District level officers.

During field trips to the region discussions were held with farmers to ascertain their attitude to the type of support they were receiving for the BS. The reaction was far from satisfactory. The T&V extension system was not functioning as expected. A majority of the farmers had never received messages from the agriculture extension workers which are supposed to be delivered through the



contact farmers. This corroborates the findings of several survey reports and evaluations of the activities of the DAE which indicated that the advice given to farmers was never above twenty percent of what was expected and required.

Flood control is an integral part of land and water development for agriculture. But it is not possible to bring all land under flood control. It is assumed that the deeply flooded land ( $F_3$  and  $F_4$ ) would remain under seasonal flooding. The shallow and medium flooded land ( $F^1$  and  $F^2$ ) would be brought under controlled flooding allowing pre-determined levels of water; this should permit increased agricultural activities. To achieve maximum benefit from such situations the activities of DAE at the field level must be improved with respect of farmers' education to help them to adopt improved agricultural practices and guide them in developing improved cropping patterns.

The primary role of the Bangladesh Water Development Board (BWDB) is to provide flood protection, drainage, and irrigation water supply to the communities. BWDB planning has been ad hoc and lacks linkages to the programmes of the other agencies. Linkages should be defined between the BWDB and the DAE. In some instances the DAE has been associated with the project committee of the BWDB but the role and the responsibility of the DAE is not well defined. A definition of the function of each organisation should be made explicit to prevent misunderstanding.

#### *Department of Fisheries (DOF)*

Flood Control measures generally have had negative impacts on open water fisheries. Inter-agency agreements include handing over the fisheries management responsibility in selected water bodies from the BWDB to DOF. In the course of the field trip, however, it was discovered that the DOF has not developed any plan to replenish fish supplies in these water bodies.

The adverse impact on capture fisheries due to flood control measures can perhaps also be mitigated by exploring the potential for fish cultivation in public water bodies such as beels and borrow pits. While discussing this with the DOF staff at field level they understood these possibilities as mitigation for the acute shortage of fish but when the question of implementation of such schemes arise they claim that budget constraints are preventing them from undertaking such activities.

During the discussion with the district and upazila level field staff in the region it was claimed that the constraints to exploitation of a large number of derelict fish ponds are mainly institutional. Restoration and proper licensing of these ponds would contribute to growth as well as to improvement in the incomes of poor fishermen.

The field level fisheries staff were found to be inefficient in carrying out their duties. In the course of discussions with fishermen in the Gaibandha Improvement Project Area they said that they had hardly any contact with the DOF personnel. According to the charter of activities the Upazila/Thana Fisheries Officers are to undertake a number of activities on a regular and routine basis but it was observed that their actual function was only collection and compilation of information and maintenance of production figures in their respective areas. It was surprising to see in some offices a lack of complete records for water bodies such as beels, khals and ponds.

#### *Department of Environment (DOE)*

The Department of Environment (DOE) maintains offices only at the regional level. In addition to its headquarters it has four regional offices in Dhaka, Chittagong, Khulna and Bogra. The DOE is



looking after a large number of environmental activities throughout the country. It is the national agency responsible for environmental planning, management and monitoring. It also works as the technical arm of the Ministry of Environment.

Officially its major responsibilities include (i) co-ordinating environmental assessment and monitoring, (ii) undertaking certain assessments and monitoring tasks such as on-site surveillance of development projects and follow-up monitoring of these to determine if environmental improvement measures are effective (iii) preparing reports for submission to planning and implementation agencies (iv) promoting environmental awareness through public information programmes and (v) controlling and monitoring industrial monitoring. Furthermore the DOE is to work closely with FPCO on all Flood Action Plan components to ensure environmental soundness of these plans.

In fact environmental impact assessment (EIA) has become almost mandatory for all irrigation, flood control and water resource management projects. But the DOE has not been able to contribute substantially to these activities. As a matter of fact enforcement of environmental protection and pollution control laws is almost non-existent due to poorly equipped laboratories of the DOE, insufficient manpower (particularly technical manpower), logistic support, low annual budgets, inadequate legislation, lack of co-ordination among various agencies and the absence of a sustainable development strategy.

Universally the maintenance of a proper environment has become a major issue. All development activities must take environmental considerations into account. As such the DOE should intensify its activities to educate people in developing environmental awareness. The DOE must be re-organised and strengthened to face this challenge.

## 7. Major Issues

Major issues arising from this institutions study are:

- enhancement of the benefit of the projects.
- sustainability of the project
- participation of the beneficiaries
- mobilization of resources particularly for O&M activities
- delegation of O&M activities.

### *Enhancement of the Benefits of the Projects*

Any projects options which have been identified on the basis of the North West Regional Study (FAP-2) are primarily meant to reduce flood damage. Flood protection projects are generally integrated with a package of measures and works for additional benefits. The agricultural sector is an example of this and direct benefits from water control can result in improved agricultural activities and increased production. With the support of agriculture extension the cropping pattern can result in advantages to farmers.

Similarly these water control projects could help in the improvement of the fisheries sector. If this is possible the impacts on the socio-economic condition of the people in the project should improve.

Furthermore the projects should be so planned as to make them sound and compatible with ecological and environmental standards. Floods raise the incidence of water borne disease and create numerous





health problems from exposure and malnutrition. FCD projects should reduce such situations and mitigate the adverse effects of floods on the health of the population.

### *Sustainability of the Project*

The sustainability of flood protection works is a critical issue. Acceptance of the project will be only considered when the beneficiaries see that the benefits are ensured on a long term basis. Necessary arrangements must be made to maintain and operate the structures properly and the delivery of services to be provided by the project to the beneficiaries is regular and sustained. Past records in this regard are far from satisfactory.

Inadequate and interrupted service delivery by existing water projects have created doubts in the minds of the beneficiaries about the sustainability of projects. There are several reasons for such a situation. In some cases the project has failed to deliver the desired services due to faulty design and poor implementation.

But the most important factor in the failure to sustain the delivery of services is poor and inadequate operation and maintenance. The institutional arrangements for the O&M activities of existing projects is extremely poor. Inadequate funds for O&M activities have aggravated the situation. In order to improve the funding position mobilization of local resources may assist in the sustainability of projects.

During field trips it has been observed that the condition of most of the completed projects of BWDB in the northwest region is not satisfactory. These projects have failed to make a positive impact on the minds of the people in the area. In some of the projects faulty design is the main reason. Furthermore poor operation and maintenance has created doubts about the sustainability of these projects. A number of review reports on O&M in water sector management during the last decade clearly indicate that improved O&M is necessary if benefits from flood control projects are to be sustained. Acute shortages of funding for O&M of existing projects results in doubts about the longterm benefits from these projects.

### *Beneficiary Participation*

The success of flood control measures would depend not only on their technical soundness but to a large extent on the degree of willingness of people to co-operate and be associated with them on a longterm basis. Maximum possible popular participation by beneficiaries in planning, implementation, operation and management of these projects may result in their long term sustainability. This will encourage resource mobilisation from local sources. The proof of sustainability may at least lead to their willingness to pay for the O&M cost of the project.

Unfortunately this situation has been conspicuously absent in Bangladesh. There has been a general lack of public consultation in planning, design and implementation of projects. Detailed decision making was dominated by engineers and not local opinion and in most cases the beneficiaries learnt of a project when construction started. Only in recent years has public participation been seriously considered and several models for this have been developed and are being tried out.

Bastin (February 1992) has suggested a demand driven model generated by villagers needs instead of top-down planning which has been the predominant mode in Bangladesh. A criticism of Bastin's model is that there are too many tiers ( five tiers from village to upazila) involved. So many levels of decision making may lead to complications which will hamper its smooth operation. Zaman (March



1992) has suggested " An Interface Approach". Yet another model has been suggested by Dirk Frans (May, 1992). Frans' model provided the basis for the composition of the field team sent to the Gaibandha Improvement Project (GIP) by FAP2 (see chapter four).

Presently representatives of the beneficiary communities exist only in the sluice gate committees where these exist. The government, however, is considering legislation which would ensure people's participation in all aspects of development projects.

It is now accepted that women's participation must be included in all phases of the flood action projects. The Draft Final Report of FAP-13 (Operation and Maintenance Study) stated that since 1990 routine embankment maintenance (preventive maintenance) in Polder 22 has been carried out by landless women recruited through and assisted by a local NGO. Women are selected from organised groups and preference given to female headed households.

### *Resource Mobilisation*

The main reason for poor operation and maintenance of BWDB projects is lack of funds. The availability of funding for O&M activities for five years (1986 to 1990) against demand is given above. The level of funding is about 50 percent of what is required with the result that projects deteriorate and consequently are unable to provide water as desired and FCD becomes vulnerable to failure not only in extreme hydrological events but even in the normal conditions they are designed to cope with.

Whatever funds are available come from the revenue budget. There has been effectively no cost recovery for O&M from the beneficiaries meaning no charge is made for FCD protection. In the case of irrigation there has been legal provision for collecting water rates since 1963. Unfortunately the performance of BWDB in collecting rates, which are themselves well below O&M costs, is extremely poor.

In recent years alternative sources of funds for O&M activities have been considered by BWDB. They are trying to evolve a different model for this purpose and a new law may emerge for future funding.

One of the possible alternatives could include making project beneficiaries pay for project services. Another may utilise other local tax resources to pay O&M costs. Involvement of the beneficiaries in the management process may improve their willingness to pay for project services. Local people appreciate the benefits of some projects and often express a willingness to contribute to O&M costs if they can be sure that the benefits will continue and their contribution will be used for the project and not for other purposes.

From a legal point of view BWDB is not, with the exception of irrigation related charges, able to raise revenue directly. No local revenue at present goes into O&M. It appears that it would be more appropriate for local government bodies, which are locally accountable to communities through their elected representatives, to be active in local resource mobilization. Under the existing law BWDB can collect charges for irrigation water which may be used for O&M of irrigation projects but for O&M of FCD projects separate arrangements will have to be made. If the flood control and drainage projects operate properly beneficiaries might be charged for O&M by eg a general tax on land.

During the field trip the question of collection of fees was discussed with Union Chairmen. They said that if appropriate legal provision is made it would be possible to collect fees. They did, however, express the opinion that during the initial stages there may be some difficulties.



### *Delegation of O&M Activities*

The Chief Engineer (Irrigation) CB&I Department of the Government formerly was responsible for the operation and maintenance of projects of the Water Development Board until 1974 when this function was transferred to BWDB. Initially the BWDB created an O&M Division. Unfortunately since then the O&M activities of completed projects have been neglected. The situation has been further aggravated because of a shortage of funds.

BWDB in the three decades of its existence has expanded its activities widely. It has about 16,000 employees on its payroll. The management of such an organisation is getting more difficult day by day. The capability of this institution to undertake O&M activities effectively has raised serious questions.

To get the intended benefits from its projects proper operation and maintenance is necessary. This might be achieved by proper institutional arrangements for which there are several alternative. They may be achieved by combinations of the following:

- a) restructuring of BWDB;
- b) involving LGEB through local government bodies;
- c) involving NGOs in O&M activities.

Whatever the arrangement is the involvement of the beneficiary in O&M should be aimed at achieving some or all of the following:

- preventing public cuts
- proper operation of structures
- proper maintenance of embankments
- resolving farmer-fishermen conflicts
- realising local resource mobilisation

Public cuts happen for several reasons (i) to save homesteads from floods in situations where people live outside an embankment, (ii) to relieve drainage congestion created by heavy rainfall and (iii) cutting them for irrigation purposes. The incidence of public cuts might be substantially reduced by involving people from the identification and planning stage onwards.

Operation of the sluice gates is far from satisfactory. According to the BWDB model there should be a gate committee for each structure. But during field trips it was noted that in most cases the committee was not in existence and where it existed it was not functioning properly. The whole operation was left in the hand of the kalashi who worked according to directions given by influential people in the locality and who had most to gain from controlling the gate's function.

Due to neglect and poor maintenance the embankments in several places were in a dilapidated condition. The supervision on the part of BWDB employees was wholly unsatisfactory. Furthermore the system of reporting the need of repair and maintenance was very lengthy and time consuming. O&M work requires to be delegated to local organisations in order to keep the embankments in proper working order.

There are also incidences of mis-use of embankments by people living on them. This is largely through ignorance of these structures by embankment dwellers. If the maintenance of the embankment is delegated to local organisations such incidences will almost certainly be reduced.

