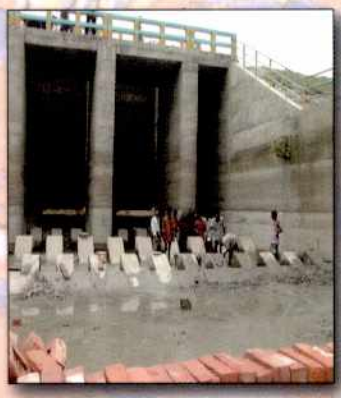
Government of the People's Republic of Bangladesh
Ministry of Water Resources
Bangladesh Water Development Board
Water Resources Planning Organization

COMPARTMENTALIZATION PILOT PROJECT TANGAIL







SEMI-ANNUAL REPORT
(January - June, 1999)

LAHMEYER INTERNATIONAL GMBH, Federal Republic of German
in Association with
Haskoning - Consulting Engineers & Architects, The Netherlands
Consultants for Development Programmes (CDP), The Netherlands
Development Design Consultants Ltd. (DDC), Republic of Bangladesh

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and
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Compartmentalization Pilot Project
Tangail

Semi Annual Report
January - June 1999

Acronyms and Abbreviations

ADAB	-	Association of Development Agencies in Bangladesh
AIT	-	Asian Institute of Technology
ATAP	-	Annual Technical Assistance Program
BADC	-	Bangladesh Agricultural Development Corporation
BARD	-	Bangladesh Academy for Rural Development
BARI	-	Bangladesh Agriculture Research Institute
BBS	-	Bangladesh Bureau of Statistics
BELA	-	Bangladesh Environmental Lawyers Association
BIM	-	Bangladesh Institute of Management
BRAC	-	Bangladesh Rural Advancement Committee
BRDB	-	Bangladesh Rural Development Board
BWDB	-	Bangladesh Water Development Board
CARE	-	Co-operative for American Relief Everywhere
CC/CHWMC	-	Chawk Committee/Chawk Water Management Committee
CPP	-	Compartmentalization Pilot Project
CPT	-	Core Planning Team
CT	-	Cluster Team/Consultants Team
CWMC	-	Compartmental Water Management Committee
DAE	-	Department of Agricultural Extension
DC	-	Deputy Commissioner
DDCL	-	Development Design Consultants Limited
DEM	-	Digital Elevation Model
DGIS	-	Direcoraat Generaal Internationale Samenwerking
DLAC	-	District Land Acquisition Committee
DoF	-	Department of Fisheries
DPHE	-	Department of Public Health Engineering
DTW	-	Deep Tube Well
DWA	-	Deep Water Aman
EIA	-	Environmental Impact Assessment
EIRR	-	Economic Internal Rate of Return
EMG	-	Embankment Maintenance Group
FA	-	Financial Assistance
FAO	-	Food and Agricultural Organization
FAP	-	Flood Action Plan
FCD/I	-	Flood Control & Drainage/Irrigation
FDAM	-	Flood Damage Assessment Model
FFW	-	Food For Work (World Food Program)
FMM	-	Flood Management Model
FPCO	-	Flood Plan Co-ordination Organization
FRG	-	Federal Republic of Germany
GIS	-	Geographical Information System
GoB	-	Government of Bangladesh
GoN	-	Government of The Netherlands
GPS	-	Global Positioning System
Ha	-	Hectare
HYV	-	High Yielding Variety
ICDDRB	-	International Centre for Diarrhoeal Disease Research of Bangladesh
IDC	-	Information Dissemination Centre
ISPAN	-	Irrigation Support Project for Asia and the Near East
JWME	-	Junior Water Management Engineer
KfW	-	Kreditanstalt fur Wiederaufbau
LCS	-	Landless Contracting Society
LFP	-	Lohajang Flood Plain
LGED	-	Local Government Engineering Department
LLP	-	Low Lift Pump
M&E	-	Monitoring and Evaluation
MCHC	-	Mother & Child Health Center
MoU	-	Memorandum of Understanding
MoWR	-	Ministry of Water Resources
MP	-	Muriate of Potash
NAS	-	Needs Assessment Survey
NCA	-	Net Cultivable Area
NGO	-	Non-Government Organization
O&M	-	Operation and Maintenance
ODA	-	Overseas Development Agency
OFTD	-	Onfarm Testing and Development
PA	-	Project Assistance
PD	-	Project Director
PRA	-	Participatory Rural Appraisal
PT	-	Project Team
PWD	-	Public Works Department
R&H	-	Roads and Highways
RNE	-	Royal Netherlands Embassy
RRA	-	Rapid Rural Appraisal
SC	-	Sub-Compartment
SCWMC	-	Sub-Compartment Water Management Committee
SMO	-	Subject Matter Officer
SMS	-	Subject Matter Specialist
SRDI	-	Soil Resources Development Institute
SSS	-	Society for Social Services
STW	-	Shallow Tube Well
SWMC	-	Surface Water Modelling Centre
TA	-	Transplanted Aman/Technical Assistance
TAPP	-	Technical Assistance Project Proforma
TL	-	Team Leader
TNO	-	Thana Nirbahi Officer
ToR	-	Terms of Reference
UNDP	-	United Nations Development Program
UP	-	Union Parishad
WARPO	-	Water Resources Planning Organization
WID	-	Women in Development
WMO	-	Water Management Organization
WUG	-	Water Users Group
XEN	-	Executive Engineer
XO	-	Agricultural Extension Overseers

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FIGURES

The 1998 monsoon flood had an adverse impact on paddy production within the compartment. Planting of the Aman crops was already delayed due to continuous heavy rainfall that started in July causing many lands to remain fallow. This was followed by the high flood that lasted up to September. A large part of the standing transplanted and broadcast paddy was damaged while another part was never planted at all. The resulting situation is shown in the land use map for the 1998 monsoon shown in Figure 1. A comparison with the 1997 monsoon map shows that the flooding greatly reduced productive land use in 1998. The shortfall in Aman paddy area compared with 1997 was about 6,000 ha. In terms of production, there was a shortfall of around 8,000 tons.

The situation was aggravated when, at the recession of the floodwater, there were severe attacks of leaf roller (*Cnaphalocrosis medinalis*) and ear cutting caterpillar (*Mythimna separate*) on the paddy.

For the farmers, this was potentially a disaster. They responded by intensifying agriculture during the Rabi and Boro.

Because of the absence of Aman in many areas, farmers were able to prepare land much earlier for Rabi crops. This can be seen in Figure 2 which shows that those areas where Aman was damaged or not planted

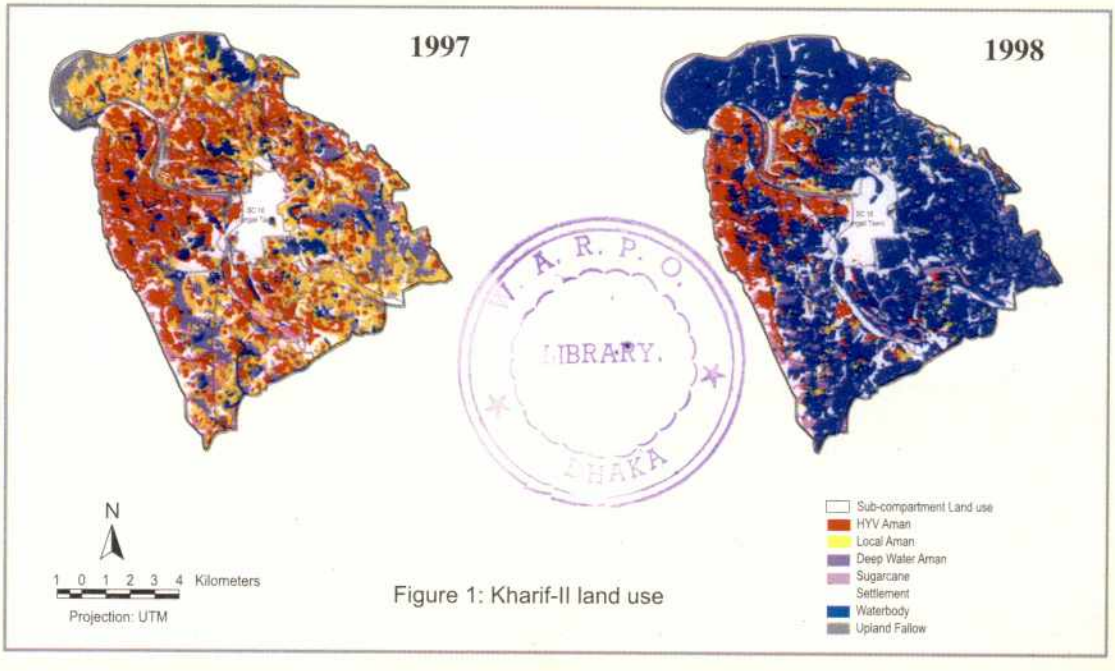


Figure 1: Kharif-II land use

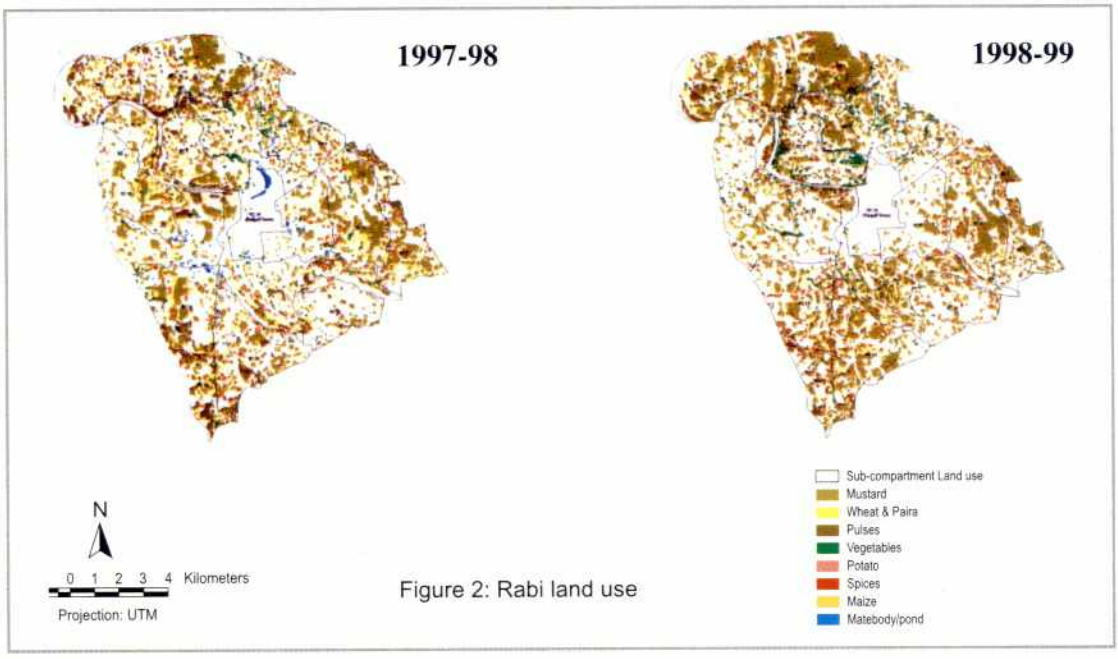


Figure 2: Rabi land use

was used for early Rabi crops, especially mustard.

Farmers most substantial response became evident in the Boro season where the area planted increased from 4,880 ha in 1997, to 6,100 ha.

The increased area of Boro had to be irrigated. To provide this irrigation more than 700 new tube well started pumping within the compartment. This increase is shown in Figures 3.

Following on from the floods of 1998 was a long period of drought. From November until well into April, the compartment saw virtually no rain. There were clear skies and hotter than normal temperatures. For irrigated Boro, this was near ideal. The dry hot weather also seemed to reduce insect pests. With no major outbreaks of pest attacks, good irrigation, and temperature and sunshine all favorable, the Boro yields within the compartment were outstanding. The yields for Boro, up to 1998, were of the order of 4.5 tons per hectare. In the 1999 Boro season, this increased to 6.8 tons per hectare.

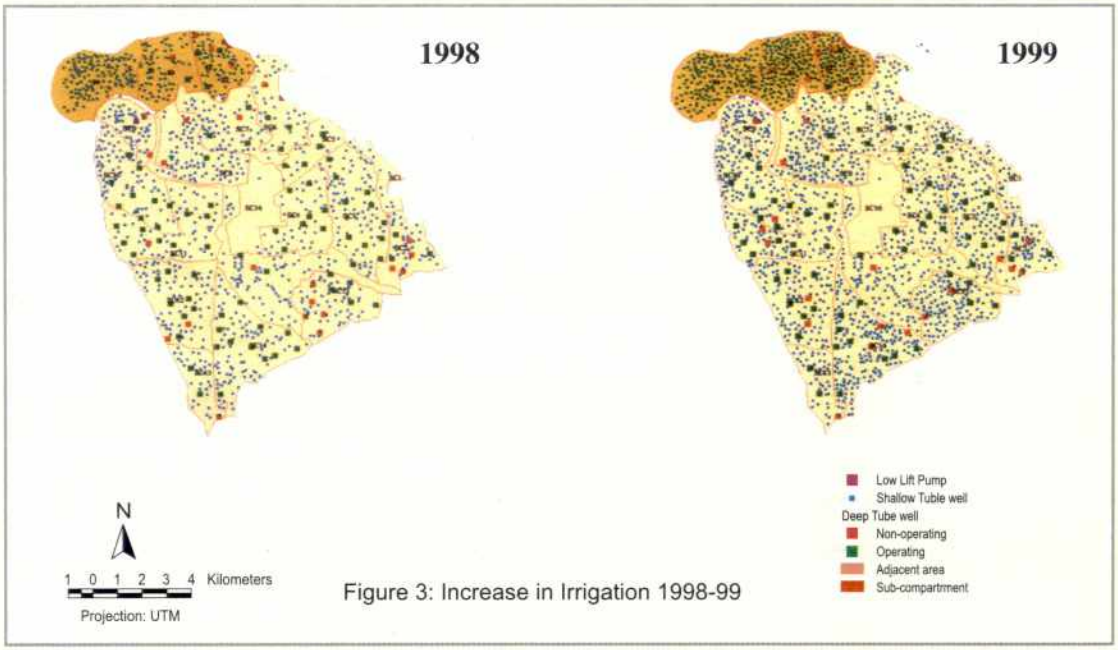


Figure 3: Increase in Irrigation 1998-99

As well as the near ideal growing conditions, there was extra effort in order to recover from the monsoon paddy losses. Farmers inputted more labor, more fertilizer and better management generally. The result for the compartment was a 1999 Boro harvest of some 41,752 tons, up from 21,519 tons in 1998.

As shown in Table 1, this more than made up for the monsoon shortfall. With a total paddy output from the 12 months June 98 to May 99 of 47,642 tons compared with 36,422 tons in the previous 12 month period.

	1997-98			1998-99		
	Area (ha)	Yield (t)	Production (t)	Area (ha)	Yield (t)	Production (t)
T. Aman (L)	2,874	1.70	4,885	634	1.41	894
T. Aman (MV)	2,906	2.78	8,078	1,538	2.50	3,845
DW Aman	1,717	1.13	1,940	1,028	1.12	1,151
Sub total Aman			13,903			5,890
Boro	4,782	4.50	21,519	6,140	6.8	41,752
Total			**36,422**			**47,642**

Table 1 : Paddy Crops- 1997/98 And 1998/99

By increasing the area under Boro; by increasing the management input; and also having the good luck to have an ideal growing season; the farmers within the compartment not only made up for the losses from the monsoon, but managed to achieve the highest ever output over a twelve month period.

Construction

The relative success of the project in resisting the 1998 monsoon flood should not obscure the fact that the project embankment and infrastructure was adversely impacted. Overtopping, seepage through the body of the embankment, piping through rat holes, river erosion and breaches all took their toll. In addition, during the flood, the embankment became saturated resulting in sliding of the embankment slopes in many places.

As well as the embankments, two water control structures, Paschim Pauti and Karatia were effected due to erosion of the side soils at both the sides of the structures.

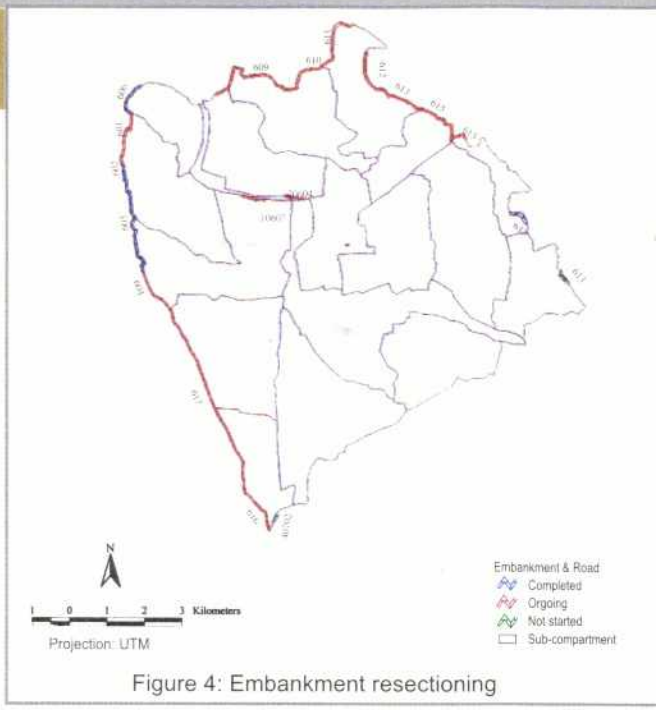


Figure 4: Embankment resectioning

The embankment at Birnali was also damaged severely by the erosion by the Pungli River with a length of 150m of embankment being engulfed completely by the river water. At this time, the entry of floodwater through the breach was prevented by backing up of the embankment with earth taken from the top of the nearby embankment. This was reinforced by dumping brickbats filled porcupines, large trees, and brickbats filled gunny bags at the erosion point.

The reasons for the overtopping, seepage and sliding of the embankment was the fact that it had never been constructed to the proper design sections plus, of course, it was not designed to resist a flood of the 1998 magnitude and duration.

After the flood, detailed surveys of the embankment and structures were made. It was estimated that an amount of about Tk. 55.0 million was required for re-sectioning 36km of the embankment, re-construction of the embankment at Birnali, repair of damaged structures and bank protection work.

During the flood, promises were made by donors, of considerable sums of money for flood damage rehabilitation. These funds did not materialize. However, it was clear to the project that most of the embankment was in no state to survive the upcoming 1999 monsoon flood, regardless of its severity.

Therefore, the construction schedule was reprioritized with the resectioning of the embankment becoming the first priority. For this, a re-allocation of Tk.18.65 million within the FA funding was made. The embankment at Birnali was also a priority and has now been reconstructed some way further back from the river. The work that has been undertaken is shown in Figure 4.

As of June 1999, most of the resectioning work is largely complete with some finishing to be done after the monsoon.

Chari in the Bari program

CPP has started a homestead Magur (catfish) culture program, also known as the Chari in the Bari program. The target group for the program is the poorest of the poor. CPP wants to show this group that it is possible to grow high valued fish with limited resources.

The people from this target group have not benefited from the previous aquaculture extension programs, because they do not have access to enough land to construct ponds. In the Chari in the Bari program, a pond is not necessary. All that is needed is a feeding bucket (or Chari), or a hole in the ground of approximately 1 m^2. This is large enough to grow 50 catfish to marketable size.

The Magur (African catfish, Clarias gariepinus) is a good fish to grow, because it has a high growth rate, very good disease resistance, and is able to take up oxygen from the air. All of this allows a large number of fish to be grown in a confined amount of water.

Although a few households in the CPP area have already been growing Magur on their homestead, most local people are not aware of the possibilities of this fish. Initially 200 households have been selected for the program. To ensure that it really does select from the poor, professional fishermen, landless, and destitute have been targeted. One of the selection criteria for the households has been that the house where the family lives, has straw, mud or jute walls.

Catfish fry is not available on the local market. Therefore, a small hatchery was built in the CPP office where local CPP staff produced 6000 catfish-fry up to 3 grams. After production of this fry, selected homesteads were offered the possibility to buy 50 fry for a nominal fee (10 Tk), while the normal price for this number of fish would be between

25 and 50 Taka. Later in the season, CPP purchased fry from the fish market in Jessore.

People who wanted to join the program, but did not comply with the selection criteria were advised to buy from local fish traders, after which they could receive technical assistance from the fisheries section on CPP. Local fish traders were taken along to the fish market in Jessore where it is possible to buy the Catfish fry.

CPP is confident that the peoples' abilities to grow catfish on their homesteads will develop, and that this program will contribute to the food and income security of the poorer segments of the population living in the CPP area.

Environmental Awareness

CPP feels that if environmental awareness within the compartment is to be improved, one of the important targets groups should be school children. To this end a program for training 200 primary school teachers is being planned jointly with the District Primary Education Office (DPEO) and Primary Training Institute (PTI). Initial meetings with DPEO and PTI are encouraging. The training titled "Environmental Education and CPP Awareness" will assist teachers to disseminate environmental awareness amongst their students thus making them environmental conscious citizens.

During the first two months of the reporting period extensive study were made to finalize water management scenarios for the compartment. The major tasks were defining the watersheds, determining the operation of the gates, and setting target water levels for the important structures. The target water levels are the maximum level which should not be exceeded upstream of the outlet structures along the Lohajang river and downstream of inlet structures.

The Flood Management Model was used to simulate scenarios maintaining certain level downstream of the Main Inlet so that downstream level at those outlet structures remains below the defined upstream target water levels. The model shows target levels were realistic if the downstream level at Main Inlet is maintained at 10.50 meter PWD or below:

These target water levels will be tested during the coming monsoon and, if necessary, will be adjusted.

As an approach to practical water management during the coming monsoon, it was felt necessary to train members of the SCWMC to prepare them for their water management tasks.

Other ongoing activities like surveys on siltation in major khals, preparatory works for data collection (rainfall, water levels, discharge etc.) for the coming monsoon season have been completed on schedule with the data collection commencing the 1st May.

Operation and Maintenance for the 1999 Monsoon

Based largely on the modeling, described above, sets of operational guidelines have been drawn up for each sub-compartment. These guidelines form the basis for the draft ***Operations Manual***. This draft manual will be evaluated during the coming monsoon and modified as necessary before finalization.

As regards maintenance, agreement has been reached with the sub-compartment committees that they will be responsible for maintenance of structures and khals within the sub-compartments. A maintenance manual is presently being drafted.

Water Management Training

After the reformulation of Water Management Committees, training was provided to all the Sub-compartment Water Management Committee (SCWMC) members during June and July 1998. The main objective of the training at that time was to prepare SCWMC for their tasks of operation of the system for the 1998 monsoon. Major emphasis was given on roles, tasks and responsibilities of the committee and agreement on system operation. Water management in the sub-compartment was not dealt with in detail at that time.

This year there was the opportunity to concentrate on water management training for the SCWMC. Topics that were included were:

- Flood control, controlled flooding and controlled drainage
- Water level and how to measure it
- CPP's objective and physical features of the project as well as of the sub-compartment
- The changes made by CPP in water management
- Inflow and drainage system of the concerned sub-compartment
- The activities to be done by the SCWMC in structure operation for better water management
- Actual structure operation during the monsoon
- Relation with other sub-compartments in respect of water management
- The management of minor structures
- Decision making process in system operation
- Conflict resolutions
- Role of women in WMC
- The necessity of bye-laws for management of the committee
- Communication with CPP/BWDB

Some one hundred and seventy one participants were involved in the training including the members of the executive committee of the SCWMC's, together with other members of SCWMC's and ChWMC's responsible for structure operation.

Conflict

Union Parishad Chairman are ex-officio Presidents of the SCWMC and three UP Members have also been included as members of SCWMC. The purpose is to establish a link between the WMC's and the elected branch of the local government. Institutions. Establishment of such a link was felt necessary in orders to increase the authority of the WMC and put the interest of the water users in a broader perspective.

Problems

The project was committed to completion of all construction by the beginning of the coming monsoon. It will have failed to achieve this.

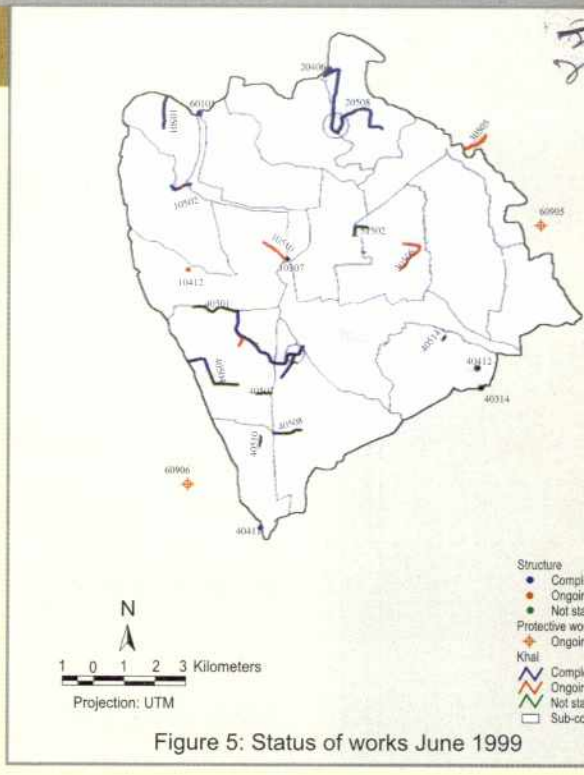


Figure 5: Status of works June 1999

The Birpushia regulator situated in SC-15 could not be started because of an outstanding dispute among the beneficiaries on its location. However, the dispute has now been resolved by the sub-compartment committee and a new agreed site has been fixed at a place downstream of the original site. The resolution of this dispute took a considerable time. In the meantime, the land acquisition proposal has been submitted to the office of the Deputy Commissioner. Although other preparatory works are complete, the need for land acquisition to be completed has meant that construction could not be started in this season. This regulator is situated at the tail end of the project (southern end) and is necessary to prevent entry of floodwater from Lohajang River when there is considerable backflow.

There are some 8.5 km of Khal that have not been completed. Five and a half kilometers of this are still awaiting land acquisition. A further 1.2 km could not be started because of opposition by local UP chairmen and one length of 1.8 km has been only partially completed by the contractor. Action is being taken with respect to the contractor. The status of this season's work is shown in Figure 5.

Although the last Joint Mission was assured by the additional Deputy Commissioner, Tangail that possession of all land would be given to CPP by the first week of September 1998, full possession has not yet been given. The matter has been raised in both the Steering Committee Meetings held since the visit of the mission.

Construction

Proposed Gharinda Regulator

The Gharinda regulator was proposed during the first phase of CPP as part of the overall plan to provide improved water control. Specifically, the regulator was supposed to render water management in Cluster 2 more or less independent from water management in Cluster 3. Model studies of the impact of the regulator were carried out in late 1998. These studies showed that the regulator had very little impact other than a possibly harmful impact to upstream areas. In view of these conclusions, it was decided that the regulator would not be constructed.

The dropping of the Gharinda regulator from the construction program was fortuitous as it freed up some FA for embankment resectioning. This need for this has been described above.

Other Construction Activity

The construction activities over the reporting period are centered on 17 new works and five carried over works. A summary is shown in Table 2 below.

Six of the new works have been completed. Progress of remaining 11 new works is from 25% to 98%. Out of 11 carried over works five have been taken up during the period. Two have been completed, and progress of three works is from 30% to 98%. Six carried over works have not been re-started.

Cluster	Name of work with code number	Tendered value (Lakh Tk.)	Status of work (% completed)	Value of work done (Lakh Tk.)	Remarks
	A. NEW WORK				
4	Bagerchara Link Canal (40507)	Not tendered	Nil	Nil	Local people wanted shifting of alignment. As such land acquisition is pending.
4	Bara-Belta Khal (40504)	8.10	50	4.05	Ch.0.00m to 1200.00m completed. Ch.1200.00m to 2410.00m not started due to cancellation of provision of LCS. Originally, this was allotted to LCS.
4	Baruha Link Canal (40510)	Not tendered	Nil	Nil	Not started due to LA problem.
4	Birpushia Box Culvert (40412)	Not tendered	Nil	Nil	Not started due to LA problem.
4	Birpushia WCS (40314)	22.64	Nil	Nil	Not started due to LA problem.
1	Dighulia CDO-2 (10307)	10.77	100	10.77	Completed (except gate fitting).
4	Katakhali Link Canal (40506)	1.02	60	0.61	Work is in progress.
1	Khanpur Borrow pit (10510)	4.38	70	3.07	Work is in progress.
4	Kumargara Khal (40517) Birnahali (60905)	0.93	100	0.93	Completed.
3	Protective work at	9.61	25	2.40	Work is in progress.
6	Protective work near Alengani loop cut (60906)	5.07	50	2.54	Work is in progress.
3	Retired embankment at Birnahali (30601)	14.43	100	14.43	Completed.
2	Rasulpur GPI (20406)	9.60	100	9.60	Completed (except gate fitting).
4	Silimpur Embkt. breach closing (40702)	0.40	Nil	Nil	Not started due to negligence of contractor.
4	Silimpur GPI (40411)	15.33	100	15.33	Completed (except gate fitting).
4	Santosh Khal (40501) Resectioning of embkt.	1.00	Nil	Nil	Not started due to LA problem.
1-4	Compartment (22 groups) (00601-5) (00609-00617)	225.00	75	168.75	Work is in progress
2	Sub-compartment (20604)	3.16	80	2.53	Work is in progress
6	Repairing work of Chardurgapur Bridge (61202)	0.72	80	0.58	Work is in progress.
1	Remodeling of fishpass in the Main Inlet (00101)	2.70	100	2.70	Completed.
1	Fatehpur culvert remodeling (10412)	2.71	10	0.27	In progress.
3	Suruj Khal Reexcavation (30505)	3.61	98	3.53	In progress.
1	Singerkona-Dannya Chowdhury Khal (10502)	3.93	98	3.85	In progress.
	B. CARRIED OVER WORK				
4	Aloa Khal (40502) (part)	12.63	96	12.12	Not restarted due to LA problem.
6	Baghil-Ainapur-Soabeel Khal (60506)	0.44	100	0.44	Completed.
4	Baruha Khal (Part-B) (40508)	5.37	62	3.33	Not restarted due to LA problem.
3	Gharinda-Jalfai Khal (30506)	9.18	30	2.75	Incomplete due to negligence of contractor.
1	Khordajugini Khal (10501)	3.55	100	3.55	Completed.
4	Kumulli Khal (40514)	0.62	50	0.31	Not restarted due to LA problem.
2	Rasulpur Khal (20508)	21.59	98	21.15	Not restarted due to LA problem.
3	Salina-Dapnajar Embkt. (Part) Group 2/31 (00613)	8.34	80	6.67	Not restarted due to negligence of contractor.
1	Sarutia-Chillabari SC Embkt. (10605)	19.00 (revised)	98	18.62	Not done due to negligence of contractor (LCS).
6	Senergagorjan Bridge to Faliarghona Madrasha Road (61207)	16.97	95	16.12	Incomplete due to negligence of contractor.
5 and 3	Tangail Town Drain (Group Drain E-2) (51502)	3.39	Nil	Nil	Not started due to LA problem.
	Total:	**446.19**		**331.00**	

Table 2: Progress of Works from January 1999 to June 1999

Operation and Maintenance

Gates with related accessories installed in 64 structures are ready for functioning during the coming flood season. Gates of three more completed structures need to be installed. Painting and greasing of 60 structures have already been done during this period. This painting and greasing of gates is necessary every year. Another 27 structures (bridges and culverts) have been completed.

For the 1999 flood season, gate operators have been appointed for 58 structures. These operators will perform their duties under the guidance of SCWMC's.

Minor Works

70 minor works have been allotted to 15 SCWMC during 1998-99. These are shown in Table 3 below

Sl. No	Type of works	No. of works	Status of works (Nos.)				Remarks
			Completed	Ongoing	Not started	Not required	
1.	Pipe culverts	48	Nil	6	42	-	All new works for 1998-99.
2.	Resectioning of road/chawk boundary	5	1	2	2	-	All new works for 1998-99.
3.	Reexcavation of khals	17	4	7	6	-	All new works for 1998-99.
	Total:	**70**	**5**	**15**	**50**	**-**	**6**

Table 3: Status of Minor Works (June 1999)

Although during the flood of 1998, this proved to be the right decision, some re-thinking might be necessary because of a conflict, which arose before the training of WMC's on water management in April 1999.

In March-April 1999, SCWMC and CPP had two joint operations: minor works for the fine tuning of the drainage system by WMC's and water management training of SCWMC. Procedure for the implementation of the minor works (actual implementation by the ChWMC's and estimates of cost) was not to the liking of some Chairmen and they encouraged SCWMC's to boycott the training.

In the event, the project took a firm stand against the Chairmen involved, canceling the minor works within the sub-compartment. The Chairmen then backed down.

It was clear that the SCWMC members did not agree with the Chairmen linking minor works and training but they felt that they could not disobey the Chairmen. The Chairmen acted on their own, without consulting their members, indicating that they see their SCWMC role as a tool for their own benefit.

This revealed an obvious gap between the interests of the Chairmen and the interests of the SCWMC members. The latter were interested in water management and training, and the Chairmen seemingly interested primarily in money and politics.

Agriculture

Land Use and Cropping

The first section has described the increase in both Rabi cropping and Boro observed this year. Table 1 gives the Figures for Boro. The results of Rabi 1998-99 season are provided in Table 4 below.

Clusters	Crops (ha)					
	Mustard	Wheat & Paira	Pulses	Vegetables	Potato	Spices
1	376	201	123	46	10	16
2	479	195	149	196	17	23
3	710	229	116	18	30	16
4	720	338	250	30	127	16
LFP	346	192	92	46	20	10
Total	**2,631**	**1,155**	**730**	**336**	**412**	**81**

Table 4: Land Use Statistics Rabi 1998/1999

With the exception of wheat and paira, all crops registered an increased area under cultivation compared with the 1997/98 Rabi season.

Irrigation Survey

The project carries out an irrigation survey once in every 2 years in order to collect information on the different type of irrigation activities in. the irrigation survey for 1999 was carried out during this reporting period.

Table 5 and 6 show the results from the survey compared with the earlier surveys. Essentially, irrigation of Boro rice continues to grow as do the number of shallow tube wells. It was by combining the results of this survey with the land use mapping that it was possible to determine that the large increase in the number of tubewells between 1997 and 1999 occurred almost entirely within the past Boro se:

Equipment	1993 nos.	1995 nos.	1997 nos	1999 nos.
STW	774	619	881	1441
DTW	78	85	81	71
LLP	3	4	2	3
Indigenous method	96	153	33	54
Total	**951**	**861**	**997**	**1568**

Table 5: Equipment

Equipment	1993 (ha)	1995 (ha)	1997 (ha)	1999 (ha)
STW	2819	2235	2960	4745
DTW	1438	1836	1797	1492
LLP	45	47	19	23
Indigenous method	82	100	6	9
Total	**4384 (45%)**	**4218 (43%)**	**4782 (49%)**	**6269 (64%)**

Table 6: Area of Boro within CPP

On Farm Testing and Demonstration (OFTD) Program:

This year the following crops and cropping are being tested and demonstrated in four pilot chawks.

- Mustard (BARI-7 with Tori local) - Boro (BR 26 & 29 with IRRI 8) - Green Manuring - T.Aman (BR 32 & 33 with BR 11 & local).
- Mustard (BARI-7 with Tori local) - Boro (BR 26 & 29 with IRRI 8) - T.Aman (BR 32 & 33 using compost).
- Mustard (BARI-7 with Tori local) - Boro (BR 26 & 29 with IRRI 8) -T.Aman (BR 32 & 33 using chemical fertilizer).
- Onion (Tahepuri variety with Boro IR 8) - Summer vegetable (Okra & Indian Spinach) - Green Manure - T.Aman (BR 32 & 33 with BR 11 & local).

Mustard, Boro & Onion trials have been completed and the economic analysis done. Summer vegetables and green manure (Dhaincha) of Kharif-I crops are now in the field. T.Aman seeds for Kharif-II program have already been distributed to seventy farmers (Farmer Testing Group) in four pilot chawks.

The result for the mustard test was very good, for the onion, a failure.

In 3F chawk, for the Mustard variety BARI Sharisha-7 cultivation, with an investment of Tk.10,670.00/ha, gave a gross return of Tk.23,400.00/ha with a very high margin of Tk.12,730.00/ha. The local Sharisha Tori-7, required a total variable cost of Tk.10,168.00/ha, but gave a gross return of Tk.14,256.00/ha with a margin of only Tk.3,088.00/ha.

In 11J, 19E and 28C chawks, results were - gross margins for the BARI Sharisha-7 of Tk.12,302.00, Tk.14,389.00 and Tk.15,246.00 per hectare respectively. Compared with the Tori-7 gross margins of Tk.4321.00, Tk.4,079.00 and Tk.5,170.00 per hectare.

Clearly, that BARI Sharisha-7 cultivation was much more profitable for the farmer than local Tori-7.

It has been agreed amongst the farmers who grew the Sharisha-7 that they will retain the seed for distribution to fellow farmers.

Not all trials can be as spectacularly successful as the mustard trial. Onion being a case in point. On the onion trials, the yield was very poor with an average of 0.41t/ha. This gave an average gross return of Tk.12,300.00/ha. However, with a cultivation cost of Tk.44835.00/ha the net return was negative at (-) Tk.32,535.00/ha.

Reasons for the poor results probably include:

- Transplanting was late for onion this year
- Poor selection of variety for hot weather production
- Drought hampered the production

A decision will be taken as to whether to proceed with the trial of onion or to abandon it.

For Boro, the test results were also good with the two new varieties BR 29 and BR 26 clearly outperforming the widely grown IR 8. The highest grain yield from the new varieties was obtained from chawk 11J (8.10 t/ha) and the lowest was obtained from chawk 28C (7.22 t/ha). This compares to between 6.24t/ha and 6.81 t/ha for IR 8.

Overall, it is found that grain yield of BR 29 was 22% higher than IR 8 and that the net return was better.

Similarly, for BR 26, the average yield of four pilot chawks was found 7.29 t/ha compared with a much lower 5.99 t/ha for the generally grown IR 8.

Environment

The agricultural section of the consultancy team have, together with the environmental section, run two environmentally friendly agricultural programs over this reporting period. These are an integrated pest management program and a composting program.

Integrated Pest Management

The Integrated Pest Management Program (IPM) has been run for the four pilot chawks. Prior to the training, a field survey showed that all farmers are using chemicals when pests attack are observed in their crops. They are aware that indiscriminate use of chemicals can be harmful to their crops as well as a health hazard, but know nothing about IPM.

The program consisted of four training sessions (4 days) in two crop stages (vegetative and pre-mature). One hundred and twenty farmers (male 84% & female 16%) received the training

Compost Preparation

In the PRA carried out by the project in 1998, it became clear that higher land was suffering from a loss of soil fertility. Use of compost (manure from rubbish/water hyacinth) is one potential means of improving soil fertility at low cost.

Accordingly, a program has been introduced in compost making with water hyacinth as one of the major composting materials.

Within this reporting period 12 compost pits have been completed, three in each pilot chawks. The materials costs for eight pits (2 pits in each pilot chawks) were provided by CPP and remaining four pits were provided by interested farmers. It is now decided that one pit in each chawk will be completed each month through motivating the farmers. In the meantime, 207 farmers (62% male & 38% female) have received training on compost making.

Homestead Forestry Program:

The Environmental section, working together with the WID section have carried out a homestead forestry program in two villages (Kumaria and Bandhabari). Five local species of trees have been selected for planting; these are Mango, Jackfruit, Olive, Mahogany and Gamari.

Environmental Monitoring

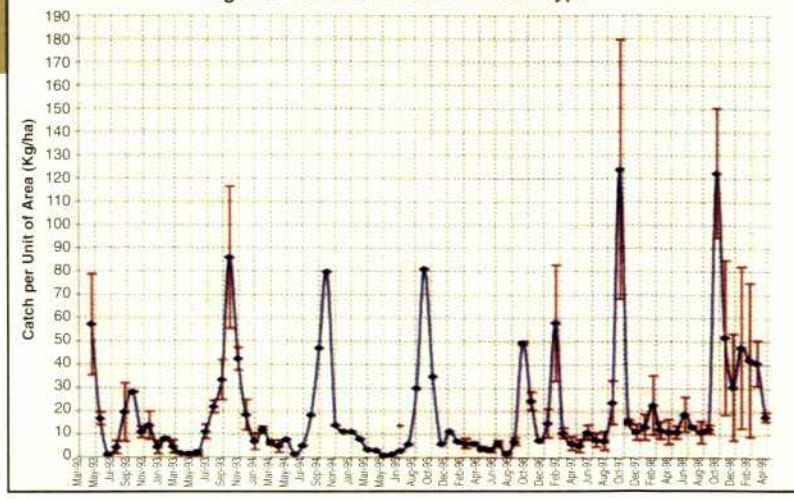
With the addition of a senior environmentalist, the environmental section of the project is now at full strength. This has allowed monitoring to proceed in all areas with the following activities being carried out during the period under review:

- Monitoring of soil fertility of intensively cultivated soil
- Monitoring of river-borne sedimentation on soil fertility
- Groundwater availability monitoring
- Water quality monitoring
- Biodiversity monitoring
- Agro-chemicals use monitoring
- Public health (disease incidence) monitoring

Monitoring Data

Major progress has been made on the data set concerning the open water fisheries in the CPP area. An estimation of the total monthly yield from the open water fisheries over the life of the project should be completed in the coming weeks.

Figure 6 : CPUA Inundated F3 landtype



A standard yield per different inundated land type (Catch per Unit of Area, CPUA) has now been established and is shown in Figure 6. This standard yield (CPUA) now needs to be multiplied by the total inundated area of that land type in the CPP area.

The CPUA graph for inundated F3 land types shows no significant difference between corresponding months of different years. This does not mean the total yield from the capture fisheries stayed the same during this period. This will be determined only when the second stage of the analysis has been completed.

The GIS section is now calculating inundated areas of different land types per month after which it will be possible to estimate the yield from open water fisheries from April 1992 until present.

Fish Pass at the Main Regulator

Last year, experiments of survival rates over the fish passes were carried out. During these experiments, it became apparent that a lot of turbulence occurred upstream and downstream of the regulator.

Turbulence hampers the safe movement of hatchlings (see the FAP 17 report: Design of 'fish friendly' regulators within the flood action plan). In view of this, CPP proposed some adaptations on the main regulator. Some of these adaptations are now incorporated on the left downstream side of the regulator, so that the effect of these adaptations can be investigated during the next hatchling migration research planned at the start of the monsoon.

Women in Development

Embankment Maintenance Groups

From September 1995 onwards, CPP's WID section had been in charge of the management of the EMG program, together with the BWDB Office of the Executive Engineer (XEN). In October 1998 the EMG program was abruptly closed. The explanation for this closure was the need for re-sectioning of parts of the embankment damaged by the flood.

In January the WID section was approached with the request to start up (part of) the program again. It was than decided that prior to restarting the program an internal evaluation should be executed in order to learn lessons from the experience, and to give recommendations and conditions for a future EMG program that would be sustainable after closure of CPP.

The Evaluation

Management of the EMG program had been divided between the CPP WID section, the CPP Quality Control section and the BWDB XEN Office. However, In practice, most of the tasks were executed by the CPP WID section who were responsible for:

- Recruitment of the women and preparation of contract forms for EMG, XEN and bank
- Supervision of their performance
- Collection and processing of monitoring data (performance and financial data)
- Assistance to the women in cases of problems
- Organization of training activities
- Advising women on options to optimally spend their saving money
- Assisting the women in opening and operating a bank account, with payment problems, and assuring that the bank transfers the saving money to the individual bank accounts

The CPP Quality Control section executed regular quality control visits. The BWDB XEN office was in charge of financial and technical matters. Hence, the XEN office identified a co-operative bank, transferred the money for the program to the preventive maintenance account of the bank and gave clearance to the bank for the transfer of the wages and savings. In addition, the XEN office was responsible for technical issues, such as the selection of the embankment reaches, technical supervision and training. Although some problems occurred from time to time with respect to the required transfer of money, co-operation between the XEN office and the CPP WID was in general good.

It is estimated that over the years an average of 20-25% of the time of the head of the WID section has been spent on EMG design, planning, supervision, co-ordination and monitoring. Whereas the time inputs were substantial in the early years of the program, the workload gradually diminished, as more experience was obtained and WID field staff became more qualified to handle the supervision. Time inputs of the XEN are estimated to be 5-10%, most of this time being spent on financial matters.

Inputs of the field staff are as presented in Table 7. During flood emergencies field staff of the XEN office and the Quality Control section are more or less permanently in the field, and their contacts with the EMG women are regular. The time inputs of the WID field staff is more equally divided throughout the year. Although the Table shows that the staff of the XEN office spends most of the time on EMG, when asked by whom they were supervised, the women were only able to mention the names of the field staff of the WID section.

Year	CPP WID section			CPP Quality Control			BWDB/XEN Office		
	No of field staff	Time inputs pp (in %)	Person months	No of field staff	Time inputs pp. (In %)	Person months	No of field staff	Time inputs pp.	Person months
1995	1	50%	2	1	5%	0.2	1	100%	4
1996	1	70%	8.4	1	10%	1.2	2	20%	4.8
1997	2	50%	12	1	10%	1.2	3	20%	7.2
1998	1	100%	12	2	20%	4.8	3	20%	6
Total			**34.4**			**7.4**			**22**

Table 7: Overview of Staff Inputs for Fieldwork

The number of EMG groups and women involved in the program increased from two groups with 13 women at the beginning to 18 EMG's with one hundred women by the time the program was closed. The stretches of embankments maintained increased in line with the increase in number of women. The following Table provides the evolution of the number of EMG groups involved, of the total number of women participating, and of the number of kilometers involved at the end of each year.

	No of EMG groups	No of women involved	Km embankment maintained
1995	2	13	6.5
1996	7	38	19
1997	16	94	47
1998	18	100	50

Table 8: Number of Women Involved and Km of Embankments

At management levels various constraints and problems were brought forward by the different partners involved in the program.

The main constraints appeared to be:

- Insufficient co-ordination, communication and feedback between the various actors involved in the program
- Lack of involvement of the WID section in decision making
- Unbalanced division of tasks: CPP's WID section was burdened with too many tasks and responsibilities, when compared to the other actors (BWDB/XEN office, CPP Quality Control section)
- Resistance among staff to working with very poor, low class women
- Lack of an EMG budget at the level of the WID section, that would allow to resolve some problems, e.g. in the field of logistics, transport facilities, financial reporting, training materials.

At field level the main constraints and problems encountered, concerned:

- High illiteracy of EMG women (training to be adjusted to illiterate women, operation of bank accounts, explanation of contract system, etc)
- Low self-esteem of the women due to their low class in society
- Group cohesion: recruitment of individual women asked for much effort to build effective groups.

Conclusions and Lessons Learned

The most relevant role the EMG's played in the framework of CPP and protection of the area, was their work in the field of patrolling. Through an effective early warning system developed by the women, they helped CPP and the BWDB to react quickly in the periods of emergency and flood. Secondly the EMG's preventive maintenance work improved the conditions of the roads on the embankment, and made transport facilities more accessible and cheaper for the inhabitants of the area.

According to observations of the women themselves, and of other women from the communities, the acceptance of female earth laborers in the area has broken certain gender barriers, since earth work was commonly considered a man's task.

Various actions undertaken by the former EMG women to find work, to integrate themselves more into the society and into community activities can be considered a new development and show their increased self confidence. This is especially the case for women who had worked for two years or longer. It can be expected that the socio-economic empowerment of these women will continue to be valuable for them (increased mobility, some functional literacy, more knowledge on health and nutrition, leadership capacities, etc). There is, however, a group of women, in particular those who worked in the program for less than one to two years, who have not been able to find new avenues and had to fall back to their former social and economic position. They feel frustrated because they have known for a short time that life can be better, and did not know in advance that the EMG program would be closed in October 1998.

One of the lessons learned is that six months contracts per EMG are very labor intensive at the level of program management. Future EMG program should preferably work with one year contracts per EMG. In addition, the formulation and implementation of concrete and measurable objectives, and of a clear division of tasks and responsibilities between the different partners involved, would certainly contribute to an increased efficiency. The program should have a well-defined training budget for social and economic development of the women EMG members. The training program should follow the issues as have been addressed in the CPP EMG program, but should be designed in a more systematic way. In addition, the total contract period per woman should preferably consist of a minimum duration of four years with an obligatory saving system, in order to enable the women to invest in small economic activities. Workshops to assist the women in making informed choices and assist the women in management, organization, marketing and other business related questions, should be part of the training program.

When compared to the outputs, the costs of EMG's are relatively high, not so much in terms of financial resources (30,000 Tk per kilometers per year), but more in terms of staffing and human resources. An estimated 10 person-months of management staff and 64 person-months of field staff were utilized to run the program over three years. It should be noted, however, that the major effects of the program are difficult to measure in quantitative terms (maintained embankments and improvement of women's social status and self esteem), and that development activities executed with very poor and mostly illiterate women will by definition require high inputs of human resources.

Recommendations

The evaluation was not in favor of the CPP's WID section taking up the EMG program again before institutional sustainability is arranged. The reasons being:

- There is at present no guarantee that the program will continue once CPP will be closed, and because
- It is not acceptable that the EMG women will be disappointed a second time

It was recommended that CPP should use its last year to assist the BWDB in developing an institutional setting for EMG in the compartment that has the dual objective of preventive maintenance and socio-economic development of poor women.

This is the course of action that CPP is now following. Attempting to integrate the EMG's in the national WFP/BWDB program, in line with the Planning and Implementation Methodology of BWDB Schemes under the WFP assisted Rural Development Program (November 1997).

Other WID Activities

WID activities continue to focus on involving women in the ongoing CPP activities rather than the development of separate women's program. To that end, activities over the reporting period have included women's involvement in:

- Water management training for all executive committee members of the SCWMC & other members responsible for structure operation. Gender issues and role of women in SCWMC were also included in the course outline.
- CPP's WID Section organized a network meeting with female members of the WMC of SC 6 and 7. Purpose of the meeting was to create the opportunities for the women to exchange experiences and to enhance their knowledge and understanding on the water management system in their area.
- Selection of farmers, plots and organizing female farmers in OFTD program and their training. Special attention was given on training of female farmers on preservation of seeds, preparation of seedbeds and sowing of seeds etc.
- WID Section organized female farmers in the IPM program
- Compost preparation from water hyacinth by selected farmers of FTG in OFTD program.
- Selection of villagers and sites for plantation in Homestead Forestry Program. Fifty percent of the participants in this program are female.

WID Section have also worked very closely with the Fisheries Section in organizing and selecting households for the "Chari in the Bari" program.

One new indicator - population- has been added to the forty five M & E indicators. The methodology for this new indicator is presently being designed. An ongoing evaluation of the effectiveness of the collection methods for all of the existing indicators is continuing simultaneously. The latest development and refinement of some of the indicators is shown in Table 9 below:

Sl No	Indicator	Changes
3.2	WMC effectiveness	New form developed and in use
4.2	Flooding depth	Has been dropped
5.2A	Contracts with EMG	Remains suspended
6.2	Beel water levels	Discontinued
6.3	Hatchling migration	1999 season about to commence
6.4	Input-output of culture fisheries	Data collection and analysis continuing
7.1	River borne sedimentation	SRDI carrying out testing and providing data
7.2	Bio-diversity monitoring	Dept. of Botany, Dhaka University carrying out testing
7.3	Agro-chemical use	Department of Soils, Dhaka University involved in this program
7.5	Water quality	Department of Soils, Dhaka University carrying out this program
7.6	Disease incidence	Collection of data on water borne diseases continues.

Table 9: Refinement of M & E Indicators

M & E analysis continues to be carried out on the basis of the With and Without project situation.

Sl. No.	Description of Item	Unit	Total Quantity & Cost as per revised TAPP		Achievement upto Dec/98 (Lakh Tk.)	Budget & Achievement for 1998-99			Cumulative upto June/99	
			Quantity	Cost (Lakh Tk.)		Budget (Lakh Tk.) (Revised)	Achievement from Jan/99 to June/99 (Lakh Tk.)	Achievement (%)	Lakh (Tk.)	%
1	Survey & study	1 item	1 item	298.52	249.04	11.00	3.93	35.73	252.97	84.74
2	Equipment:	-	-	47.72	48.20	-	-	-	48.20	101.00
	a) Leveling instrument	Nos.	6	5.76						
	b) Jeep	Nos.	3	22.16						
	c) Motor cycle	Nos.	10	5.90						
	d) Computer and software	Nos.	3	4.40						
	e) Typewriter	Nos.	8	2.00						
	f) Ammonia printing machine	Nos.	1	1.20						
	g) Photocopier	Nos.	3	3.00						
	h) Duplicating machine	Nos.	1	0.90						
	i) Penetro meter	Nos.	2	1.20						
	j) Concrete tests hammer	Nos.	2	1.20						
3	Construction:									
	a) Regulators	Nos.	15	864.18	855.34	-			855.34	98.98
	b) Modification of old sluice	Nos.	5	13.14	2.92	-			2.92	22.22
	c) Minor regulator	Nos.	44	785.50	640.98	50.00	39.61	79.22	680.59	86.64
	d) Sub-compt. bridge & culvert	Nos.	33	392.40	387.24	9.80	2.28	23.27	389.52	99.27
	e) Reexcavation of khal/river	Km.	129.83	780.24	292.89	40.00	21.86	54.65	314.75	40.34
	f) Resec. compartment embkt.	Km.	68.10	321.56	321.90	18.50	17.54	94.81	339.44	105.56
	g) Tangail town drainage dev.	Km.	3.00	300.00	392.79	14.10	8.21	58.23	401.00	133.67
	h) Implementation of access road	Km.	3.20	52.36	51.91	-	-	-	51.91	99.14
	i) River bank protection & training	LS	5	117.77	113.78	4.00	4.87	121.75	118.65	100.75
	j) Miscellaneous	LS	1 item	68.24	11.88	1.00	0.72	72.00	12.60	18.46
	k) Mitigation measure	1 item	1 item	134.61	142.48	1.60	0.87	54.38	143.35	106.49
	l) O&M during construction	1 item	1 item	639.32	228.34	205.00	184.14	89.82	412.48	64.52
4	Augmentation of PT	1 item	1 item	114.22	68.03	10.00	6.81	68.10	74.84	65.52
5	Unforeseen cost (minor works)	1 item	LS	400.00	66.89	50.00	17.38	34.76	84.27	21.07
	Total:			**5329.78**	**3874.61**	**415.00**	**308.22**	**74.27**	**4182.83**	**78.48**

Table 10: Financial Progress RPA (FA) As Per 2nd Revised TAPP

GoB Fund Utilization

Sl. No.	Description of Item	Unit	Total Quantity & Cost as per revised TAPP		Achievement upto Dec/98 (Lakh Tk.)	Budget & Achievement for 1998-99			Cumulative upto June/99	
			Quantity	Cost (Lakh Tk.)		Budget (Lakh Tk.) (Revised)	Achievement from Jan/99 to June/99 (Lakh Tk.)	Achievement (%)	Lakh (Tk.)	%
1	Land acquisition (ha)	1 item	346	1671.10	1301.60	-	1.18 (-) 210.18*		1092.60	65.38
2	GoB establishment	Ha.	1 item	658.59	582.11	100.00	48.12	48.12	630.23	95.69
3	Taxes	1 item	1 item	41.55	13.52	-	-	-	13.52	32.54
4	Cost escalation	1 item	1 item	164.66	-	-	-	-	-	-
5	O&M during construction including flood fighting	1 item	LS	-	-	60.00 (+) 26.01	82.51	95.93	82.51	-
	Total			**2535.90**	**1897.73**	**186.01**	**(-) 78.37**	-	**1818.86**	**71.72**

Table 11: Financial Progress Gob As Per Approved Revised TAPP

Reimbursement

The total amount of the reimbursement recommended against FA until the 30th June 99 stands at Tk.370,034 million (Table 12). This includes Tk.8,120 million for Sirajganj Compartment.

For Tangail Compartment, during the period from 1st January 99 to the 30th June 99 no recommendation was made for reimbursement. Therefore, the total amount recommended remains at Tk.361,914 million. At the end of the last half-year (July/98-Dec/98), bills of Tk.6,079 million were pending with the consultant. During the period under report, bills for a further Tk.15,674 million have been received.

Division	Reimbursement (million Tk.)		
	Request received	Recommended	Under scrutiny
Tangail			
Cumulative upto 31.12.98	367.993	361.914	
01.01.99 to 30.06.99	15.674		
Total: Tangail	383.667	361.914	21.753
Total: Sirajganj	8.120	8.120	Nil
Grand Total:	**391.787**	**370.034**	**21.753**

Table 12: Reimbursement Recommended Against FA Until 30.06.99

TA Fund and Expenditure

Code No.		Budget 15.09.96 to 30.06.2000	Actual Expenditure (DFL)			Exp. %	Balance (DFL)
			Upto 31.12.98	01.01.99 to 30.06.99	Cumulative to 30.06.99		
300	Contract staff cost	5,056,347.00	2,994,389.91	792,858	378,7248	75	1,269,099
400	Investment/purchases	264,000.00	151,161.73	70,432	221,93	84	42,407
500	Operational cost	618,750.00	435,828.21	132,178	568,006	92	50,744
600	Training & courses	1,523,400.00	643,715.36	240,875	884,590	58	638,810
700	Transferred fund						
800	Contingencies	373,125.00	213,704.00	1,4124	227,828	61	145,297
	Total:	**7,835,622.00**	**4,438,799.21**	**125,0466**	**5,689,266**	**73**	**2,1463,56**

Table 13: TA Budget for the Period From 15.09.1996 To 31.08.2000 and Expenditure Up To 30 06 1999

Budget allocation according to financial proposal (final phase)