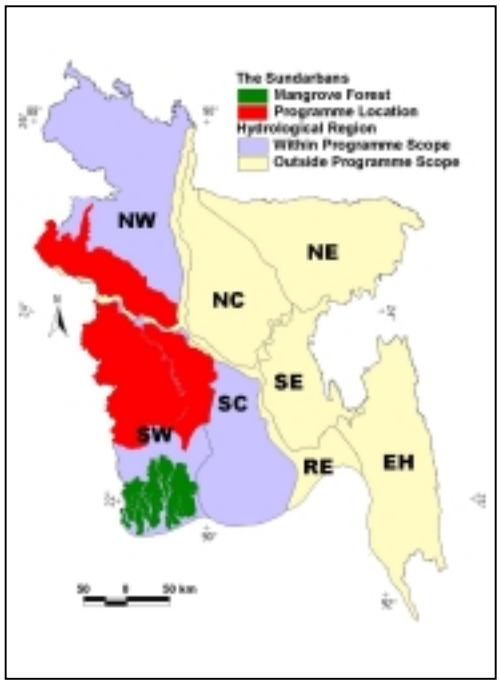
Ganges Dependent Area Regional Surface Water Distribution Networks

Ref: **MR 007**

Basic Data

NWMP Sub-sector **Main River Development**

Region(s) **SW and nearby areas of NW and SC regions**



Relevance to NWPo

NWPo Articles 4.2(j) and (k) provide for development of the main rivers for multi-purpose use and Article 4.7 requires the promotion of conjunctive use of groundwater and surface water and encourages the continued expansion of minor irrigation. Articles 4.9 and 4.12 stress the need for water for fisheries and wildlife and for adequate upland flow in water channels to limit salinity intrusion and preserve estuary ecosystems.

Purpose of Programme

The Ganges Dependent Area covers a third of the country and has long been recognised as an area where improved water resources management is most needed. Over the last three decades, the water resource system has been in a process of degradation, principally due to a reduction of freshwater inflows from the Ganges, siltation of rivers following construction of the polder systems and increasing salinity intrusion from the Bay of Bengal. This has led to a down turn in agricultural production in the coastal areas, the main source of employment, reduced opportunities for navigation, a loss of biodiversity and reduction in wood production in the internationally recognised Sundarbans forest reserve, and increasing social conflict associated with changing land use. The area has more flooding than on average in the rest of Bangladesh, as well as the greatest extent of water shortages in the dry season. Arsenic contamination is widespread across much of region.

The strategy for the GDA must respond to the central issues of a widening gap between water demands and availability, increasing saline intrusion and worsening drainage congestion in a manner that fully recognises the dynamics of the resource system. These are particularly complex in the GDA, and especially so when considered in the context of climate change, projected sea-level rise, land subsidence and the observed rapid increase in tidal range.

The overall objectives for the GDA therefore are to manage the water resource system in a manner that promotes social and economic development in an equitable fashion, and to arrest and reverse the environmental degradation that has already set in. The main thrusts of the strategy are to relieve drainage congestion within the polder area through development of a sustainable river and drainage system, control salinity intrusion and relieve water shortages in the area. This is to be achieved by a combination of river and drainage improvement programmes, augmentation of dry season upland flows and improved management of trans-regional wet

season flood flows. These will be complemented by measures to develop and improve local management of water resources, optimise land use potential and enhance environmentally sound development.

Four main sub-programmes are to be taken up on an integrated basis: general sub-programmes, drainage relief sub-programmes, augmentation sub-programmes and institutional development.

This Programme MR 007 deals with the development of the regional and local distribution networks that would be associated with the augmentation sub-programmes above. Other aspects of the GDA development are covered by MR 003: Ganges Barrage and Ancillary Works, MR 006: Regional River Management Improvement (which includes works on the coastal polders), AW 005: Improved Water Management at Local Government level, AW 006: Improved Water Management at Community level, EA 009: Improved Water Management and Salinity Control in the Sundarbans and ID 001 and ID 004 dealing with Local government and BWDB management. Provision for a feasibility study of the overall development is included under Programme MR 001.

Programme Outline

A full description of the Programme is presented in the July 2001 OGDA Report. Three distribution systems have been identified in that report as follows. On the Ganges left bank in the NW three existing channels would be developed for abstraction from the Ganges, the Boral River, another opposite the Gorai river mouth and a third about 45km upstream. For augmentation of supplies to the Gorai Right Bank area of SW Region, Link Channel 1 would take off directly from the Ganges just downstream of Hardinge Bridge. It would link up with the existing river courses of the Hisna and Mathabanga, following a route outside the GK Irrigation Project, and would deliver flows to the existing Nabaganga–Chitra and Bhairab–Kobadak–Betna river networks. The location of the Ganges offtake for Link Channel 4, to serve the Gorai Left Bank, would depend on which of the two possible Ganges Barrage sites, Tagorbari or Pangsha, were selected. In either case the diverted flows would go into the existing Chandana River and the existing Madaripur Beel Route channel.

All distribution would be by gravity flow. There would be a limited number of structures on the main rivers forming the link channels. Land acquisition requirements would be minimal, because of the use made of existing channels. The structures would control water levels in the drainage network, facilitating development of surface water irrigation through farmer-owned LLP systems. Link 1 would be sized to provide additional flows for salinity control purposes to the western part of the Sundarbans (complementing augmented flows in the Gorai to provide salinity control in the eastern part).

This programme provides for the capital investments necessary to establish both the regional and local river system developments. The amount of this provision takes into account that part of these works will be developed under Programme AW 005.

Financing Arrangements

Financing of all the above works would be by GoB, and would be suitable for donor support. Cost recovery for the regional systems is not thought to be practicable in view of the multi-purpose use of the water provided over such a large and diverse area. Funding of local networks maintenance would be considered under programmes EE 013 and AW 005.

Objectives and Indicators

Objective	Suffix	Indicators/Means of Verification	Due
• Regional river link channels	I1	• Physical progress of capital works	2017
• Local link channels	I2	• Physical progress of capital works	2017
• Increased dry season water availability in the GDA	K	• Dry season discharges	2017
• Bangladesh's main and regional rivers comprehensively developed for sustainable multi-purpose use	D	• Returns per unit of water • River maintenance costs • Quality and Quantity of in-stream flows	2025

Institutional Arrangements

BWDB would be responsible for the regional river systems and Local Government for the local systems. Community groups and individual pump operators would be involved in the final delivery of water. NGOs would assist in the limited land acquisition and resettlement required.

Existing Documentation

OGDA Draft Final Report, July 2001, GRRP Feasibility Report, July 2001 and the NWRD (National Water Resources Database).

Linkages

As stated above, this programme follows on from the studies to be made under Programme MR 001 and the feasibility study of the Gorai River Restoration Project (GRRP). Other aspects of the GDA development are covered by MR 003: Ganges Barrage and Ancillary Works, MR 006: Regional River Management Improvement (which includes works on the coastal polders), AW 005: Improved Water Management at Local Government level, AW 006: Improved Water Management at Community level, EA 009: Improved Water Management and Salinity Control in the Sundarbans and ID 001 and ID 004 dealing with Local government and BWDB management.

Risks and Assumptions

The programme assumes that a fully viable integrated development solution will be developed out of the MR 001 studies. The main environmental risk is the interruption to fish migration that the regulating structures may cause. Whilst in some cases migration has already been interrupted by the diminution of dry season flows, this will nevertheless be a key issue to address properly in the design of the systems. Effective utilisation of water provided for consumptive use will depend upon both there being a demand for the water provided and that individuals and communities co-operate in rehabilitating and maintaining field channels and small khals. Whilst there is evidence to support that there will be demand, albeit with a modest growth rate, achieving sustainable maintenance has so far been illusive. Programme AW 006 is directed at resolving this.

Ganges Dependent Area Regional Surface Water Distribution Networks

Ref : **MR 007**

Cluster :	**Main Rivers**	Region(s) :	**NW, SW, SC**
Focus/Foci :	**Surface Distribution Networks**	Location :	**Ganges Dependent Area**
Start Year[1] :	**2009** Duration[2] : **8 year(s)**	Agency(s) Responsible :	**BWDB** **(Lead)** LGED (Supporting)

Short Description : This programme provides for the capital investments necessary to develop both regional and local river distributary systems as part of the overall GDA development. This provision takes into account that part of these works will be developed under Programme AW 005. Three main link channels have been identified to serve both the Ganges left and right banks. The links would be sized to accommodate supplementary flows for salinity control, as well as for development of LLP irrigation and other consumptive needs.

MIS Links

Cost Calculation :	MR Programme costing.xls	Map :	MR 007 Map.jpg
Disb't Schedule :	MR Programme costing.xls	Description :	MR 007 PgP.doc

Finance

	Costs		Private	Funding (%) GoB	Beneficiaries	Expected by Programme Year
Total Capital[3]	**8,911.00**	MTk	**0%**	**98%**	**2%**	**8**
Ultimate Recurring	**267.30**	MTk/yr	**n/a**	**75%**	**25%**	**9**

Date of Data : **31** (dd) **07** (mm) **01** (yy)

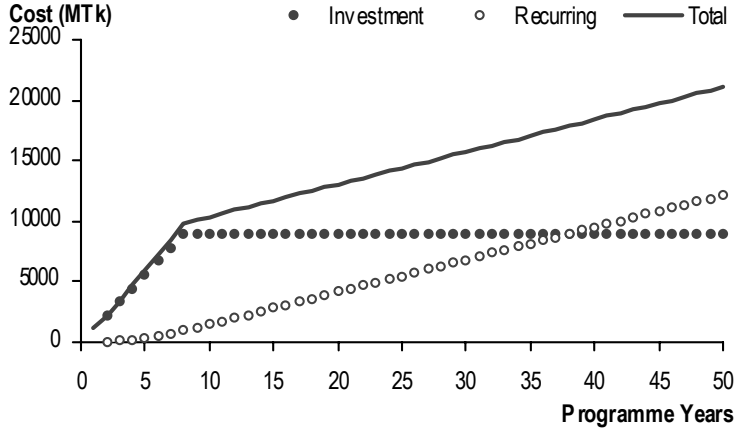
Status : **Identified**

Financial Base Year: **mid-2000**

Planned Expenditure (to date) : **0** MTk

Actual Expenditure[4] (to date) : **0** MTk

Stacked Cumulative Cash Flow Chart



Monitoring

Objective	Indicator	Present Status[5]
• Regional river link channels	• Physical progress of capital works	NYD
• Local link channels	• Physical progress of capital works	NYD
• Increased dry season water availability in the GDA	• Dry season discharges	NYD

Notes : 1. Indicative 2. Until commissioning 3. Inclusive of planning, design _supervision 4. For future monitoring purposes and NWMP updates
5. Present Status keys: NYD- Not yet due, IP- In progress, D- Done

National Water Management Plan

Programme Costing Sheet

Programme Ref	**MR 007**
Title	**Ganges Dependent Area Regional Surface Water Distribution Networks**

Assumptions:

Taka/US$ 51.000 TA duration 0.0 years All prices in mid-2000 values

Investment duration 8.0 years

Item	Unit	Quantity	Rate US$	Rate Tk'000	Amount TkM	O&M %	O&M/yr TkM
Technical Assistance							
Expatriate consultants (all-in rate)	p-m	-	20,000		-		
Senior National consultants (all-in rate)	p-m	-		150	-	*0.0%*	-
Mid-level National consultants (all-in rate)	p-m	-		90	-	*0.0%*	-
Sub-totals					-		-
Other general TA programme costs		*25%*			-		-
Specific other TA programme costs					-	*0.0%*	-
Total TA Costs					**-**		**-**
Other Programme Costs							
1. NW Link					1,086.0	*3.0%*	32.6
2. Link Channel 1					5,953.0	*3.0%*	178.6
3. Link Channel 4					1,872.0	*3.0%*	56.2
4.					-	*0.0%*	-
5.					-	*0.0%*	-
6.					-	*0.0%*	-
7.					-	*0.0%*	-
8.					-	*0.0%*	-
9.					-	*0.0%*	-
10.					-	*0.0%*	-
Total Other Programme Costs					8,911.0		267.3
Overall Programme Costs					**8,911.0**		**267.3**

GDA Regional Surface Water Distribution System Costs *excluding cost of barrage, headworks and field networks*

	NCA km2	SW Irrig km2	Investment Costs (TkM) Regional	Local	Total	Cost/ha Tk/ha	Less AW 005 costs	Net Invest TkM
NW Link	3,167	1,671	712	687	1,399	8,372	(313)	1,086
Link Channel 1	7,324	3,453	5,357	1,242	6,599	19,111	(646)	5,953
Link Channel 4	3,596	2,225	1,627	661	2,288	10,283	(416)	1,872
Totals	14,087	7,349	7,696	2,590	10,286	13,996	(1,375)	8,911

Note 520,000 ha developed under AW 005 nationally

Assume 75% of this is within GDA, remainder to be covered under GDA programme

Northwest Region 13.6%

Southwest Region 64.2%

Southwest Region 22.2%

Ref OGDA Studies, Draft Final Report, July 2001