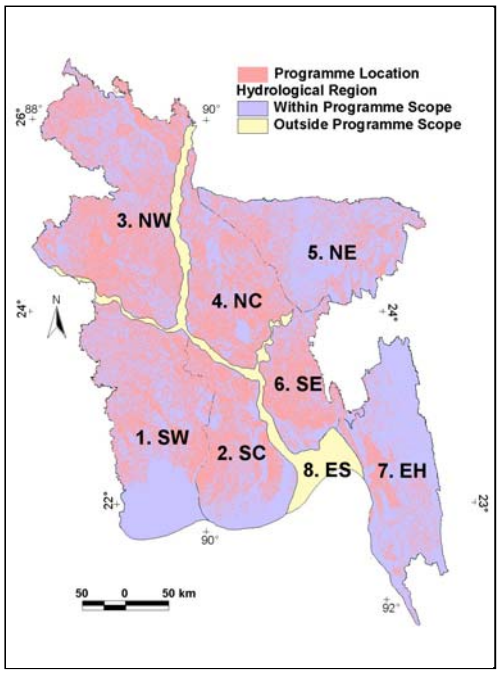
Supplementary Irrigation and Drought Proofing of Rural Water Supplies.

Ref: **DM 006**

Basic Data

NWMP Sub-sector **Disaster Management**

Region(s) **Nationwide**



Relevance to NWPo

Under NWPo Article 4.6(a), it is GoB policy to facilitate the availability of safe and affordable drinking water supplies. Article 4.2(o) requires the development of early warning and flood proofing systems to manage natural disasters like flood and drought.

Purpose of Programme

Apart from its effect on surface water availability, lower than average monsoon rainfall, such as occurred over 2 – 3 years in the mid-1990s, often results in reduced aman paddy yields and a fall in groundwater levels, with damaging effects on hand tubewell (HTW) domestic water supplies and shallow tubewell (STW) irrigation pumping costs in the following dry season. Such droughts occur mainly in the western parts of the country.

The purpose of the Programme is to alleviate such impacts by promoting supplementary irrigation of the aman crop and by continuing the present GoB/UNICEF programme of installing force mode Tara HTWs in areas of severe dry season watertable decline. Tara HTWs can pump from as deep as 15m, whereas the standard No. 6 suction mode HTW cannot pump from below 6 – 7m. Quite apart from drought alleviation, the installation of Tara HTWs is a means of mitigating the effects on watertable levels of STW pumping in areas of intensive STW irrigation development such as much of the NW, NC and SW Regions. Neither of the two Programme components would have significant adverse environmental impacts.

Programme Outline

1. **Promotion of Supplementary Irrigation of Aman**

   Supplementary irrigation of aman can bring two main benefits. First, in dry years aman irrigation in the crucial flowering and grain filling post-monsoon period in late September and October can prevent the substantial yield losses that would otherwise occur. Second, and unrelated to drought, cropping can be intensified by using irrigation to enable land preparation and transplanting of aman to take place in June or early July, before or in the early stages of the monsoon. Farmers in the Kushtia District of South West Region have been observed to be doing this. Aman harvesting can then be completed early, in October, allowing more time for rabi cropping with pulses, oilseeds and other short duration crops before land preparation and transplanting of the important boro paddy crop in January – February.

Despite these advantages few farmers practice supplementary irrigation at present, for various reasons. In 1996-97 and 1997-98 only 5% and 6% respectively of the total irrigated area received supplementary irrigation in the aman season. DAE took up a three year GoB funded project for Supplementary Irrigation in Drought-Affected Transplanted Aman Crop (SIDATAC), in which it was intended to provide diesel fuel and electricity free-of-charge to aman farmers affected by drought. However, no disbursements were made in 1999 as there was no drought.

This programme would build from the experience of SIDATAC and the earlier National Minor Irrigation Development Project, and provide targeted promotional support for aman farmers in drought risk areas. It would complement efforts made under ID 009: Department of Meteorology Capacity Building to improve long-range weather forecasting to enable better anticipation of drought conditions. The programme would undertake research under different soil conditions into different viable choices farmers can make given the expectation of drought, investigate obstacles to employing irrigation equipment outside of the boro season, and prepare advisory packs for farmers to be distributed through DAE's field staff, and other media, including radio and TV.

2. **Installation of Tara Hand Tubewells**

Three kinds of Tara pumps are in use, the Mini-Tara (maximum pumping depth 15m, cost Tk8,000), the Standard Tara (15m, Tk16,000) and the Super Tara (30m, Tk18,000). NWMP costing has been based on the Standard Tara. Starting in 1987, by mid-1998 almost 152,000 Taras had been installed by DPHE (Department of Public Health Engineering). This has been done free of charge through WATSAN committees organised by the Union Parishads (Councils). One drawback is that the Taras have often been sited inside the courtyards of the local elite, with a consequent reduction in benefit to the poor. With existing models, maintenance and the vertical pumping motion required can cause problems, but improved designs are being developed.

Since Taras are more costly than the standard No. 6 suction mode HTWs, they are installed only where seasonal watertable decline makes their use essential and other force mode options are not appropriate. In the future the main alternative to Taras in rural areas is likely to be small deep tubewell (DTW) – based village piped water systems. Development of such systems is still in the pilot stage in Bangladesh. The NWMP target applied for planning purposes is that by 2025 60% of the rural population will be using such systems (see Programme TR 004). Social, institutional and financial constraints may, however, hold back their rate of adoption. At this stage there is thus uncertainty as to the degree to which this target will be met, and the extent to which DTW-based systems will lessen the requirement for Taras.

The other important uncertainty is the rate of expansion in the area that will be sufficiently affected by seasonal watertable decline as to require the introduction of force mode pumping for village water supplies. DPHE/UNICEF and NWMPP studies indicate that at full irrigation development (100% of the irrigable net cultivable area (NCA) irrigated in the dry season) most of the shallow tubewell (STW) – irrigated areas of NC and SW Region, and much of those areas in NW Region, will need force mode pumping. This is, however, only a projection – only time will tell how much area will actually need force mode pumps. In particular, in most areas 100% irrigation development may never be reached.

The Government's strategy is nevertheless to phase out support for Tara pumps as more appropriate systems are popularised. For the reasons stated above, this needs to be done gradually to avoid unnecessarily disadvantaging those living in areas where seasonal water declines are interfering with use of HTWs. Between 1987 and 1998, on average 14,000 Tara pumps were installed each year, with at least 75% of their cost subsidised by Government. For the future, in line with the stated strategy, it is assumed that this level of subsidy would be progressively reduced, and eliminated after 10 years. On the basis that the rate is reduced progressively to 50% by year 8 and that this reduces demand as the subsidy rate falls, it is provisionally estimated that a further 95,000 Tara pumps would be subsidised over the next 10 years at a cumulative cost of Tk926M.

The programme should be kept under review in the light of actual demand for alternative water supply systems, the numbers of residual HTW affected by seasonal drawdown and the further research on arsenic contamination of aquifers.

Based on the NWMPP estimates of projected seasonal drawdown and the numbers of HTW likely to be affected, the regional distribution of subsidies is estimated to be as follows:

NW	NC	NE	SW	SC	SE	RE
28%	19%	9%	22%	5%	10%	7%

Financing Arrangements

Both activities are appropriate for Government finance, each possibly with donor support.

Objectives and Indicators

Objective	Suffix	Indicators/Means of Verification	Due
• New Tara hand tubewells commissioned	I1	• Physical number of new wells	2011
• Increased area of aman rice under supplementary irrigation	I2	• Areas planted	2012
• Increased quality of life in target areas	K	• Return on family labour	2021
• Climatic threats to life and livelihood mitigated by structural and non-structural measures	D	• Risk of loss of life (human and livestock) as estimated actuarially • Risk of income disruption as estimated actuarially • Risk of damage as estimated actuarially	2026

Institutional Arrangements

Promotion of aman supplementary irrigation will continue to be undertaken by DAE. The Tara installation programme will continue to be implemented by DPHE, but with increasing private sector participation.

Existing Documentation

NWMPP DSR Sections 9.8 and 7.7, the National Water Resources Database (NWRD), SIDATAC and DPHE/UNICEF reports.

Linkages

There will be linkage mainly with Programme TR 002: Rural Arsenic Mitigation, TR 004: Rural Water Supply and Distribution Systems and AW 001: Promotion of Expanded Minor Irrigation and Improved On-farm Water Management.

Risks and Assumptions

As explained above, the Tara programme is subject to an unavoidable degree of uncertainty concerning the future level of demand. The same applies to farmer adoption of supplementary aman irrigation. Its advantages are clear, but practical constraints have held back the rate of adoption in the part. The programme allows for this to be investigated and for appropriate action to be taken to adjust the approach to promoting supplementary irrigation for aman.

Supplementary Irrigation and Drought Proofing of Rural Water Supplies

Ref : **DM 006**

Cluster :	**Disaster Management**	Region(s) :	**All**
Focus/Foci :	**Drought Proofing**	Location :	**Nationwide but emphasising NW, NC, SE, SW, SC**
Start Year[1] :	**2002** Duration[2] : **10 year(s)**	Agency(s) Responsible :	**DAE** **(Lead)** None (Supporting)
Short Description :	This programme aims to promote supplementary irrigation during the drought-prone aman season, as well as including efforts to drought-proof rural water supplies.		

MIS Links

Cost Calculation :	DM Programme costing.xls	Map :	DM 006 Map.jpg
Disb't Schedule :	DM Programme costing.xls	Description :	DM 006 PgP.doc

Finance

	Costs	Private	Funding (%) GoB	Beneficiaries	Expected by ProgrammeYear
Total Capital[3]	**1,041.40** MTk	**0%**	**85%**	**15%**	**10**
Ultimate Recurring	**0.00** MTk/yr	**n/a**	**n/a**	**n/a**	**n/a**

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

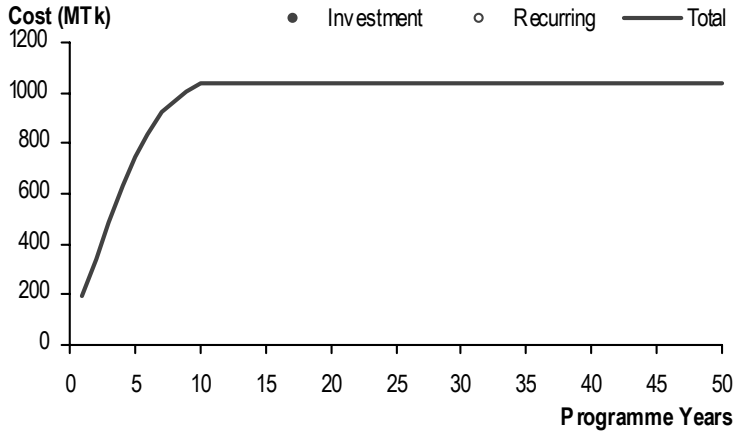
Status : **Identified**

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]
• New Tara hand tubewells commissioned	• Physical number of new wells	NYD
• Increased area of aman rice under supplementary irrigation	• Areas planted	NYD
• Increased quality of life in target areas	• Return on family labour	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	**DM 006**
Title	**Supplementary Irrigation and Drought Proofing of Rural Water Supplies**

Assumptions:

Taka/US$ 51.000 | TA duration 5.0 years | Investment duration 10.0 years | All prices in mid-2000 values

Item	Unit	Quantity	Rate US$	Rate Tk'000	Amount TkM	O&M %	O&M/yr TkM
Technical Assistance	*Supplementary Irrigation Promotion Support Programme*						
Expatriate consultants (all-in rate)	p-m	12.0	20,000		12.2		
Senior National consultants (all-in rate)	p-m	180.0		150	27.0	*0.0%*	-
Mid-level National consultants (all-in rate)	p-m	364.0		90	32.8	*0.0%*	-
Sub-totals					72.0		-
Other general TA programme costs		*25%*			18.0		-
Specific other TA programme costs	Promotion materials				25.0	*0.0%*	-
Total TA Costs					**115.0**		**-**
Other Programme Costs							
1. Tara Pump Subsidies					926.4	*0.0%*	-
2.					-	*0.0%*	-
3.					-	*0.0%*	-
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					926.4		-
Overall Programme Costs					**1,041.4**		**-**

Provisional Estimate of Tara Pump Subsidies

Year	Pump Demand	Cost Rate (Tk)	Total Cost (TkM)	Subsidy Rate (Tk)	Subsidy TkM
1	14,000	16,000	224.0	75%	168.0
2	12,000	16,000	192.0	65%	124.8
3	12,000	16,000	192.0	65%	124.8
4	12,000	16,000	192.0	65%	124.8
5	10,000	16,000	160.0	55%	88.0
6	10,000	16,000	160.0	55%	88.0
7	10,000	16,000	160.0	55%	88.0
8	5,000	16,000	80.0	50%	40.0
9	5,000	16,000	80.0	50%	40.0
10	5,000	16,000	80.0	50%	40.0
Totals	95,000		1,520.0		926.4