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**GOVERNMENT OF BANGLADESH - UNICEF**

**RURAL WATER SUPPLY**

**AND SANITATION**

**PROGRAMME**

**1992-1995**

August 1992

822-BD92-12265

CORRIGENDUM

PLEASE REPLACE THE WORD "UPAZILAS" BY THANAS"

LIST OF ACRONYMS

ADP	Annual Development Plan
CDD	Control of Diarrhoeal Diseases
CF	Call Forwards
CHT	Chittagong Hill Tracts
DANIDA	Danish International Development Agency
DHS	Department of Health Services
DPHE	Department of Public Health Engineering
DSTW	Deepset Tubewell
ESA	External Support Agency
FC	Ferro-cement
IA	Integrated Approach
ICDDR,B	International Centre for Diarrhoeal Disease Research, Bangladesh
IRP	Iron Removal Plant
LGRD&C	Local Government, Rural Development & Cooperatives
LWT	Low Water Table
PCIS	Programme Communication and Information Section (UNICEF)
ORT	Oral Rehydration Therapy
PHP	Public Health Promoter
PSF	Pond Sand Filter
RCC	Reinforced Cement Concrete
RWSS	Rural Water Supply & Sanitation
SDC	Swiss Development Cooperation
SST	Shallow Shrouded Tubewell
SWT	Shallow Water Table
TAPP	Technical Assistance Project Proposal
TW	Tubewell
TWM	Tubewell Mechanic
VSC	Village Sanitation Centre
VSST	Very Shallow Shrouded Tubewell
WES	Water and Environmental Sanitation Section (UNICEF, Dhaka)
WID	Women in Development

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## TABLE OF CONTENTS

List of Acronyms

Table of Contents

Summary Sheet

1.	BACKGROUND/PROBLEM STATEMENT . . . . .	1
1.1	General . . . . .	1
1.2	Morbidity and Mortality . . . . .	1
1.3	Water Supply . . . . .	2
1.4	Sanitation and hygiene . . . . .	4
1.5	Integrated approach and thrust on behavioral change related to sanitation and hygiene . . . . .	6
1.6	Community participation/involvement . . . . .	6
1.7	Operation and maintenance . . . . .	6
2.	GOVERNMENT PLAN . . . . .	7
3.	PAST UNICEF ASSISTANCE . . . . .	8
4.	STATUS OF UNICEF ASSISTANCE UNDER THE CURRENT FOURTH COUNTRY PROGRAMME PERIOD 1988-93 . . . . .	8
5.	GENERAL OBJECTIVES . . . . .	9
6.	SPECIFIC OBJECTIVES . . . . .	9
7.	STRATEGY AND COMMON ELEMENTS IN THE PROPOSED UNICEF ASSISTANCE FOR THE PERIOD JULY 1992 TO JUNE 1995 . . . . .	10
7.1	Overall approach . . . . .	10
7.2	Achieving health impact . . . . .	11
7.3	Promotion of Programme sustainability. . . . .	12
7.4	Communication . . . . .	19
7.5	Training . . . . .	19
7.6	Involvement of women . . . . .	19
7.7	Convergence and interlinkages . . . . .	20
7.8	Research and development . . . . .	20

7.9	Priority to underserved area and pockets	21
7.10	Choice of Technology	22
7.11	Maintenance and rehabilitation	22
7.12	Monitoring and evaluation	22
7.13	Collaboration with other donor agencies	23
7.14	Relation to Chittagong Hill Tracts	23
7.15	Collaboration with other implementing agencies	24
7.16	Organization and Management	24
7.17	Finances	25
8.	THE PROJECTS	26
9.	INTENSIVE SOCIAL MOBILIZATION AND COMMUNICATION FOR SANITATION	27
9.1	Background	27
9.2	Specific Objectives	27
9.3	Project strategies	27
9.4	Development of Strategies and Materials	28
9.5	UNICEF Resource Inputs	31
10.	VILLAGE SANITATION	32
10.1	Specific Objectives	32
10.2	Physical objectives	32
10.3	Appropriate Sanitary Latrine Technology	32
10.4	DPHE Village Sanitation Centre	32
10.5	Mobile Production Centres	34
10.6	Training	35
10.7	Latrine construction, usage and maintenance	35
10.8	Strategy beyond 1995	36
10.9	Support to the private latrine production centres	36
10.10	Research and Development	36
10.11	Pilot studies	37
10.12	Monitoring and Evaluation	37
10.13	Transportation	37
10.14	Phasing of implementation (1992-95)	38
10.15	UNICEF Resources inputs	39
10.16	Plan of Operation: Village Sanitation	

11.	UNICEF WATER SUPPLY & SANITATION IN THE LOW WATER TABLE AREA . . . . .	40
11.1	Physical objectives . . . . .	40
11.2	Hydrogeological identification & monitoring of low water table areas . . . . .	40
11.3	Implication of declining water table . . . . .	40
11.4	Research and Development . . . . .	41
11.5	Installation of handpump system . . . . .	42
11.6	Cost recovery of deepset tubewells . . . . .	42
11.7	Training . . . . .	42
11.8	Transportation . . . . .	43
11.9	Phasing of implementation 1992-95 . . . . .	44
11.10	UNICEF resource inputs . . . . .	45
11.11	Plan of operation: Low Water Table Area . . . . .	
11.12	Plan of operation: R & Activities for drilling tubewells in stony formation.	
11.13	Plan of operation: R & D activities of Tara II handpumps	
11.14	Plan of operation: R & D activities for rejuvenation of choked up Tara tubewells	
11.15	Plan of operation: R & D activities on Mini Tara handpumps.	
12.	RURAL WATER SUPPLY & SANITATION IN THE COASTAL BELT .	46
12.1	Physical objectives . . . . .	46
12.2	Identification of least cost water sources . . . . .	46
12.3	Installation of handpump systems . . . . .	46
12.4	Cost recovery of deep tubewells . . . . .	47
12.5	Research and development (R&D) . . . . .	47
12.6	Training . . . . .	47
12.7	Transportation . . . . .	48
12.8	Phasing of implementation 1992-95 . . . . .	49
12.9	UNICEF Resource Inputs . . . . .	50
12.10	Plan of operation: RWSS in coastal belt	
13.	RURAL WATER SUPPLY & SANITATION IN THE SHALLOW WATER TABLE AREA . . . . .	51
13.1	Physical objectives . . . . .	51
13.2	Serving the underserved pockets in shallow water table area . . . . .	51
13.3	Installation of shallow tubewells . . . . .	52
13.4	Construction of ring wells in stony area . . . . .	52
13.5	Training . . . . .	53

13.6	Future of the programme . . . . .	53
13.7	Phasing of implementation 1992-95 . . . . .	54
13.8	UNICEF resource inputs . . . . .	55
13.9	Plan of operation: Shallow water table area	
14.	<b>WATER SUPPLY &amp; SANITATION IN URBAN SLUMS AND FRINGES</b>	<b>56</b>
14.1	Physical objectives . . . . .	56
14.2	Establishment of Pourashava-level implementation committee . . . . .	56
14.3	Identification of fringe and slum areas & establishment . . . . .	56
	of ward committees . . . . .	56
14.4	Identification of NGOs and other resource agencies . . . . .	56
14.5	Identification of appropriate tubewell technology . . . . .	57
	and scheme allocation . . . . .	57
14.6	Installation of handpump tubewell . . . . .	57
14.7	Construction of iron removal plants . . . . .	57
14.8	Construction of latrine production centres . . . . .	57
14.9	Production and sale of water seal latrine components . . . . .	57
14.10	Promotion of home-made latrines . . . . .	58
14.11	Training . . . . .	58
14.12	Assistance to UNICEF assisted slum improvement project (SIP) . . . . .	58
14.13	Future of the project . . . . .	58
14.14	Phasing of Implementation (1992-95) . . . . .	60
14.15	UNICEF Resource inputs . . . . .	61
14.16	Plan of Operation: Urban Slums and Fringes . . . . .	
	. . . . .	
15.	<b>RURAL WATER SUPPLY MAINTENANCE, REHABILITATION</b>	
	<b>AND UPGRADING</b> . . . . .	<b>62</b>
15.1	Physical objectives . . . . .	62
15.2	Upazilawise scheme allocation . . . . .	62
15.3	Sale of spare parts . . . . .	62
15.4	Rehabilitation of choked-up shallow TWs . . . . .	
	(desanding & resinking) . . . . .	63
15.5	Rehabilitation of deepset tubewells . . . . .	63
15.6	Rehabilitation of choked-up TWs in the coastal belt . . . . .	63
15.7	Phasing of obsolete handpumps . . . . .	64
15.8	Rehabilitation of on-site water treatment plants . . . . .	64
15.9	Construction of platforms . . . . .	64
15.10	Enlargement of existing one-bag platform . . . . .	64
15.11	Construction of iron removal plants (IRPs) . . . . .	64
15.12	Training . . . . .	65
15.13	Transportation . . . . .	65
15.14	Phasing of implementation 1992-95 . . . . .	66

15.15	UNICEF resource inputs . . . . .	67
15.16	Plan of Operation: Maintenance, Rehabilitation and Upgrading . . . . .	
15.17	Plan of Operation: Preparation of Annual Development Plan . . . . .	

TABLE

Table 1	Installation of new water supply system . . . . .	14
Table 2	Water supply maintenance, rehab.. & upgrading . . . . .	15
Table 3	Latrine production and sale . . . . .	16
Table 4	Proposed additional UNICEF support . . . . .	25



ANNEX	<u>No. of Pages</u>
Annex 1	Providing universal access to rural drinking water in Bangladesh by the year 2000 . . . . . 1-10
Annex 2	Universal access to sanitation in Bangladesh by the year 2000 is a possible goal . . . . . 1-5
Annex 3	National action plan for RWSS to achieve the goals for child development set out in the declaration of the world summit for children . . . . . 1-10
Annex 4	Organogram of DPHE . . . . . 1-2
Annex 5	Organogram of Water & Sanitation Section, UNICEF . . . . . 1-1
Annex 6	Handing over repair and maintenance of No. 6 and No. 4 hanpumps . . . . . 1-4

**GOVERNMENT OF BANGLADESH - UNICEF  
RURAL WATER SUPPLY AND SANITATION (RWSS)  
PROGRAMME 1992 - 1995**

**SUMMARY SHEET**

Name of the Programme : Rural Water Supply and Sanitation Programme

Duration : July 1992 - June 1995

Government Implementing Agency : Department of Public Health Engineering (DPHE), Ministry of Local Government, Rural Development and Cooperatives

" 000 US \$"

Programme Cost :

* Approximate Govt. Contribution	=	13,247.1 (23%)
Approx. Beneficiary Contribution	=	24,654.5 (43%)
UNICEF Contribution	=	19,614.6 (34%)
	-----	
Total	=	57,516.0 (100%)

**Phasing of UNICEF Assistance by Project**  
**(In thousands of US \$)**

	<u>1992-93</u>	<u>1993-94</u>	<u>1994-95</u>	<u>Total</u>
1. Intensive Social Mobilisation & Communication for Sanitation	200.0	0.0	0.0	200.0
2. Village Sanitation	782.6	1,132.6	1,428.6	3,343.8
3. RWSS in LWT Area	1,528.7	1,886.6	1,828.4	5,243.7
4. RWSS in Coastal Belt	981.2	844.2	836.6	2,662.0
5. RWSS in SWT Area	454.2	554.1	633.8	1,642.1
6. WSS in Urban Slums and Fringes	235.5	132.5	132.0	500.0
7. RWSS Maintenance, Rehabilitation and Upgrading	1,282.8	805.0	805.0	2,892.8
Sub-total	5,465.0	5,355.0	5,664.4	16,484.4
Project Support Services (UNICEF HQ) 6%	327.9	321.3	339.8	989.0
Consultancy Service	200.0	210.0	290.0	700.0
DPHE Organization Study	200.0	-	-	200.0
<b>TOTAL</b>	<b>6,192.9</b>	<b>5,886.3</b>	<b>6,294.2</b>	<b>18,373.4</b>
<b>Price &amp; Physical Contingencies (5%, 7.5%, 10%)</b>	<b>273.2</b>	<b>401.6</b>	<b>566.4</b>	<b>1,241.2</b>
<b>GRAND TOTAL:</b>	<b>6,466.1</b>	<b>6,287.9</b>	<b>6,860.6</b>	<b>19,614.6</b>

\* Only direct cost of the Government, excluding overhead and establishment cost.

## RURAL WATER SUPPLY AND SANITATION PROGRAMME (1992-95)

### 1. BACKGROUND/PROBLEM STATEMENT

#### 1.1 General

The provision of clean water, improved sanitation and hygiene are basic elements of Primary Health Care and are essential preconditions for child survival and development. Bangladesh has made enormous progress in the last eighteen years, installing some 732,000 public tubewells in addition to the previously existing 200,000, and producing almost 1.2 million water seal latrine units by June 1991.

#### 1.2 Morbidity and mortality

Every year about 250,000 children under 5 years of age, accounting for one-third of all child deaths, die of diarrhoea. Limited use of Tubewell water combined with poor environmental sanitation and standards of personal hygiene in Bangladesh contribute to the high rates of diarrhoeal diseases and parasitic infections in children. Although most people in rural Bangladesh today use tubewell water for drinking, only 16 percent use it for all domestic purposes. The practice of sanitary excreta disposal has improved, with 26 percent of the rural population using a sanitary latrine. However, all users are not maintaining the facilities hygienically. There has been very little improvement in personal hygiene practices. In Bangladesh there are an estimated 57.2 million episodes of under-5 child diarrhoea each year, causing 250,000 under-5 child deaths annually. Prevalence of parasitic infections in children under 5 years is frequently over 85 percent, leading to nutritional problems, lowering of resistance and increasing mortality from otherwise survivable diseases. The vicious cycle of malnutrition and frequent bouts of diarrhoea, which is a contributory cause of energy-protein malnutrition, particularly among children of pre-school age, inevitably leads to poor physical and mental development of the child.

Another important consideration is the relationship between soil-transmitted helminths and nutritional status. Heavy loads of hookworms cause anemia as a result of direct loss of blood consumed by the worms. In Bangladesh where much of the iron in the diet comes from vegetable source and is less easily assimilated, anemic cases are further aggravated by hookworms. In addition, high hookworm load can cause malabsorption of nutrient intakes. In an environment of low food intake due to poverty, roundworm infestation forms an additional interfering element.

In combating malnutrition and enhancing the quality of life of the people, particularly of the children, it is vital to create a healthy physical environment. The use of safe water and improved sanitation and hygienic practices are necessary interventions. In fact, preliminary findings from sanitation projects initiated in the

late 1970's by the World Bank in Columbia indicated a reduction of nutrition problems by 15 percent for every 10 percent increase in households with latrines.

### 1.3 Water Supply

#### 1.3.1 Regional Disparity in Rural Areas

While the improvement of rural water supply facilities is impressive, it has not been evenly spread throughout the country. The average national coverage in 1991 is estimated at 115 persons per operating public tubewell. However, coverage rates vary sharply by hydrogeological area, from an average of 85 persons per operating public tubewell in the shallow water table area, to 365 persons per operating public tubewell in the coastal belt and 463 per operating public tubewell in the low water table area. On average 80% of the rural people have access to safe drinking water.

The poor coverage in the coastal belt is largely due to groundwater salinity down to depths varying from 100 to 700 feet in certain areas. Some 25,000 deep tubewells have been installed in this area, drawing fresh water from 100 - 700 feet, underneath the saline layers. These deep tubewells are approximately nine times as expensive as the more common shallow tubewells suitable for most of the country, thus explaining the slower implementation rate has been slower. This situation is compounded by the fact that the rural population is more scattered and poor communications have made supervision and logistics particularly difficult. There are some areas in the coastal belt where even deep tubewell is not feasible due to salinity down to depth over 1,000 feet. Alternative technologies such as Pond Sand Filters and Very Shallow Shrouded Tubewells have been developed. There will still be some unserved areas for which exploratory and R&D works are required.

The poor coverage in the low water table area is due to the fact that the water table is beyond the range of the cheap suction-type handpump. The traditional deepset pump which was used is approximately five times more expensive, and is difficult for the beneficiaries to maintain, with the result that large numbers of the pumps that have been installed are out of order. Furthermore, the water table is falling in many parts of the country due to massive extraction of groundwater for irrigation, rendering thousands of suction-type handpumps unserviceable for part of the year. The percentage of the rural population living in low water table areas was 8 percent in 1985 and may rise to 35 percent in 1995. Conversely, the percentage of the rural population in the shallow water table area would decline.

A better assessment of the extent of the area to be affected by decline of water table will emerge from a study to be undertaken in this programme.

To overcome the problem of the falling water table, the Tara handpump has been developed which is less than half the price of the traditional deepset handpumps. Tara pumps can be locally manufactured and be maintained by the beneficiaries without hand tools.

In early 1991, research activities have been initiated to develop a Mini-Tara, based on the Tara technology, which can fit into existing shallow suction (No.6) tubewells with minimum modification to the latter. Preliminary findings are promising and this alternative has the potential of keeping existing tubewells located in the declining water table zone operational throughout the year, without the need to sink a new Tara tubewell.

Although the shallow water table area is better served than average, the coverage is still inadequate. The health impact of tubewell water will always be limited as long as people continue to use other sources as well. The more convenient the tubewell water becomes in comparison to other sources, the greater will be the use of tubewell water. To make the tubewell more convenient it is necessary to increase the size of the platform to permit multipurpose and simultaneous use by a few people, and to reduce the number of persons using each tubewell by providing more tubewells. Studies have shown that, in Bangladesh, the average per capita water consumption from all sources is approximately 50 litres per day. A study by ICDDR,B indicated that the per capita daily consumption of tubewell water increased from 19 to 51 litres as the average tubewell user group size reduced from 82 to 12 persons. This implies that use of tubewell water for all purposes may be achieved when the level of service approaches one tubewell per bari. Therefore there is a need to continue to improve coverage, ultimately to achieve this level. But with the regional disparity in access to tubewells being so high and UNICEF's resources so limited, this should soon become the responsibility of the Government to continue to provide shallow tubewells in collaboration with the people to maintain and improve the present level of coverage in the shallow water table area.

An estimated 3 million people still use unprotected water sources such as ring wells or springs in areas where tubewells are not feasible or difficult due to stony ground formations.

### 1.3.2 Urban Slums and Fringes

The situation in the peri-urban fringe areas and urban slum pockets also deserves attention. There are 104 municipalities in the country, of which 64 are district towns. Data for the district towns indicate that approximately 33 percent of the urban population have a reasonable public water supply: 10 percent by house-connection calculated at 13 persons per connection; 6 percent by public standposts at 100 persons per standpost; and 17 percent public handpumps at 75 persons per handpump. However, piped water supply generally serves only the core area of the

municipality. While the Government has plans to improve coverage substantially in the core areas, so far there is gradually some provisions planned for the considerable proportion of the population that lives outside the area served or likely to be served by piped water supply. The ongoing rural water supply programme of DPHE does not extend to the fringe or peri-urban areas of the municipalities. It is likely that these are less well-served by hand pump tubewells than the national average. In addition, even within the core areas there are frequently slum pockets which are not served adequately by existing or proposed water supply schemes. With UNICEF assistance, the Government has taken up a project from the fiscal year 1989-90 to address the problem of urban slums and fringes. The progress so far has been very insignificant.

#### 1.4 Sanitation and hygiene

A recent evaluation of the Union Village Sanitation Centres and the revolving fund schemes suggests the need for improvement in management and planning, and inadequate supervision by DPHE generally leading to poor quality control of products, stock-piling and large accumulation of funds at the centre. Urgent follow-up actions based on the recommendation will be taken up to remedy the shortcomings.

Bangladesh has developed a programme for the promotion, production and sale of low cost water-seal latrines. In the 1970's, UNICEF and WHO assisted the Department of Public Health Engineering (DPHE), on a pilot basis to develop a rural sanitation programme based on the production and sale of water-seal latrine components. After the early pilot projects, a full scale programme was prepared, the first phase of which started in 1978-79. Initially the programme experienced a very low demand ranging from 3,000 to 5,000 per year. An evaluation conducted by WHO (1989) also showed that 70 percent of the users use and maintain hygienically. Since that time the demand for the subsidized latrines has grown substantially. The present production capacity of the 1000 existing production centres is well over 500,000 units per year but the sales have never exceeded 250,000 units per year.

Due to wide spread demonstration, production and sale of latrines from government centres over the years and promotion of sanitation through sustained communication, social mobilization and integrated approach to water, sanitation and hygiene, a favourable situation has been created for accelerated sanitation programme. There are now roughly 700 private producers and some 80 NGO production and selling centres which produce latrines following the government design. Politicians are now gradually becoming aware about the importance of sanitation and are urging people to improve their sanitation and personal hygiene practices.

The recent national survey (1992) showed that the use of sanitary latrines has increased to 26 percent in 1991 from 10 percent in 1989. 60 percent of the latrines

were of the homemade (do-it-yourself) type, 3 percent were septic tank design and 7 percent were of the waterseal one-slab with one or more rings. A recent WHO sample survey (1992) was conducted on the one-ring and one slab latrine which represent about 25% of all waterseal latrines. The data showed that of the users whose waterseal latrine pits were filled up, about 17 percent went back to open defecation and 30 percent use them unhygienically. The main reasons for them are lack of proper knowledge of shifting when filled up.

Although the sanitation programme has expanded in terms of numbers of latrines produced and sold, and that the present coverage with sanitary latrines has recently reached 26%, there has been no measurable decline in the incidence of diarrhoeal diseases and parasitic infections in children in this period. It is acknowledged that coverage is still low and that the government programme alone cannot achieve the target of full sanitation coverage. During the last two years, the sanitation activities expanded largely as a result of the Integrated Approach which promoted the do-it-yourself (homemade) latrines. For continued accelerated progress, a new dimension is added to the IA approach with emphasis on people's participation, social mobilization and affordable technology.

The private sector needs to be strengthened to produce and sell latrine components. However, the private sector is currently somewhat constrained because it is competing with the subsidized price of the Government latrines. Therefore it will be necessary to gradually reduce the subsidy on Government-produced latrines and/or adjust Government production in a way that private sector can play a complementary role.

Though problems with and clogging of the waterseal is observed, the water-seal latrine is considered an appropriate low-cost technology for which there is a potential market. However, even at the current subsidized rate, many rural families cannot afford this technology.

Faecal contamination of the environment and, thus, the transmission of disease will continue until the vast majority of people practice sanitary excreta disposal. Therefore it is essential that poorer people also build and use latrines. Experiences to-date have demonstrated that it is possible to build a homemade (do-it-yourself) hygienic, simple pit latrine entirely with locally available materials. There is a need, therefore, to continue the promotion of such latrines as an alternative for families who cannot, as yet, afford a water-seal latrine.

In addition, there is a need for an intermediate technology (SANPLAT) to provide a wider range of option.

Studies have shown that the most significant practices relating to diarrhoeal diseases in children are indiscriminate defecation by young children around the bari (house) in which they play and the handwashing practices of the mother, particularly before food preparation and serving.

#### 1.5 Integrated approach and thrust on behavioral change related to sanitation and hygiene

Faecal pollution of the environment and poor hygiene practices provide ample opportunities for the continued transmission of these diseases even after clean water is made available. a combination of expanded use of tubewell water, improved sanitary practices and improved personal hygiene are necessary, though not sufficient, conditions for significant health impact. Integrated approach to sanitation and hygiene with respect to new installations (of tubewells) will be implemented in 256 out of 460 Upazilas by June 1992. The whole country will be brought under this approach by 1995. A phased national scale intensive social mobilization has to be effectively carried out for improvement of sanitation and hygiene practice.

#### 1.6 Community participation/involvement

In all water supply and sanitation programmes, the beneficiaries play a significant role. In all cases of handpump system installations, the beneficiaries select the location of the installation. They contribute in cash, leaving the actual installation responsibilities to the Government to carry out through contractors. After installation the beneficiaries themselves carry out the maintenance of the No. 6 handpump at their own cost. However, for TARA Deepset pumps, spares are still provided free of cost.

For waterseal latrines from government or private sources, the beneficiaries pay the prices fixed by the respective agencies and bear the entire cost of carriage and installation including superstructure. For homemade latrines, and those purchased from private sources, the responsibility lie entirely with the beneficiaries.

#### 1.7 Operation and Maintenance:

The record for operation and maintenance of handpump tubewells in Bangladesh is remarkably good. Based on the latest national survey (1992) approximately 90 percent of all public tubewells are in operation at any time and approximately 3 percent of tubewells are presently choked up. This is to be expected, considering that approximately 25 percent of tubewells are over 20 years old, and the simple but appropriate technology used.



Approximately 7 percent of handpumps are out of order at any time due to failure of the pump mechanism. In most cases the pump is out of order for a short time, because responsibility for maintenance lies with the beneficiaries. The beneficiaries nominate a Caretaker Family that is trained and receives tools to repair the handpump. Spare parts are provided through DPHE, and are also available in the local market. The average cost of spare parts per handpump per year is approximately US \$ 2.5 or Tk. 100. For a shallow tubewell this represents two cents (US) per beneficiary per year.

Once installed, the maintenance and improvements of latrines are entirely the responsibility of the beneficiaries. A recent study by WHO (1992) of the one-ring and one-slab latrine which represent about 25 percent of all waterseal latrines showed that when the latrine parts are filled up, 17 percent went back to open defecation and 30 percent use them unhygienically. However, field observations have shown that the homemade latrines are generally well maintained.

2.

### GOVERNMENT PLAN

The Government of Bangladesh is committed to achieve universal coverage of rural water supply and sanitation. Since independence in 1972, the Government has been consistently implementing rural water supply and sanitation programme resulting in the impressive improvement of coverage from 417 people in 1972 to 115 in 1991 per operating public tubewell and from zero coverage to approximately 26% coverage (10.4% waterseal and 15.3% sanitary pit latrine) in respect of rural sanitation during 1991. The Government has substantially increased its budget allocation to this sub-sector for the last year of the Third Five Year Plan Period (1985-90) and plans to continue the trend in the 4th Five Year Plan Period (1990-95). The 4th Five Year Plan document of the Government indicated higher allocation to this sector with the intention to achieve accelerated implementation of rural water supply and sanitation programme and uniform coverage by water supply between the different hydrogeological regions of the country. Government plan includes sharing of responsibility and cost of installation and maintenance with the beneficiaries to achieve sustainability. To achieve health impact the integrated approach to implementation of water supply, sanitation and hygiene will be expanded to cover all upazilas.

The Government also plans to bring about behavioral change in terms of personal hygiene practices among the people to achieve health impact, particularly among children. This would be achieved through social mobilization and the promotion of socially and affordable technologies.

During natural calamities, the government undertakes activities in addition to the planned GOB-UNICEF programme; they are usually limited to the sinking of tubewells. Such activities are implemented on an ad-hoc basis and the size depends on the financial allocation made available either from bilateral aids or from GOB special funds. In the period 1991-92, the Saudi Government provided US\$ 4 million for sinking of 2000 deep and 7000 shallow tubewells in the cyclone affected coastal

belt. GOB provided US\$ 3 million for 900 deep tubewells, 6620 shallow tubewells and 2850 Tara tubewells in response to droughts in Rajshahi Division. During 1990/91 and 1991/92, 18% and 41% of all DPHE tubewells were installed through these special allocation. The quality control of the Tara tubewells were provided by UNICEF, and the Government will provide quality control of future tubewell materials. The site selection procedures of the normal programmes are followed. However, the contribution from users were not collected from the affected areas during calamities on special consideration.

### 3. PAST UNICEF ASSISTANCE

UNICEF's involvement in Rural Water Supply and Sanitation Programme in Bangladesh effectively began in 1972 immediately after the emergence of the country when it desperately needed assistance in this Sub-sector. Since then UNICEF provided substantial assistance in the form of supplies, logistics, training and programme communication through a number of country programmes. By June 1991, the Government has installed and maintained 732,000 handpump systems, rehabilitated 190,000 choked up tubewells and produced and sold over 1.2 million waterseal latrines with UNICEF assistance.

UNICEF also provided technical assistance and support to improve the designs of water and sanitation technologies, develop alternative technologies and hydrogeological mapping of coastal and low-water table areas. In the earlier stages of the programme, UNICEF demonstrated and successfully persuaded the Government to adopt community involvement in the programme implementation. UNICEF also provided support in respect of development of infrastructure and human resources. UNICEF has been providing operational support in respect of quality control in physical implementation and overall management of supplies and transports.

Programme implementation has in general been smooth since the beginning without major constraints. As a major breakthrough, UNICEF assisted the Government to set up self supportive revolving system in the production and sale of water seal latrines and sale of spare parts for maintenance of Handpump No. 6. However, the spare parts selling were postponed by GOB after 6 months on the ground of floods. However, GOB agrees to restore the system from July 1992 onwards.

### 4. STATUS OF UNICEF ASSISTANCE UNDER THE CURRENT FOURTH COUNTRY PROGRAMME PERIOD 1988-93

UNICEF sought US\$ 29.5 million in supplementary funding for assisting the Government in implementation of six projects under the Water and Environmental Sanitation Programme in the July 1988 to June 1993 period. Due to Government's accelerated implementation coupled with cost escalation, the allocation of US \$29.5 was exhausted in early 1992 with varied degree of physical achievement. Hence,

additional funding is being sought by UNICEF to support the current GOB Fourth Five Year Plan in the Water and Sanitation Sector.

5.

### GENERAL OBJECTIVES

The general objectives of this proposal for new UNICEF assistance for water supply and environmental sanitation programme are to help the Government:

- a) reduce the incidence of diarrhoeal diseases and parasitic infections in children by further expanding clean water facilities integrated with improved sanitation and promotion of personal hygiene; and
- b) strengthen its national capacity to provide water supply and sanitation facilities for rural areas and urban slums and fringes in a way that will achieve the maximum possible health impact, and with particular emphasis in the underserved coastal and low water table areas, and behavioral change in sanitation and hygiene practices.

6.

### SPECIFIC OBJECTIVES

The specific objectives linked to general objective (a) are:

- a) Increase use of tubewell water for all domestic purposes.
- b) Increase regular and sustained use of sanitary latrines by all family members.
- c) Improve domestic hygiene habits practiced by all family members.

The specific objectives linked to general objective (b) are:

- d) enhance long-term financial sustainability of the programme by the Government of Bangladesh.
- e) Strengthen the capability of DPHE and allies, particularly in the "software" component of the programme.
- f) promote the growth of the private sector.
- g) increase community participation.

7. **STRATEGY AND COMMON ELEMENTS IN THE PROPOSED UNICEF ASSISTANCE FOR THE PERIOD JULY 1992 TO JUNE 1995**

Useful background information on the long-term strategy for water and sanitation up to the year 2000 are outlined in Annexes 1 and 2. A National Plan of Action by DPHE covering the same period is given in Annex 3. In addition, "A proposal for Future Strategies" has been produced by UNDP in the Water and Sanitation Sector in Bangladesh (Sept. 1991). The experiences to be derived from the implementation of this programme will assist in refining the long-term strategy.

7.1 **Overall Approach**

The strategies during the 1992-1995 programme period to achieve these objectives are in particular the following:

- a) continue to improve water supply coverage in underserved areas.
- b) focus water supply on the coastal belt, low water table areas and stony layer areas to reduce national disparities.
- c) focus water supply on underserved pockets in all areas.
- d) intensive sanitation and hygiene promotion campaign in intensive advocacy, social mobilization and programme communication.  
110 diarrhoeal-prone upazilas combined with awareness building on the national scale.
- e) promotion of a range of affordable sanitary latrine technologies.
- f) increased involvement of women in programme activities.
- h) enhanced sustainability through increased financial contribution and participation by users and through strengthening of the capabilities of DPHE and other partners.
- i) reduced of subsidies in order to promote the growth of the private sector.
- j) continued improvement of the programme through R & D activities.

Some of these strategies are discussed in more detail in the sections below.

## 7.2 Achieving Health Impact:

To maximize the health impact, tubewell installation will follow an integrated approach, combining improved water supply, sanitation and hygienic practices in the same beneficiary group. The programme will further develop interlinkages with other health related UNICEF-assisted programmes. In addition an intensive communication and sanitation programme will be taken up for CDD Upazila to substantially increase the sanitation coverage and improve hygienic practice, supported by national and sub-national level social mobilization.

In the past, the water-seal latrine has been assumed to be the only sanitary technology in the country. Simpler homemade pit latrines were generally considered to be unhygienic. However, the hygienic quality of a waterseal or simple pit latrine largely depend on the habits and practices of the user. Therefore, the approach to sanitation will be to motivate people to dispose safely of human excreta and to develop and demonstrate the various types of "technologies" that they can choose from, depending on their ability to pay.

**The Integrated Approach:** (For new installations) It is recognized that the minimum conditions necessary to achieve health impact are:

- a. Expanded use of tubewell water by all beneficiaries for all domestic needs.
- b. Practice of hygienic excreta disposal by the same beneficiaries, with due attention to hygienic disposal of the faeces of young children.
- c. Practice of improved personal and domestic hygiene like thorough hand washing by everyone in the same beneficiary families.

To achieve these objectives DPHE, with the support of UNICEF, has developed new implementation procedures based on the following principles:

- i. In order to **increase use of tubewell water**, all beneficiaries must feel a greater sense of ownership of and uninhibited access to the tubewell. This requires better participation by all beneficiaries in the whole process of application, site selection, contribution, installation and maintenance. The participation of all beneficiaries will also facilitate promotion of sanitation and hygiene.
- ii. In order to **increase sanitary excreta disposal practices** in the same beneficiary group, vigorous promotion of latrine construction by beneficiary householders, without enforcement, is necessary. The homemade latrine made entirely of local materials and other intermediate technologies will be promoted for the less affordable families. Families will be encouraged through motivation and

education to construct and use sanitary latrines in the context of tubewell provision.

- iii. In order to **improve personal and domestic hygiene** promotion activities will be undertaken, for which communication materials will be made available; health promotion and awareness raising activities will be conducted through public meetings and house-to-house visits among the prospective tubewell user group.

The procedures of the **Integrated Approach** for tubewell provision and sanitary latrine construction can be summarized as follows:

- a. Application forms for tubewells are widely distributed and require the participation of all beneficiaries for completion.
- b. Once selected, based on site selection criteria, the applicant families form a group, under the guidance of the DPHE field staff.
- c. Applicant Groups undertake a sanitation and hygiene promotion campaign to encourage as many households as possible to build a hygienic latrine and to adopt hygienic practices.

In addition, seminars are organized at upazila and union levels for change agents, including school teachers, health workers, NGO field workers, women's groups and religious and local leaders. The participants are explained the benefits of a combined water, sanitation and hygiene package, the potential role they can play as community leaders, and the need to integrate sanitation with other sectoral activities. Thus, sanitation has been made a permanent agenda in union parishad meetings in certain upazilas, and miking, rallies and other events have been initiated taken up as part of IA activities.

### 7.3 **Promotion of Programme Sustainability:**

Continued emphasis will be given to promotion of a sustainable water supply and sanitation sector. Among others, the following strategies will be applied.

#### 7.3.1 **Reduction of Subsidy**

In order to increase programme sustainability, beneficiaries would enhance the contribution to cost sharing and recovery. The major aspects under consideration are:

- a) Installation of new water supply systems,
- b) Water Supply Maintenance, Rehabilitation & Upgrading and
- c) Latrine Parts Production and Sale

The current and long term plan towards increased contribution by users is shown in Table 1 for installation of new water systems. For the period 1992-95 the proposed increases in user contributions more or less catches up with inflation since the present rates were introduced. Consequently, the overall approach (section 7.1 h) of enhancing sustainability through increased financial contribution is implemented after 1995 only.

Users' contribution are also increased for water supply maintenance, rehabilitation and upgrading. The current and future levels of contribution are shown in Table 2. Free distribution of spare parts for Handpump No.6 and Tara will be stopped and selling will be restored by the GOB from 1992-93 using the mechanism already developed.

Table 1

INSTALLATION OF NEW WATER SUPPLY SYSTEMS  
Beneficiary Contribution

Type of technology	Estimated total cost based on 1992 price	Estimated labour cost for installation based on 1992 price	** 1991-92 beneficiary contribution	** 1992-95 beneficiary contribution (1)	** 1995-97 beneficiary contribution (1)	** 1997-2000 beneficiary contribution (1)
Deep tubewell	Tk. 40,000	Tk. 21,000	Tk. 1,000 (2.5%)	Tk. 2,000 (4.3%)	Tk. 3,000 (5.1%)	Tk. 5,000 (6.6%)
TARA deepset wells	Tk. 12,500	Tk. 3,700	Tk. 350 (2.8%)	Tk. 1000 (6.8%)	Tk. 1,500 (8.1%)	Tk. 2,500 (10.7%)
VSST	Tk. 2,800	Tk. 1,900	Tk. 350 (12.5%)	Tk. 700 (21.5%)	Tk. 1,500 (36.4%)	Tk. 1,900 (36.3%)
SST	Tk. 3,500	Tk. 2,300	Tk. 350 (10%)	Tk. 700 (17.2%)	Tk. 1,500 (29.1%)	Tk. 2,300 (35.1%)
PSF	Tk. 18,000	Tk. 9,000	* Free	Tk. 2,000 (9.5%)	Tk. 3,000 (11.3%)	Tk. 5,000 (14.8%)
STW	Tk. 3,800	Tk. 1,000	Tk. 350 (9%)	Tk. 700 (15.8%)		
Ring Well	Tk. 40,000	Tk. 15,000	-	Tk. 1,000 (2.1%)	Tk. 2000 (3.4%)	Tk. 3000 (4.0%)

\* According to the implementation guideline the beneficiaries are supposed to contribute in kind equivalent to Tk. 1,500 approximately.

\*\* % of contribution is calculated based on total cost and assuming 10% inflation.

(1) % of beneficiary contribution is the average for the specified period using annual inflation of 10% to derive average estimated total cost for the period.



Table 2

WATER SUPPLY MAINTENANCE, REHABILITATION & UPGRADING  
Beneficiary Contribution

Type of technology/ Activity	Estimated total cost based on current price	Estimated labour cost for installation based on 1992 price	* 1991-92 beneficiary contribution	* 1992-95 beneficiary contribution	* 1995-97 beneficiary contribution	* 1997-2000 beneficiary contribution
Spare parts for HP No.6	Tk. 100/yr	-	free <sup>(1)</sup>	Purchase <sup>(3)</sup>	Purchase <sup>(4)</sup>	Purchase <sup>(4)</sup>
Spare parts for TARA	Tk. 70/yr	-	free	Purchase from DPHE	Purchase	Purchase
Desanding of choked up STW		** Tk. 40	TWM/free	TWM/free	Full amount	Full amount
Resinking of choked up STW	Tk. 2,700	Tk. 1,800	Tk. 350 (13%)	Tk. 700 (26%)	Tk. 1000 (28%)	Tk. 1,500 (34.5%)
Construction of IRP	Tk. 3,000	Tk. 1,900	Free <sup>(2)</sup>	Tk. 400 (13%)	Tk.1,000 (25%)	Tk. 1,900 (39%)
Repairing of HP No. 6 (physical work)	-	-	TWM/ Beneficiaries	Beneficiaries/ TWM	Beneficiaries	Beneficiaries
Repairing of TARA (physical work)	-	-	TWM/ Beneficiaries	TWM/ Beneficiaries	TWM/ Beneficiaries	Beneficiaries (TWM)
Mini Tara	Tk. 3200	Tk. 700	-	***Tk. 700 (22%)	Tk. 1000 (23.4%)	Tk. 1500 (29%)

- (1) Selling started from December 1988 ;but stopped after six months on the ground of law.
  - (2) According to the implementation guideline the beneficiaries are supposed to contribute in kind equivalent to Tk. 400 approximately.
  - (3) Purchase from DPHE and Private Sector
  - (4) Pending the study on handing over No.6, purchase from private sector only.
- \* % of contribution is based on total cost and 10% inflation.  
\*\* Cost of carriage only.  
\*\*\* Beneficiary contribution will be realized from 1993-94

Desanding of choked up tubewells will be done free of cost up to 1995 after which the beneficiaries are expected to take over. Beneficiaries contribution for resinking of choked up tubewells and construction of IRP will be gradually increased to reduce the burden on the Government.

Table 3 shows the reduced subsidy in the waterseal latrine production and sale. The principle of subsidy for 1992-95 is that the cost recovery will be proportional to Government cost with inflation.

The plan from 1995 onwards is tentative only. A detailed subsidy strategy will be prepared as a part of the programme proposal for the period after 1995.

Table 3

LATRINE PRODUCTION AND SALE  
Beneficiary Contribution

Item	1992 production cost (Tk.) (1991-92)			1992 - 95 Production Cost <sup>(1)</sup>			1995 - 2000
	GOB	UNICEF	TOTAL	GOB	UNICEF	TOTAL	
FC slab with pan (one)	62	84	146	72	97	169	Tentatively 40% subsidy in 1997 and 25% subsidy in year 2000.
RCC ring (one)	47	40	87	54	47	101	
Total:	109	124	233	126	144	270	
Proposed selling cost of one slab and one ring		Tk. 70 (70% subsidy)			Tk. 125 (54% subsidy) (2)		

(1) Production cost is calculated based on 1992 price and 10% annual inflation and averaged for 4 years i.e. 1992, 1993, 1994 and 1995.

(2) Average % of subsidy for the period is based on total cost and 10% annual inflation.

### 7.3.2 Enhancement of Users Involvement

Cash contribution of the beneficiaries for both new installation and maintenance and upgrading would be increased as shown in Tables 1, 2 and 3. Greater beneficiaries involvement from mid 1994 in actual maintenance of HP No.6 has been planned. The actual implementation is subject to the findings of the pilot study mentioned in section 15.3. Once implemented, the beneficiaries will be entirely responsible for maintenance of the HP No. 6 which includes both physical work and provision of spares.

As the training of Tara Caretaker Families will be strengthened, it is expected that the beneficiaries will also gradually play a greater role in maintenance of the Tara pump along with the Tubewell Mechanics. Caretaker family training for each HP system implemented during 1992-95 will be given which will improve maintenance substantially. The present efforts to clear the backlog in CTF training will be continued and completed during 1992-93. All CTFs of Tara who have not been trained recently will receive refresher training.

Desanding of the choked up STW will be properly operationalised during 1992-95 with necessary study in the first year. It is expected that by the end of the FY 1994-1995 the system will become popular and the community will bear the cost of the desanding.

Training of Caretakers families for Iron Removal Plants and Pond Sand Filters will be strengthened so that the beneficiaries can take care of day to day maintenance of the plants themselves. Provision will be made for storing the important spare parts of these plants at DPHE upazila stores, so that the beneficiaries have easy access to them.

The programme has contributed considerably to the general promotion of shallow tubewells fitted with No. 6 handpumps. The technology is widely known by now. Consequently, as a major step towards sector sustainability, the shallow tubewell component is being phased out during 1992-95.

### 7.3.3 Private Sector Involvement

The Private Sector has been playing the key role in actual pump production, installation and construction of handpump systems. Private tubewell Mistries and private masons are engaged by the contractors or DPHE to drill new tubewells, resink choked up handpumps and construct iron removal plants and pond sand filters. This will continue without interruption. Moreover, it is expected that private tubewell Mechanics will become involved in desanding of the choked up tubewells from 1995. The Private tubewell Mechanics are already playing an important role in maintenance of the HP No.6. When the Government tubewell mechanics may be withdrawn following the outcome of the study, users themselves will take over the responsibility of maintenance of HP No.6.

The private sector has been selling a large proportion of the total spare parts, needed for HP No.6 along side the public sector. When public sector sale of No.6 pumps will be stopped following the study, the private sector will entirely take over this operation. As selling of Tara spare parts will begin from 1992-93, the private sector is expected to be more involved. A planned massive promotion of sanitation will create a demand for latrines, which will give the private producers a good market

Under the 1992-95 programme, latrine slabs with one ring only will be produced and the private sectors will be expected to meet the demand for additional rings. Moreover, the subsidy reduction on the sale of one slab and one ring from the DPHE latrine production centres will reduce the price difference between public and private sector and encourage the private sector to grow faster. The promotion of second pit which will be a strategy during 1992-95 onwards will also create greater market for the private sectors. Moreover, a pilot project expected under bilateral financing, will indicate (Section - 10) what direct assistance will help the private sector to grow and operate more efficiently

#### 7.3.4 Institutional Strengthening of DPHE

DPHE has been very efficient in the day-to-day implementation of the hardware components of the projects. Their role for software aspects like training, communication, mobilization, monitoring, R&D and WID has been increased somewhat, but will increase further in the future. It is necessary to readjust and/or increase its capacity in all key areas. In view of this, a study of the DPHE organization, particularly in relation to its role and responsibilities for RWSS programme will be conducted in order to determine the actual need which will be followed by necessary action for reorganization and strengthening.

#### 7.3.5 Institutional Strengthening of Partners

It has been recognized that DPHE needs partnership of various potential organizations such as High School System, Primary School System, NGOs, Women Organization, Islamic Foundation, etc., particularly in social mobilization for sanitation. The programme covers the training of selected representatives from the partner organizations who will be used as resource persons during the training of their respective change agents, e.g. headmasters, field level workers etc. The partners will be assisted by UNICEF monitoring unit in setting up simple reporting and monitoring system for the intensive sanitation areas.

It is the intention to use existing manpower and infrastructure of the NGOs and other institutions such as the school network rather than creating new set-ups.

#### 7.4 Communication:

UNICEF will provide assistance to Government for the production of public information material for effective operation of the programme and for raising public awareness of healthy and hygienic practices. UNICEF will also support orientation and training of local government and non-government staff and local leaders in the operational aspects of the water and environmental sanitation projects and in how to use the public information materials. The emerging political will of the Government will be further supported through national level seminars as well as local level campaigns to be mounted under the leadership of people's elected representatives like and Union Parishad Chairmen. Further elaboration on sanitation aspect is given in Section 9.

#### 7.5 Training

Since inception of UNICEF assisted programme, sporadic training activities were undertaken under each project. The training activities have generally been given very low priorities. This has been reflected in the large backlog of Tara pump caretakers. In addition, the quality of the training methodology in general as well as the content of the curriculum can be further improved. This will be given due attention in this project, particularly in the content of social mobilization for sanitation and the training of other partners. In addition, an analysis of a medium and long term strategy for training of DPHE staff would be included in the proposed organizational study of DPHE referred to in Section 7.16.

Training will cover both the technical and hygiene sanitation components as identified under each project. The training modules will be updated as necessary to make the training more participatory and effective. UNICEF will finance the annual refreshers courses for SDEs, SAEs and TWMs through Reimbursable Project Aid (RPA). Details of training have been elaborated under the different projects.

A UNDP/World Bank International Training Network (ITN) Centre is planned at Bangladesh University of Engineering and Technology (BUET) for further promotion of appropriate technology and social engineering. The present programme will collaborate with this ITN Centre, as appropriate.

#### 7.6 Involvement of Women:

Women are not only the main drawers and users of water, they can significantly reduce the incidence of diarrhoeal disease and parasitic infections in their children by adopting improved practices of personal and domestic hygiene and by installing improved sanitary habits in their children. The programme will take special measures to involve and influence women, to ensure that they participate more fully in the programme and in the

activities necessary to achieve the health impact. The women will be encouraged to select the actual location of the tubewells. They will also be trained for maintenance of the handpumps.

DPHE will make provision for replacement of male tubewell mechanics on retirement by female tubewell mechanics to encourage women participation. They will be supported and monitored among others by a senior female engineer, who will be trained on "Women in Development" issues.

In UNICEF, the focus on women's issues will receive more attention with the recruitment of two senior female sanitation officers to make an all-female sanitation unit.

In the collaboration with NGOs for the intensive sanitation programme in 110 upazilas, the field level workers will be predominantly females, thus facilitating interaction with the female family members.

#### 7.7 Convergence and Interlinkages:

The chances of achieving health benefits for children are significantly enhanced when child survival activities are brought together to converge in one community. Even where full convergence is not possible, interlinkages may be made with other child survival activities, particularly through orientation of field staff of different Government and non-government implementing agencies. This programme will exploit all opportunities for convergence and interlinkages with other child survival activities particularly CDD. ORT messages will become part of the sanitation and hygiene promotion messages. People will be encouraged to use ORS sachets or Lobon Gur Sharbat (LGS) when necessary, and to report diarrhoea episodes to the extension workers of Department of Health Services (DHS) directly or through any extension worker including DPHE field staff (Tubewell Mechanics of Health Educators).

#### 7.8 Research and Development:

DPHE will conduct Research and Development activities to improve existing technologies, develop cheaper alternatives and develop technologies for those situations in which existing technologies cannot be applied. The activities will be coordinated by SE (Groundwater Circle) through the DPHE Research and Development Division with technical assistance from UNICEF, WHO, and other research institution, as necessary. For any works which will need sophisticated scientific intervention for which DPHE does not have the appropriate professional staff and necessary equipment, existing research institutions will be engaged to carry out various research and development work, as appropriate, on behalf of DPHE.

UNICEF will provide funds for all Research and Development activities agreed between UNICEF and DPHE.

A number of Research & Development works are envisaged during the programme period. Detailed plan of operation of R & D activities are given in the respective project description.

The R & D activities will be initially identified by the R & D Division of DPHE in collaboration with UNICEF. A systematic workplan will be developed and implemented by the R & D Division.

There are certain stony and rocky areas in the country where drilling tubewells is difficult with the locally available technologies. Declining water table renders a considerable number of No. 6 suction handpumps inoperative during the dry season. Rejuvenation of these handpumps with Mini Tara would result in enormous saving of cost which would otherwise be necessary to replace these by Tara pumps.

Further improvement on the existing latrine technologies is possible. There is a need to develop intermediate technologies such as sanplats, and other option such as the plastic pans. Method of profitable use of human excreta or digested pit contents needs to be explored. All these issues will be addressed through Research & Development activities.

Currently DPHE is carrying out R&D works with assistance from UNICEF & DANIDA on Tara-2, Mini Tara and exploratory drilling in the coastal belt.

After satisfactory completion of the R & D activities, the respective technologies will be tested in the field on a limited scale and monitored effectively before introduction to the regular programme.

#### 7.9 Priority to Underserved Areas and Pockets:

The programme will accord top priority to the underserved areas. The main categories of underserved area are the coastal belt, the low water table area, the urban slums and fringes, stony layer area and underserved pockets within the better-served shallow water table area. In terms of financial allocations, approximately 16% of the total of UNICEF and Government resources under this programme is allocated to the coastal belt, and 32% to the low water table area. A new project for the urban slums and fringes is also included. The project for the shallow water table area will focus on underserved Unions to achieve a more uniform coverage, and NGOs will be encouraged to install tubewells in underserved pockets and among the poorest groups, as per guidelines set by Government in agreement with UNICEF. The strategies to be adopted for reducing disparities in the low water table areas and the coastal belt and to identify underserved

pockets in the high (shallow) water table area are described in the respective project headings. In essence, upazilawise allocation will be done at DPHE Headquarter level and the unionwise allocation will be made by the DPHE field level staff to achieve uniform service coverage. The unionwise allocation will be verified by UNICEF.

#### 7.10 Choice of Technologies

In the past the proposed choice of technology was not always in accordance with the hydrogeological conditions. For the 1992-93 ADP preparations this problem has been solved.

In the preparation of the ADP, the selection of the type of technologies, e.g. type of pumps and tubewell and the depths of tubewells will be carried out using the two reports prepared by the Groundwater Exploration and Development Circle, DPHE, on "Guidelines for Choice of Well Technology" and "Guidelines for Choice of Pump Technology" (June/May 1991). These guidelines will be updated with the accumulation of more field data. The choice of technology will be verified by UNICEF.

#### 7.11 Maintenance and Rehabilitation:

Increased attention to maintenance and rehabilitation by strengthening the community base maintenance system will be given. Transfer of DPHE maintenance of the No. 6 handpump to the users will be tested in a pilot area. If successful all No. 6 handpumps will be maintained by the beneficiaries without government involvement. Because of newness of TARA deepset technology and also non-availability of TARA spare parts in the market, UNICEF will supply TARA spare parts through DPHE for sale to beneficiaries. The sale proceeds will be used to generate revolving fund as created for the spare parts of No. 6 handpump.

The technical and economic feasibility of desanding shallow choked up tubewells will be reviewed and if found feasible be given same priority as resinking and drilling of new tubewells. Initially DPHE will meet the cost of desanding, but once the system is well established, the cost will be transferred to the beneficiaries. Appropriate techniques to rehabilitate choked up deep and deepset tubewells will be developed.

Rehabilitation and conversion of small platforms to large platforms will be taken up wherever the user group exceeds 30-40 persons.

#### 7.12 Monitoring and Evaluation:

The frequency of field visits and reporting by supervisory staff of DPHE is specified in the prevailing Project Plans of Action. UNICEF field staff will check a minimum of 3 percent of all tubewell sites and completed installations. DPHE's Zonal Review Committee will meet quarterly, attended by UNICEF staff. The Ministry, implementing



department and UNICEF staff will review progress and prepare an annual workplan which will be reviewed every six months. UNICEF with collaboration of WHO will assist Government to carry out sample surveys to assess level of progress in programme implementation, the use of facilities and hygiene practices of the people.

The monitoring methodology, including the parameters to be monitored, will be developed collaboration with DPHE by the Senior Monitoring Officer, to be recruited under the project. Furthermore, mechanisms to ensure the feedback from the monitoring and surveys into the programme will be elaborated and institutionalized. The monitoring will be both qualitative and impact orientated, and would include software aspects of the programme, such as women's participation, user's involvement in planning and contribution etc. With the expansion of the sanitation activities, more intensive monitoring of progress to ensure quality and usage level will be undertaken. For this purpose, UNICEF capacity will increase by the recruitment of a Senior Monitoring Officer in Dhaka and 2 Monitoring Officers in each UNICEF Divisional Offices.

#### 7.13 Collaboration with other Donor Agencies:

Collaboration will continue with the UNDP/World Bank Handpump Testing Project (INT/81/026) for the continued development and performance monitoring of the new TARA deepset handpump and the Mini Tara. There will also be coordination with the UNDP/World Bank Regional Water and Sanitation Group (RWSG) in implementation of the planned ITN and Handpump Training & Monitoring Projects. WHO will continue to provide support for the programme, particularly in the field of training, monitoring and evaluation. The programme will also benefit from joint appraisals and evaluations with the major multilateral and bilateral donors providing supplementary funding to UNICEF. Collaboration with DANIDA will be ensured in their proposed exploratory drilling works in the underserved coastal belt to be carried out on bi-lateral term. In addition, the results from the planned R & D activities to be undertaken on a bilateral basis on low cost sanitation will be reflected in the programme.

#### 7.14 Relation to Chittagong Hill Tract:

The proposed programme will cover the entire Chittagong Hill Tracts. The main components which will be implemented are the provisions of water supply and training of caretakers (Tara pump, Shallow tubewell, Ring wells) the Sanitation Promotion and the Rehabilitation and maintenance of tubewells. In addition, tubewells and ring wells needed in the UNICEF-assisted Integrated Community Development Programme (ICDP) in this area will be met from this programme. DPHE will install the tubewells under its regular programme at sites selected following the ICDP's criteria. However, acceleration of implementation of the water supply in CHT depends on developing an

alternative appropriate drilling technology. This programme provides for research and development activities to develop such technology.

#### 7.15 Collaboration with Other Implementing Agencies:

There are certain other Government agencies assisted by UNICEF whose activities include components of water supply and sanitation. In many cases, these agencies are working specifically with the underserved and poorer sections of society. As far as possible the concerns of these agencies to extend service coverage to their target groups will be taken care of by this programme spelling out specific provisions in the Annual Implementation Plan. Besides, some UNICEF assisted projects being implemented by other government agencies will need materials. There are also many non-government organizations who wish to provide water and sanitation facilities for their target groups. As in the previous country programme, the DPHE will, at the request of UNICEF, release materials for handpump systems and for the establishment of latrine production centres to the implementing agencies of other UNICEF-assisted projects and to non-government organizations. The quantity of materials available for release to NGOs will be not less than 5 percent of the quantity provided under the present project.

A major collaboration is expected in the promotion of sanitation, as part of the social mobilization drive. Major allies such as the Primary and High School Masters and NGOs are necessary to accelerate sanitation coverage and bring about improved health to the community.

#### 7.16 Organization and Management

The programme will be the responsibility of LGRD&C and will be implemented by DPHE. UNICEF will play an advisory and monitoring role in addition to the procurement of supplies. The donors will monitor the programme through annual reviews.

DPHE: With increased sanitation activities, DPHE has strengthened its set-up by the appointment of a Project Director in the rank of Superintending Engineer responsible for the overall implementation of the village sanitation projects including social mobilization. It has also appointed the Project Director and some other staff as envisaged in its PP for improvement of management of the project water supply & sanitation in the urban slums & fringes. A national committee headed by the Additional Chief Engineer, DPHE, will monitor the programme implementation at the national level. The committee will meet bimonthly and will include representation of the LGRD&C, Health & Family Planning welfare, respective implementation partners, WHO Sanitary Engineer, DPHE and UNICEF. In addition, the needs for strengthening DPHE capability through an organizational study in relation to this programme will be undertaken. The study will focus on the type of staff needed to promote software aspects of planning, social mobilization and hygiene education, as well as the structure

needed for an effective monitoring system. In addition, it will analyse the necessary linkages with other organizations. The organogram of DPHE is given in Annex 4. An estimated budget of US\$ 200,000 has been proposed.

UNICEF: The Water & Sanitation (WES) Section of UNICEF Dhaka Office, as per the present organogram given in Annex 5, provides advisory technical support to DPHE which includes policy matters, programme formulation & implementation and new initiatives. WES receives the support of other UNICEF sections, particularly the Programme Communication and Information Section (pcis) on the intensive sanitation and hygiene project. In addition to the overall coordinating role, WES, Dhaka also supports the WES unit of the four Divisional Offices which play the major role of monitoring implementation progress in respect of behavioural changes, quality and utilization of facilities. In addition, UNICEF will procure all materials and undertake quality control. UNICEF will increase its monitoring capacity by the addition of a Senior Monitoring Officer in Dhaka and 2 monitoring officers at the Divisional offices for monitoring of programme activities. The proposed monitoring staff is financed directly by the project. The field monitoring officers would be responsible to the Divisional Chief; however, the Senior Monitoring Officer in Dhaka would advise on the monitoring procedures and compile the data. (Table 4).

- 7.17 FINANCES: In order to facilitate the calculation of the costs and benefits of the programme, an annual accounting format which shows utilization of funds from the donors, GOB and UNICEF core funds will be prepared.

Table 4 - Proposed additional UNICEF support

Post/Items	Level	No.	Unit Annual cost (\$)	3-year cost US\$
1. Project Officer (Monitoring)	L-4	1	80,000	240,000
2. Monitoring Officers	GS-6	8	11,000	264,000
3. Drivers	GS-2	4	4,000	48,000
4. Vehicles (field)		4	12,500	50,000
5. Operational cost (Vehicles)		4	3,000	36,000
6. Computers (field)		4	3,000	12,000
			Total:	650,000

## 8. THE PROJECTS

To achieve these objectives UNICEF will cooperate with Government in implementing the following seven projects:

1. Intensive Social Mobilization and Communication Project for Sanitation.
2. Village Sanitation.
3. Rural Water Supply and Sanitation in the Low Water Table Area.
4. Rural Water Supply and Sanitation in the Coastal Belt.
5. Rural Water Supply and Sanitation in the Shallow Water Table Area.
6. Water Supply and Sanitation in Urban Slums and Fringes.
7. Rural Water Supply Maintenance, Rehabilitation and Upgrading.

UNICEF will seek an estimated US\$ 19.6 million in supplementary funding for the Water and Environmental Sanitation Programme for the July 1992 to June 1995 period.

All seven projects will be implemented by the Department of Public Health Engineering (DPHE) under the sponsorship of the Ministry of Local Government, Rural Development and Cooperatives.

## 9. INTENSIVE SOCIAL MOBILIZATION AND COMMUNICATION FOR SANITATION - PREPARATION PHASE - 1992/93

### 9.1 BACKGROUND

Although there has been a good deal of national and district-level advocacy for increasing sanitation coverage and some experiences with the involvement of new partners in the programme, there are conflicting reports on the success of such initiatives. Before the intensive social mobilization programme is launched in more diarrhoea-prone thanas, a good deal more research and planning is required to ensure that future efforts lead to sustained behavioural change. This preparatory stage will ensure that Advocacy, Social Mobilization and Programme Communication components are properly phased, converging on the same areas and coordinated. The detailed activities are given in Section 9.6.

### 9.2 STAFFING AND COORDINATION

On the UNICEF side, a team of three female sanitation officers are now in place in the sanitation unit of WES Section, led by an international staff member with excellent experience in community participation in water and sanitation and health education. The Programme Communication and Information Section (PCIS) of UNICEF has also taken on an additional female, national consultant with excellent experience in communication and training in water and sanitation who will contribute to this developmental phase. In addition to informal, daily consultations, coordination meetings take place between PCIS and WES every two weeks. Meanwhile, DPHE has established an office and appointed a Project Director for the Village Sanitation project who is also the coordinator for Social Mobilization. In addition to weekly contacts on specific activities, formal coordination meetings between DPHE and UNICEF will take place monthly to review progress.

### 9.3 RESEARCH

Needs Assessment of Existing Programmes: A qualitative study on current knowledge, attitude and practices regarding environmental sanitation and personal hygiene will be undertaken by a local social research firm with results available by end of November 1992. The study will involve focus group discussions and in-depth interviews with beneficiaries, DPHE and NGO workers, and allies working in collaboration with the sanitation programme. The study will attempt to assess the strengths and weaknesses of the different programmes including Integrated Approach and the regular programme of DPHE, existing NGO programmes and high school and primary school programmes.

The study will especially attempt to ascertain the level of motivation and positive/negative factors for sustaining the proper use of latrines within these programmes. The results will be used to strengthen future communication/social mobilization strategies/messages and define, more precisely, the roles various partners should play in the programme. The study will be coordinated by PCIS with input and regular review by WES and DPHE.

Review of Training Curricula and Materials: An in-depth review of current curricula, methods and materials used in training for sanitation and personal hygiene will be undertaken by a local social research firm with the results available by mid-November 1992. This will involve a qualitative assessment of the current programmes of DPHE, Ministry of Health and Family Welfare, Ministry of Education, Ministry of Religious Affairs (Imam training) and major NGOs, including an assessment of their success to date. The study will make specific recommendations for further development/revision of training and orientation curricula, including participatory training methodologies and supervision/monitoring of training, with special emphasis on the active participation of women at all levels. This activity will be coordinated by PCIS with input and regular review by WES and DPHE.

Baseline Surveys: In addition to thana profiles, qualitative baseline surveys will be undertaken in a number of diarrhea-prone thanas identified for the first phase of intensive social mobilization activities. These studies will involve identification of key indicators for sustained behavioural change. Local research firms will be contracted to train DPHE and NGO staff in standard methods of investigation. This activity will be coordinated by WES Section, UNICEF with support from UNICEF's Divisional Offices, PCIS and DPHE.

Monitoring: Monitoring mechanisms for the communication components of the programme will be integrated with the hardware components. However, special monitoring criteria and methods for intensive promotion strategies will be designed during this time with responsibilities allocated. An ethnographic research project will be designed to monitor behavioural changes in the intervention areas. This activity will be coordinated by WES with support from Div. Offices and DPHE. PCIS will commission the design of the ethnographic study.

#### 9.4 DEVELOPMENT OF STRATEGIES AND MATERIALS

Overall Strategy: Beginning in September 1992, a series of meetings/workshops will be held, involving DPHE, UNICEF (WES, PCIS and Div. Offices), W.H.O., NGO Representatives, relevant Ministries and donor focal points to familiarize partners with the research/developmental steps being taken and to refine the overall social mobilization strategy, giving wider ownership to the final programme proposal. The

meetings will also review the criteria for the involvement of NGOs in the programme and selection of targeted thanas.

The final results of the needs assessment and curricula review research will be fed into a final planning workshop in mid/late November 1992, following a ZOPP methodology and facilitated by an expert in the method. The final project proposal for 1993-95 funding will be written from the output of this workshop.

NGO and Thana Selection: A small number of diarrhoea-prone thanas will be chosen for the first phase of the programme based on the refined criteria. The final selection of NGOs to participate in the first phase of the programme will be made following the refined criteria, strength of proposals and the selection of first phase thanas. The selection of thanas and selection of NGOs, based on their existing infrastructure, is necessarily inter-dependent. A number of diarrhoea-prone thanas which are not targeted for intensive motivation work, but which come under DPHE's regular programme, will also be selected for monitoring to determine what changes take place over the project period, independent of the project's efforts. Of course, these thanas will have to have similar baseline characteristics to the targeted thanas and no alternative special programmes for sanitation. This activity will be coordinated by WES/DPHE with input from PCIS.

Training Curricula and Module: The above research will lead to the development of standard training curricula, methods and materials. This will consist of a core module for use by all and a set of various modules to be used in the training of various partners in the chosen thanas. The module will emphasize participatory-interactive methods and interpersonal communication/counselling techniques and will be pretested in all programmes in connection with the activities of the core trainers. This activity will be coordinated by PCIS with input from WES and DPHE.

Training of Trainers: A core national training group will be identified consisting of members from UNICEF, DPHE, selected NGOs and selected resource people. This group will pretest the training curricula and identify and train core training groups in each of the thanas to be targeted. They will, in turn, carry out training of all DPHE and NGO field workers, school teachers and officials and community leaders, following the standard curricula. The national core training team will also monitor the thana-level training as it is implemented in 1993/94. This activity will be coordinated by WES with input from PCIS, NGOs and DPHE.

Other supporting allies: During this development phase a series of planning workshops will be held with other non-traditional allies, including service clubs, youth groups and traditional media groups, to determine how they can become involved in supporting the overall strategy as it develops. This activity will be coordinated by PCIS with support from WES/DPHE.

Training of Project and Monitoring Staff: Key staff members in DPHE and UNICEF Divisional Offices will receive specialized training in the overall social mobilization strategy and monitoring methods. If necessary, the Social Mobilization Officer will be given special training in communication/social mobilization. This activity will be coordinated by WES with support from PCIS and DPHE.

Development of Communication Materials : A number of prototype training and communication materials will be designed and pretested with potential beneficiaries during this developmental stage, based on the final results of the formative research. This may include counselling posters, manuals, stickers, advocacy materials for special events, billboards and audiovisual materials. The mass reproduction and wide dissemination of these materials will not take place, however, until the 1993/95 project period begins. Some materials will be produced nationally by UNICEF/DPHE while others will be built within NGO proposals. This activity will be coordinated by PCIS with support from WES/DPHE.



Intensive Social Mobilisation and Communication for  
Sanitation - Preparation Phase 1992-93

9.5 UNICEF Resource Inputs

<u>Activities and Materials</u>	<u>US \$ 1992-1993</u>
1. <u>Research</u>	
i) Needs assessment by sanitary programme	- 20,000
ii) Review of training curricula & materials	- 10,000
iii) Baseline survey	- 30,000
2. <u>Development of Strategies &amp; Materials</u>	
i) Overall strategy	- 10,000
ii) Training curricula & module	- 50,000
iii) Training by trainers	- 30,000
iv) Supporting allies	- 10,000
v) Training of project & monitoring staff	- 10,000
vi) Development of communication materials	- 30,000
Total:	<u>US\$ 200,000</u>

9.6 Plan of Operation  
 Project : Activities for Intensive Social Mobilisation  
 and Communication for Sanitation

Sl. No.	Activities	1992						1993						Responsible for	In collaboration with	
		J	A	S	O	N	D	J	F	M	A	M	J			
1	Needs assessment of existing programmes														PCIS	WES and DPHE
2	Review of training curricula and materials														PCIS	WES and DPHE
3	Baseline surveys														WES & PCIS	PCIS & DPHE
4	Overall strategy meeting														PCIS	WES, DPHE & NGOs
5	NGO and Thana Selection														WES/DPHE	PCIS
6	Development of training curricula and module														PCIS	WES & DPHE
7	Training of trainers														WES	PCIS, NGOs & DPHE
8	Planning workshops with non-traditional allies														PCIS	WES & DPHE
9	Training of project and monitoring staff														WES	PCIS & DPHE
10	Development of communication materials														PCIS	WES & DPHE

## 10. Village Sanitation:

### 10.1 Specific Objectives:

The village sanitation project will be undertaken nationally. The specific objective is to produce low cost sanitary latrines to contribute to sustainable use of the facilities and to a sustainable growth of the sector. Some pilot studies will also be carried out on new low cost technologies and subject to the success of the studies, the technologies will be introduced into the programme in a phased approach.

### 10.2 Physical Objectives:

It is tentatively assumed that the sanitary latrine coverage would increase from 26 percent to 45 percent during the project period, with an additional 3.3 million families reached. It is estimated that half of these i.e. about 1.6 million would be of the homemade (do-it-yourself) latrines. It is also likely that a certain number of families currently having homemade latrines would upgrade it to a waterseal unit.

The physical objectives of the project are to produce and sell, from DPHE centres, 0.9 million waterseal latrines (one-ring and one-slab) and to achieve a high percentage of proper use of these facilities.

Waterseal latrines with one or more rings will also be produced and sold by the private sector to meet demands in excess of the DPHE production. It is tentatively estimated that about 1.0 million would be sold, taking into account the upgrading of homemade latrines to the waterseal units.

### 10.3 Appropriate Sanitary Latrine Technology:

Until recently, the concrete slab and five ring waterseal latrines have been promoted by DPHE-UNICEF as the main option. Recognizing the low affordability level of the masses, the one-slab and one-ring waterseal latrine and the homemade latrine which were introduced in the recent years will be promoted nationwide. In addition, research and development works on both technical aspects and social acceptance of intermediate latrine technologies such as the SANPLAT will be undertaken. (Section 10.10).

The concrete latrines can be purchased at any of the 1000 DPHE Village Sanitation Centres (VSC) at subsidized rates or from the growing private sector at commercial rates (Sections 10.4, 10.5, 10.9). Though the one-slab and one-ring waterseal latrine is an appropriate technology, surveys and field observations have indicated technical problems related to inadequate foundation for the ring, inadequate pit depth as well as intentional breakage of the waterseal before installation. These aspects will be given more attention in this project.

The homemade latrine consists essentially of a pit of at least 2 m deep in the ground covered by a wooden slab or bamboo platform which incorporates an opening. The latter is closed by a lid when the latrine is not in use. The building materials would be primarily those available free of cash in the backyard of the families. This technology is getting growing acceptance and considered a first step to a more durable concrete latrine for many families with low affordable levels.

The stability of the soil formation will determine whether the pits require lining. Where lining is required, the use of home-available material will be promoted, during refresher training courses for tubewell mechanics and through design pamphlets to be made available freely at DPHE centres and through field level workers. For families choosing the concrete waterseal latrines, the pits can either be lined with local materials or by using concrete rings purchased from the private sectors.

Where space for building latrines proves to be a constraint, the promotion of shared latrine (through capital cost sharing) or the use of a neighbour's latrine will be explored in terms of cultural acceptance.

#### 10.4 DPHE Village Sanitation Centre:

DPHE has established 1000 latrine production and selling centres in the country resulting in at least 2 centres per Upazila. They will remain fully operational during the project period. However, no new centres will be created during 1992-95. In order to enable the DPHE field staff to address the operational and user-level problems revealed by the recent WHO surveys, the latrine production and sale has been fixed at 200,000 latrines in 1992-93, 300,000 latrines in 1993-94 and 400,000 latrines in 1994-95.

The supervision of the Union VS centres will be strengthened substantially in order to improve management of these centres. Furthermore, vigorous supervision of the revolving funds for sanitation will be ensured.

The subsidy on the sale of latrine parts will not be increased up to 1995 as shown in table 3. This project provides for the production and sale of one-ring and one-slab latrine set only. However, DPHE may produce and sell additional rings at cost price whenever the situation demands. The present cost of production of one-ring and one-slab is Tk. 232. The current subsidized selling price of Tk. 70 will be increased to Tk. 125 for the period 1992-1995. The purchase of local materials (such as khoa, sand) from revolving fund by DPHE and cement, wire mesh and mild steel wire by UNICEF will continue during the project period.

Moreover, Upazila-wise Annual Development Plans (ADPs) for production and sale of latrine components and hygiene promotion will be prepared by DPHE based on the previous/earlier year's sale. Adjustments in production targets amongst the DPHE centres will be made during the year according to market forces, within the ADP target. Both these steps will reduce stock piling. In addition, DPHE will stop new production once the stock level reaches, 200 rings or slabs. When the stock level drops to, 100 rings or slabs, production will again be started. DPHE and UNICEF will accordingly prepare guidelines and control procedures for implementation. Centres with continued low performance will be identified and measures will be taken as required.

The financial proceeds from the sale of latrines as per established system will be deposited at the Upazila level revolving fund and used directly by DPHE. The accumulation of the revolving funds will be addressed for effective utilization.

DPHE will undertake the repair of existing centres at GOB cost. UNICEF will provide limited funds subject to availability for major reconstruction on a case by case basis due to total destruction of centres by natural calamities.

#### 10.5 Mobile Production Centres:

In a few places, mobile teams from DPHE VSCs have been assigned to the field to produce latrine parts for a group of families on demand. This has proved to be feasible. Hence, on a provisional basis, and on demand, the project will promote the production of latrine parts at the community level by the existing upazila level production team. The basic framework is as follows:

- there has to be a demand for such a production from a community or group of families for a sufficient number of units.
- the community will bear the cost of carriage of Govt. raw materials and tools, to and from the production sites.
- the community will buy the finished products at the prescribed Government rates.
- the production with Government materials will be limited to a set of one slab and one ring only and be within the limit of the ADP. However, if the buyers want more rings, they will have to organize their own raw materials and pay for the additional labour costs to DPHE at the prescribed rates.
- carriage of the finished products from the production site to individual home will be the responsibility of each individual buyer.
- the community will be responsible for protection and security of Government materials and tools at the production sites.

- the sale proceeds will be accounted for in the revolving account and the quantity produced and sold will be reflected in the normal reporting system.

An assessment will be made at mid-1994.

### **10.6 Training:**

Training will be imparted to tubewell mechanics (TWM) and masons on the proper installation, maintenance, and use of the one-ring and one-slab waterseal and the homemade latrines, with subsequent inclusion of the SANPLAT. An appropriate training module will be prepared and will include siting of ring, etc. The training module will be incorporated as part of the annual refresher training courses for TWMs with the addition of the VSC masons.

Training on the production of waterseal latrines will be imparted to masons from selected NGOs desirous to set up latrine production centres, as per DPHE-UNICEF established guidelines, and to masons from the private sector, on demand. A training module will be developed, and design specifications will be prepared and provided free to the trainees. The training related to installation, maintenance and use will also be included.

### **10.7 Latrine Construction, Usage and Maintenance:**

A recent WHO survey (1992) on the one-ring and one-slab latrine which constitutes about 25% of all water seal latrines, revealed that 25 percent of the users do not shift the ring and slab when the pit is full, thus allowing the sludge to flow into ditches. 17 percent revert to open defecation. In addition, out of the 9 percent of users who desludge the pits, half did so in an unhygienic way. The shifting of latrine will be promoted as the best option, and this issue, along with the implication of reverting to open defecation will be addressed vigorously during the project.

Families will be instructed to locate the latrine on high grounds and/or raise the plinth level in order to minimize the risks of flood waters, and to site latrines at a safe distance from water sources. These would be communicated through field level workers including tubewell mechanics and through instruction leaflets.

The DPHE centres will also provide information through interpersonal communication and pamphlets to buyers on issues related to construction, shifting to new pits, siting of latrine with respect to water sources and proper usage of facilities.

### **10.8 Strategy beyond 1995:**

Based on the experiences gained during the project period, DPHE-UNICEF, in collaboration with other agencies, will develop a strategy to define the role of DPHE Village Sanitation Centres beyond 1995, taking into consideration the role of the private sector, sustainability and affordability.

### **10.9 Support to the Private Latrine Production Centres:**

The anticipated greater demand for waterseal sanitary latrines will have to be met by the private latrine producers and people's own initiative using the homemade latrines. The increased demand is expected to be a boost to the private sector. In addition, DPHE limiting its production and sale to the one-ring and one-slab option only, will give a wider market for rings by the private sector latrine producers if there should be a demand. It is anticipated that increased sale by the estimated 700 existing manufacturers as well as the growth of more private production centres will result.

A register of the existing manufacturers will be prepared as part of the preparation of the sanitation profile for 110 diarrhoea-prone upazilas covered under the intensive sanitation and hygiene promotion. The information will be shared with the various implementation partners who in turn will make them known to their relevant target groups.

Strategies for more direct support to the private sector will be developed based on a pilot study under consideration through bilateral fundings (section 10.11)

### **10.10 Research & Development**

The introduction of the intermediate low cost SANPLAT technology will be undertaken in a pilot project in 3 upazilas through three private producers. Initially R&D activities will be undertaken to determine optimal technical design and assess users' acceptance. Subsequently, the production will be expanded to meet the demands in the upazilas. The coordination, supervision on monitoring will be undertaken jointly by DPHE and UNICEF. In addition, the pilot study will look into the development of the training package aimed at transferring the know-how to more private producers, including the sale of moulds.

Alternative technologies on the latrine parts such as plastic or concrete pans with offshoot pipe can be developed through research and development with the participation of potential private manufacturers. The modalities will be worked out with the private manufacturers..

### **10.11 Pilot Studies:**

A pilot project based in a few selected VSCs, for more direct support to the private latrine producers is under consideration under separate bilateral financing. DPHE and UNICEF will collaborate on this study and use the experiences as inputs to the current project and for developing the sanitation strategy beyond 1995.

### **10.12 Monitoring & Evaluation:**

During their field visits, both DPHE and UNICEF staff will inspect the sanitary latrines and interact with users on usage and maintenance. More in-depth studies on selected sample areas in the sanitation intensive upazilas will be undertaken (section 10.10).

UNICEF and WHO field sanitation officers will also visit VSCs to check on quality and take on-the-spot actions. The internal DPHE supervision of its latrine production and promotion will be upgraded substantially. The Project Director will issue the necessary written instruction in this respect.

The production and sale of latrine parts at the VSCs will be reported monthly to Project Director of DPHE, Dhaka for necessary action, particularly with a view to reduce stockpiling. The Project Director will also ensure that information pamphlets on sanitary latrines referred to above are available and distributed after explanation to buyers.

In addition, the R & D activities and the pilot studies will be monitored jointly by the respective DPHE, UNICEF and WHO field offices, including quarterly reports to DPHE, UNICEF and WHO in Dhaka. For monitoring the performance of mobile sale units, a reporting system will be developed by DPHE-UNICEF. The reports will be analyzed in Dhaka for necessary action. DPHE will also keep close watch on the operation of the revolving fund and ensure that it runs efficiently.

Evaluation studies related to the technical aspects (construction, usage and maintenance) of sanitary latrines will be conducted annually on a sample basis in order to address emerging issues and reinforce the project. DPHE will also keep close watch on the operation of the revolving fund and ensure that it runs efficiently.

### **10.13 Transportation**

UNICEF will consider providing up to a maximum of 1 truck, 2 jeeps, 50 motor cycles and 100 bicycles to DPHE.



Village Sanitation10.14 Phasing of Implementation (1992-95)

The annual physical targets are as follows:-

<u>Activity</u>	<u>1992-93</u>	<u>1993-94</u>	<u>1994-95</u>	<u>Total</u>
<b><u>Training</u></b>				
Training of DPHE new masons	100	100	100	300
Training NGO masons (w/materials) (est.)	50	50	50	150
Training Pvt. masons (w/materials) (est.)	150	150	150	450
<b><u>Transport and Transportation</u></b>				
Truck	1	-	-	1
Jeeps (DPHE)	2	-	-	2
Motorcycle (DPHE)	-	50	-	50
Bicycles (DPHE)	50	50	-	100
<b><u>Latrine Installation/Sale</u></b>				
Installation of demonstration latrine for schools (Homemade)	2,480	4,500	6,020	13,000
Sale of Water-seal (1 ring + 1 slab) (DPHE)	200,000	300,000	400,000	900,000
Installation of homemade/water seal from other sources	600,000	800,000	1,000,000	2,400,000
Research & Development (Sanplat, Plastic Pan)		as proposed		
Pilot Studies		as proposed		
<b><u>Construction, Usage &amp; Maintenance</u></b>				
Pamphlets and leaflets		as proposed		

Village Sanitation10.15 UNICEF Resource Input

	UNIT <----- Thousands of US \$----->				
	<u>\$</u>	<u>1992-93</u>	<u>1993-94</u>	<u>1994-95</u>	<u>Total</u>
<b><u>Training</u></b>					
Training of DPHE new masons (est)	35	3.5	3.5	3.5	10.5
Training NGO masons (w/materials) (est)	35	1.8	1.8	1.8	5.4
Training Pvt. masons (w/materials) (est)	35	5.3	5.3	5.3	15.9
<b><u>Research and Development</u></b>					
Pilot Studies	LS	8.0	8.0	9.0	25.0
<b><u>Transport</u></b>					
Truck (DPHE)	25,000	25.0	-	-	25.0
Jeep (DPHE)	12,500	25.0	-	-	25.0
Motorcycle (DPHE)	1,000	-	50.0	-	50.0
Bicycles (DPHE)	120	6.0	6.0	-	12.0
<b><u>Construction, Usage &amp; Maintenance</u></b>					
<b>Pamphlets and leaflets (Under Social Mobilization Project)</b>					
Water Seal (1 ring + 1 slab) (DPHE)	3.5	700.0	1,050.0	1,400.0	3,150.0
		-----	-----	-----	-----
		782.6	1,132.6	1,428.6	3,343.8





## 11. RURAL WATER SUPPLY AND SANITATION IN THE LOW WATER TABLE AREA

This project will be implemented in 200 Upazilas identified as being fully or partially affected by the water table declining beyond the suction limit of 7.75 m. Upazilas may be added or deleted after joint agreement by Government and UNICEF but only based on the monitoring of the water table.

### 11.1 Physical Objectives

This project will provide domestic water for approximately 5.6 million people in rural communities in the low water table area by installing 29,450 deepset tubewell handpumps with large platforms, improving the coverage to approximately 490 people per operating tubewell; promote the construction of 294,500 low cost simple hygienic latrines by the beneficiaries of handpumps; improve the personal hygiene practices of 1.7 million beneficiaries.

### 11.2 Hydrogeological Identification and Monitoring of Low Water Table Areas:

DPHE will continue to monitor the minimum water levels in all Unions. This work will be done by the territorial staff of DPHE, with technical support from the two DPHE Hydrogeologists (different from the two provided for coastal belt) and five DPHE technical assistants under the control of the EE, R&D. DPHE has deputed only one Hydrogeologist so far. The remaining staff will be appointed by DPHE by June 1992. In consultation with UNICEF, DPHE will develop a systematic annual workplan with the objective of improving the efficiency of the Division. DANIDA Hydrogeologist provided to DPHE, will spend approximately 20 percent of his time on this project (Section 12.2).

Based on these investigations, affected Upazilas will be identified. Each affected Union will then be considered during the ADP allocation in order to achieve uniform coverage, with special emphasis on the least served areas. The choice of technology and the unionwise allocation will be verified by UNICEF.

### 11.3 Implication of Declining Water Table

Since 1986, DPHE has been monitoring the fluctuations of groundwater table using a measuring network of 4394 tubewells located one in each union of the country. Measurements are taken once annually during the peak dry season during the last week of April and first week of May. The data indicates that the area where the water table has fallen beyond the suction limit has increased from 12% in 1986 to about 20% in 1990. As a result, large numbers of tubewells fitted with No.6 suction pump become non-functional during the dry season (April to June). Earlier data predicted that the affected area would increase to 50% by the year 2000, thus affecting some 360,000 public tubewells and an equal number of private tubewells. During 1992-95 an indepth study will be carried out to assess more precisely the area of the country where the water table would be beyond the suction limit in 2000. The

Water Resources Plan & Organization (WARPO) and other relevant organizations will be involved in the study.

#### 11.4 **Research & Development:**

##### 11.4.1 **Mini Tara Hand Pump**

Although the Tara pump has been designed and applied effectively in 2-inch diameter tubewells up to 15 metres depth, the cost of replacement of the public shallow tubewells alone by the year 2000 AD by the conventional Tara tubewell is of the order of US\$ 125 million, if the previous assessment of the expansion of the low water table area is valid. Research and Development have been initiated since May 1991 to come up with a modified Tara pump that can fit in the existing 1½-inch diameter No.6 pump shallow tubewell with minimum modifications. The results of the field testing at 20 sites and laboratory tests at MAWTS have been encouraging. This alternative is likely to cost one-third of the conventional Tara option.

As shown in Section 11.15, the testing of the Mini Tara handpump will be completed by December 1992. During Jan-June 1993 the production of the pump will start under strict supervision. SAEs, TWMs and contractors will be trained. UNICEF's monitoring and support activities will be planned. To the extent necessary, additional man power will be hired for these activities. During July-Dec. 1993, where DPHE's field activities are moderate 500 pumps will be installed at the project cost under R & D activities to rehabilitate the affected No. 6 pump tubewells in selected upazilas of the districts of Rajshahi and Nawabganj. This activity will include intensive monitoring related to performance, maintenance and user reactions. Subject to satisfactory performance of these 500 pumps, additional 1500 pumps will be installed during 1994-95. The beneficiaries contribution will be the same as for the resinking of choked-up tubewell (Tk. 700).

##### 11.4.2 **Tara II Hand Pump:**

Presently Tara handpumps are installed at 15 metres depths in low water table areas which are underserved. Since in some parts of North Bengal the water table is declining beyond the capacity of Tara pump, Tara II has been developed and field tested for the last three years to lift water from 30 metres depth. An evaluation by the R&D Committee in early 1992 has indicated that the Tara II fitted with No. 6 pump head can be used as an interim solution, and 450 such sets will be installed in a few districts. However, R&D on this pump fitted with No. 6 head will be further carried out to improve the vertical movement of the pump rod. In addition, alternative pump which have been standardized and proven in other countries will be considered. Due consideration will be given to low cost, VLOM concept, indigenous technology, durability and ease of operation.

#### 11.4.3 Stony Area:

Certain stony/rocky areas in Sylhet, Panchagarh districts and Chittagong Hill Tracts in Bangladesh have been underserved. Since September 1991 the drilling of tubewells with the sludger method was tried out. It has been proved to be inappropriate. Therefore, it is proposed to procure a Down - The - Hole Hammer (D.T.H.) rig and drill 50 tubewells on a pilot basis. An assessment will be carried out on the performance of the rig. Suitable guidelines will accordingly be developed for wider application of the technology from 1994-95. Necessary hydrogeological data collection and geophysical investigation will be combined with the test drilling in order to determine the water resources, aquifer characteristics and water quality in the stony areas.

#### 11.4.4 Iron Free Aquifers

In a limited iron problem areas under both low water table area and shallow water table area there is a likelihood of avoiding the high iron concentration by adjusting the depth of the tubewells. The depth can be determined by surveying the existing tubewells, both public and private, followed by test drilling. Once determined, the new depths should be reflected in the depth book. R&D Division of DPHE with the assistance of UNICEF will execute this activity following the plan of operation shown at 11.16.

#### 11.5 Installation of Handpump System:

DPHE will install deepset handpump systems according to the technology selected. The Government will provide sinking costs, platform and other construction costs including local materials. UNICEF will provide materials such as PVC pipes, well screens, fittings, handpumps and cement. The beneficiaries will contribute cash Taka 1,000 for each deepset tubewells. Other technologies may be selected once they have been developed under Research and Development. Provision for limited number of ringwells has been kept in the shallow water table project (Section 13) for installation in the stony area of both low water table area and shallow water table area.

#### 11.6 Cost Recovery of Deepset Tubewells:

In order to increase the resources, more beneficiary contributions are envisaged as described in Section 7.3.1.

#### 11.7 Training:

DPHE will conduct training for the Caretaker families of the 29,450 different types of Tara tubewells to be installed during 1992-95. This training will be conducted in two phases. phase I training will be conducted at tubewell site immediately after installation in the presence of the user families including the Caretaker family. During this training, the TWM will explain briefly the major components of the pump, its forthcoming and the need for proper operation and maintenance. Emphasis will be given to the use of tubewell water for all domestic purposes, the promotion of sanitary latrine and personal hygiene.

Phase II training will be conducted at a convenient venue within the Union where a group of 15 Caretaker families (one female and one male for each tubewell) will be invited. The training will cover in detail, the repair and maintenance of the pump, including practical sessions. In addition, the linkage between water, sanitation and hygiene will be focussed on. During this training, DPHE will provide Tara Kit 'A' and a manual to the Caretaker family.

Since the launching of the Tara tubewell scheme in 1988, about 26,000 tubewells have been installed upto June 1991. However, the training of the Caretaker Families has been lagging behind. The backlog has accumulated to about 19,000 Caretaker Families at the end of 1991. During 1991-92 an additional 18,150 Tara pumps have been installed. Training of caretakers are being undertaken and the training is expected to be completed by December 1992. Since this is crucial to proper use and maintenance of the pumps, a plan has been developed to expedite the training programme and clear this backlog by December 1992.

After the phase II training of 19,000 CTF will be over, the first phase will be completed, during 1992-93 together with phase 1 and phase 2 training of the above 18,150 CTF. This training will be given priority over installation of new tubewells. Besides, refresher training will be organized at site, for the  $(26,000 - 19,000) = 7,000$  caretaker families who were trained at the beginning of the programme. This training will only cover Phase I but kit A will be provided as a special case. All the backlog training that have accumulated upto June 1992 will be undertaken under the project Rural Water Supply, Maintenance, Rehabilitation and Upgrading, Section 15.

Although both female and male members of the caretaker families are invited, only about 20 percent were reported to be women. In view of the general reluctance of female caretakers to come for training, which is generally attributed to social factors, special visits will be made by Tubewell Mechanics to the families to seek increased participation of women.

To monitor the quality of the training, including the duration and level of participation of the trainees, UNICEF staff will attend at least 10 percent of the courses at random, based on the training schedule to be prepared by DPHE. Besides, WHO staff will attend the training courses to monitor the quality of the training. They (WHO staff) will be involved in monitoring the efficiency of the training including testing of the CTFs in their villages for the knowledge and skills acquired by them.

DPHE will also conduct annual in-service refresher training for the SDEs, SAEs and Tubewell Mechanics of DPHE as indicated in Section 12.6.

#### 11.8 Transportation:

Subject to the availability of funds, UNICEF may consider supply of 1 truck, 2 jeeps, 50 motorcycles and 100 bicycles in line with stipulations indicated in section 12.7.



Rural Water Supply & Sanitation in Low Water Table Area

11.9 Phasing of Implementation: 1992-95

The annual physical targets are as follows:

	<u>1992-93</u>	<u>1993-94</u>	<u>1994-95</u>	<u>Total</u>
1. Installation of Tara TW and handpumps	7,000	10,000	10,000	* 27,000
2. Installation of Tara II TWs	150	150	150	450
3. Installation of Mini Tara handpumps under rejuvenation of No.6 pumps		500	1,500	2,000
4. Training of caretakers families and beneficiaries at TW sites under Phase I	10,650	11,650	13,150	35,450
5. Training of caretakers families on maintenance under Phase II	10,650	11,650	13,150	35,450
6. Refresher training on TWMs (Public Health Promoters) with focus on their role in IA	800	800	800	2,400
7. Refresher training of SAEs with focus on their role in sanitation	200	200	200	600
8. Refresher training on SDEs with focus on their role in sanitation	40	40	40	120
9.(a) IA seminars (upazila level)	35	35	0	70
(b) IA seminars (Union level)	175	175	0	350
10. Orientation of other Sectoral Field Workers including women on their role in IA (courses)	140	140	0	280
11. Hydrogeological studies in low water table area	50%	50%	0	1
12. Provision of a DTH drilling rig	1	0	0	1
13.** Drills test wells with DTH	0	50	0	50

\* The target includes installation of 900 TARA deepset wells for other UNICEF assisted project namely Family Development project, Integrated Development of Rural Women and Children through Cooperatives Project and CHT Project. DPHE will install the tubewells following the national system in the sites selected following the respective project's criteria.

\*\* The Down The Hole (DTH) rig will be used in tubewell installation in the stony/rocky area under a normal programme in 1994-95.

Rural Water Supply & Sanitation in Low Water Table Area

## 11.10 UNICEF RESOURCE INPUTS

	UNIT	Thousands		of US \$	
	\$	1992-93	1993-94	1994-95	Total
<u>Water Supply Materials</u>					
TARA materials	153	1,071.0	1,530.0	1,530.0	4,131.0
TARA materials	350	52.5	52.5	52.5	157.5
Mini TARA Materials	70	0.0	35.0	105.0	140.0
		-----	-----	-----	-----
Sub-Total:		1,123.5	1,617.5	1,687.5	4,428.5
<u>Vehicles</u>					
a) 1 x truck	25,000	25.0	-	-	25.0
b) 2 x jeep	12,500	25.0	-	-	25.0
c) 50 x motorcycle	1,000	50.0	-	-	50.0
d) 100 x bicycle	120	12.0	-	-	12.0
		-----	-----	-----	-----
Sub-Total:		112.0			112.0
<u>R &amp; D</u>	LS	* 130.0	** 100.0	15.0	245.0
<u>Hydrogeological Study</u>	LS	30.0	30.0	0.0	60.0
		-----	-----	-----	-----
Sub-Total:		160	130.0	15.0	305.0
<u>Training &amp; Orientation</u>					
a) CTF training					
i) Phase I at site	1.4	14.9	16.3	18.4	49.6
ii) Phase II in batch	25.0	26.6	29.1	32.8	88.5
iii) Kit 'A' for CTF	2	21.3	23.3	26.3	70.9
b) TWM/PHP training	30	24.0	24.0	24.0	72.0
c) SAE training	60	12.0	12.0	12.0	36.0
d) SDE training	60	2.4	2.4	2.4	7.2
e) IA seminar (Upazila)	450	15.7	15.7	-	31.4
f) IA seminar (Union)	20	3.5	3.5	-	7.0
g) Briefing of sectoral worker on IA (courses)	20	2.8	2.8	-	5.6
		-----	-----	-----	-----
Sub-Total:		123.2	129.1	115.9	368.2
<u>Communication &amp; Health Promotion</u>					
	LS	10.0	10.0	10.0	30.0
		-----	-----	-----	-----
Total:		1,528.7	1,886.6	1,828.4	5,243.7

\* Includes cost of a DTH Drilling Rig

\*\* Includes cost of drilling and installation of 50 test wells in the stony/rocky area under DTH drilling rig including data analysis and evaluation complete.

11.11 Plan of Operation  
Project : Rural Water Supply & Sanitation in Low Water Table Area

Sl. No.	Activities	1991 (QTRS)				1992 (QTRS)				1993 (QTRS)				1994 (QTRS)				1995 (QTRS)				Responsible for	In collaboration with
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		
1	Provide upazilawise physical targets for activities specified (ADP)							—				—										DPHE	UNICEF
2	Procurement of materials																					UNICEF	DPHE
3	Distribution of materials upto Sub-Division/Upazila stores as per requirement of the ADP																					DPHE	UNICEF
4	<u>Allocation for Tubewells</u>																						
a	Unionwise allocation of tubewells and related activities							—				—				—						DPHE	UNICEF
b	Distribution of information leaflet, application forms among the public, collection of forms, processing, site selection and approval							—				—				—						DPHE	UNICEF NGOs Other Govt. Departments
c	Motivation of communities and latrine construction by beneficiaries																					DPHE	Beneficiaries
5	<u>Installation</u>																						
a	Tubewells																					DPHE	UNICEF
6	<u>Training</u>																						
a	Tubewell Mechanics/SAE							—				—				—						DPHE	UNICEF
b	SDEs and EEs							—				—				—						DPHE	UNICEF



11.12 Plan of Operation

Project : R&D Activities for Drilling Tubewells in Stony Formation in Low Water Table Area

Sl. No.	Activities	1991 (QTRS)				1992 (QTRS)				1993 (QTRS)				1994 (QTRS)				1995 (QTRS)				Responsible for	In collaboration with
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		
1	Visit and study the Stony Areas			█																		R&D Div. (DPHE)	UNICEF
2	Preparation of project protocol			█																		R&D Div. (DPHE)	UNICEF
3	Procurement action for a drilling rig								█	█												UNICEF	DPHE
4	Geophysical investigations for site selection (desk study)								█													Groundwater Unit, DPHE	UNICEF
5	Commissioning of and training of drilling crew											█										Rig Supplier	DPHE UNICEF
6	Test drilling of 50 tubewells and preparation of borelog												█	█								R&D Div., DPHE	UNICEF
7	Geophysical investigation in a selected number of holes (physical work)												█	█								R&D Div., DPHE	UNICEF & DANIDA Hydrogeologist
8	Assessment of performance and preparation of guidelines													█	█	█						R&D Div., DPHE	UNICEF
9	Assessment of water resources and aquifer characteristics													█	█							R&D Div., DPHE	UNICEF & DANIDA Hydrogeologist

**11.13 Plan of Operation**  
**Project : R&D Activities of TARA II Handpumps in Low Water Table Area**

Sl. No.	Activities	1991 (QTRS)				1992 (QTRS)				1993 (QTRS)				1994 (QTRS)				1995 (QTRS)				Responsibility for	In collaboration with
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		
1	Final evaluation of the 14 test Tara II handpumps and report preparation																					R&D Div. DPHE	World Bank, WHO, MAWTS, AQUA UNICEF
2	Standardisation and preparation of drawings for the pumps																					R&D Div. DPHE	World Bank, WHO, MAWTS, AQUA UNICEF
3	Extension of field testing of Tara II pumps																					R&D Div. DPHE	World Bank, WHO, MAWTS, AQUA UNICEF
4	Ergonomics tests at MAWTS																					R&D Div. DPHE	World Bank, WHO, MAWTS, AQUA UNICEF
5	Laboratory test on new heads																					R&D Div. DPHE	World Bank, WHO, MAWTS, AQUA UNICEF
6	Evaluation of the field tested pumps																					R&D Div. DPHE	World Bank, WHO, MAWTS, AQUA UNICEF

### 11.14 Plan of Operation

Project : R&D Activities of Rejuvenation of Choked Up Tara Tubewells including Desanding in Low Water Table Areas

Sl. No.	Activities	1991 (QTRS)				1992 (QTRS)				1993 (QTRS)				1994 (QTRS)				1995 (QTRS)				Responsible for	In collaboration with		
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV				
1	Analysis of the problem																						R&D Div. DPHE	UNICEF	
2	Identification of possible solutions																							R&D Div. DPHE	UNICEF
3	Field testing of techniques for rejuvenaion of 5 tubewells																							R&D Div. DPHE	UNICEF
4	Evaluation of the techniques & methodologies																							R&D Div. DPHE	UNICEF
5	Finalization of the technique																							R&D Div. DPHE	UNICEF
6	Rejuvenation of TWs in one pilot district																							R&D Div. DPHE	UNICEF
7	Preparation of guidelines																							R&D Div. DPHE	UNICEF

**11.15 Plan of Operation**  
**Project : R&D Activities on Mini Tara Handpumps in Low Water Table Area**

Sl. No.	Activities	1991 (QTRS)				1992 (QTRS)				1993 (QTRS)				1994 (QTRS)				1995 (QTRS)				Responsible for	In collaboration with
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		
1	Updating the ongoing works																					R&D Div., DPHE	UNICEF World Bank WHO, MAWTS AQUA
2	Improvements to design of pump parts																					R&D Div., DPHE	
3	Testing of pump parts at BITAC lab.																					R&D Div., DPHE	
4	Field testing of 20 Mini Tara pumps																					R&D Div., DPHE	DPHE, Rajshahi Dhaka
5	Develop suitable methodology & equipment to cut 20 ft. GI pipe (tubewell)																					R&D Div., DPHE	DPHE, Rajshahi Dhaka
6	Commissioning of testing Mini Tara handpumps at MAWTS																					R&D Div., DPHE	UNICEF World Bank WHO, MAWTS AQUA
7	Final evaluation of the tested Mini Tara pumps																					R&D Div., DPHE	UNICEF World Bank WHO, MAWTS AQUA
8	Finalisation of pump design and preparation of drawings																					R&D Div., DPHE	UNICEF World Bank WHO, MAWTS AQUA
9	Ergonomics tests at MAWTS																					UNICEF	DPHE
10	Extension of installation and field testing of 500 Mini Tara handpumps																					R&D Div., DPHE	UNICEF



11.16 Plan of Operation

Project : R&D works under the Project RWSS in low water table area to determine iron free aquifers

Sl. No	Activities	1991 (QTRS)				1992 (QTRS)				1993 (QTRS)				1994 (QTRS)				1995 (QTRS)				Responsible for	In collaboration with	
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV			
1	Mapping of high iron (5-10 ppm and above 10 ppm) area showing depths of existing tubewells																					EE, R&D	Senior Hydrogeologist, DPHE DANIDA Hydrogeologist	
2	Desk study to identify the potential areas																						EE, R&D	Senior Hydrogeologist, DPHE DANIDA Hydrogeologist UNICEF, Dhaka
3	Physical survey of the potential areas																						EE, R&D	Territorial EEs of DPHE UNICEF, Field
4	Study of the survey findings and identify areas for drillings including number of drillings and depth																						EE, R&D	DANIDA Hydrogeologist
5	Test drilling and data collection and analysis																						EE, R&D	DANIDA Hydrogeologist
6	Determination of new ironfree depth and updating the map																						EE, R&D	DANIDA Hydrogeologist

## 12. RURAL WATER SUPPLY AND SANITATION IN THE COASTAL BELT

This project will be implemented in the 84 coastal belt Upazilas. Upazilas may be added or deleted, after joint agreement by Government and UNICEF, in cases where more detailed hydrogeological information will be available.

### 12.1 Physical Objectives

This project will provide domestic water for approximately 2.0 million people in rural communities in the coastal belt by installing 9,450 handpump systems (including 7,500 Deep Tubewells) with large platforms, improving average coverage to approximately 300 persons per operating handpump; promote the construction of 94,500 low cost simple hygienic latrines by beneficiaries of the handpumps; improve the personal hygiene practices of 0.5 million beneficiaries.

### 12.2 Identification of Least Cost Water Sources:

Each Union in the project area has been "mapped" to indicate which parts of the Union can be served by which technology. The maps will be updated every second year. To provide technical support, DPHE has made provision for two hydrogeologists and four technical assistants in addition to EE, R&D. So far DPHE has deputed one hydrogeologist and 3 technical assistants. The remaining staff will be appointed by June 1992. DANIDA has deputed one hydrogeologist to support DPHE, and will spend approximately 40 percent of his time on this project. (The other 60 percent will be spent on the project for the low water table area, stony areas, iron problem areas). The DANIDA hydrogeologist will carry out his work following an annual workplan agreed by DPHE and UNICEF. Unions have been divided into areas suitable for Shallow Tubewells (STW), Deepset Tubewells (DSTW), Deep Tubewells (DTW), Very Shallow Shrouded Tubewells (VSST), Shallow Shrouded Tubewells (SST) and Pond Sand Filters (PSF). The remaining areas have been classified as unsuccessful with currently available technologies; hence exploratory works and R&D will be conducted. During 1990-91 DPHE's R&D Division drilled 139 exploratory boreholes in the unsuccessful areas without the support of the electric logger which resulted in inadequate data collection. In 1991-92 DPHE has undertaken a smaller programme of 25 boreholes with the support of electric logger and assisted by the DANIDA Hydrogeologist. However, the whole unsuccessful areas can be addressed efficiently through a comprehensive exploratory programme as offered by DANIDA under bi-lateral arrangement. A TAPP has been developed and is expected to be approved before the end of 1992 by the Government.

### 12.3 Installation of Water Supply Systems:

DPHE will install water supply systems according to their feasibility. The Government will provide sinking costs, platform and other local construction costs including local materials. UNICEF will provide materials such as PVC pipes, well screens, fittings, handpumps and cement. The beneficiaries will contribute cash (Taka 2,000 for DTW and PSF, Taka 700 for VSST and SST).

The technologies currently available under this project are Deep Tubewells, Very Shallow Shrouded Tubewells, Shallow Shrouded Tubewells and Pond Sand Filters. In the preparation of the ADP, the selection of the type of technologies, e.g. type of tubewell, will be made following the report "Guidelines for Choice of Well Technology June 1991" prepared by DPHE R&D Division with the assistance of DANIDA Hydrogeologists. This guideline will be updated with the accumulation of more field data.

In order to remove the variation in service coverage between unions, annual allocation will be made taking into consideration the current population to tubewell ratio of each union so that the underserved unions will continue to get higher annual allocation until a uniform coverage is achieved. The choice of technology and the unionwise allocation will be verified by UNICEF.

Shallow and deepset tubewells will be provided by DPHE under similar UNICEF-assisted projects for shallow and low water table areas. Other technologies may be selected once they have been developed under Research and Development activities.

#### 12.4 Cost Recovery of Deep Tubewells:

In order to increase the resources for installation of water supply systems, increased contribution from the users has been envisaged. (Please see Section 7.3.1).

#### 12.5 Research and Development (R&D):

Specific R&D works that will be carried out under this project are exploratory drilling in the coastal belt under DPHE normal programme, exploratory drilling under DANIDA assistance programme and monitoring the performance of VSSTs. The plan of operation of these activities are shown in Section 12.10. WHO field staff will be engaged to monitor the performance of the VSSTs in order to assess the problem which will be addressed appropriately by the R&D Division. The DPHE R&D Division will be the focal point for these R&D works.

#### 12.6 Training:

DPHE will conduct post installation training for the Caretaker families and other beneficiaries of the 9,450 handpump systems. This will be conducted at the tubewell site in the presence of all users including the caretaker family. This training will cover both repair and maintenance aspect as well as hygiene and sanitation. During the training, DPHE will provide the Caretaker family a set of wrenches and one bottle of lubricant oil. The SAE will supervise the quality of the training given by the TWMs. An independent post assessment of the quality of training will be carried out by WHO field staff. DPHE will also conduct annual in-service refresher training for DPHE implementing staff of Sub-Divisional Engineer (SDE) level and below. UNICEF will provide funds for all of the above training activities.

12.7 Transportation:

All DPHE vehicles and boats previously provided by UNICEF will continue to be utilized for UNICEF-assisted projects. The Government will provide DPHE with adequate budget for the running and maintenance costs of all UNICEF-supplied vehicles and boats. Subject to availability of funds, UNICEF may provide additional vehicles for this project up to a maximum of 1 truck, 2 jeeps, 50 motorcycles, 100 bicycles and 5 boats to the extent that the need for these is well established and mutually agreed upon. Under Government regulations, DPHE will be required to pay Customs Duties and Sales Tax for all vehicles and boats to be supplied by UNICEF. The title of all new and existing vehicles and boats must be taken over by Government. In case new transport is supplied, title will be transferred on arrival in Bangladesh before its utilization in the programme.

Rural Water Supply & Sanitation in Coastal Belt

12.8 Phasing of Implementation (1992-95):

The annual Physical Targets are as follows:

	<u>1992-93</u>	<u>1993-94</u>	<u>1994-95</u>	<u>Total</u>
1. No. of inter-personal contacts on health, hygiene and sanitation at site for beneficiary families.	3,150	3,150	3,150	9,450
2.(a) Deep Tubewells (DTW)	2,500	2,500	2,500	7,500
(b) Very Shallow Shrouded Tubewells (VSST)	350	350	350	1,050
(c) Shallow Shrouded Tws (SST)	150	150	150	450
(d) Pond Sand Filter (PSF)	150	150	150	450
4. Training of caretaker family on maintenance	3,150	3,150	3,150	9,450
5. Refresher training of TWMs (Public Health Promoters) with specific focus on their role in I.A.	336	336	336	1,008
6. Refresher training of SAEs with specific focus on their role on sanitation.	84	84	84	252
7. Refresher training of SDEs with specific focus on their role on sanitation.	17	17	17	51
8.(a) IA seminars (Upazila level).	12	12	0	24
(b) IA Seminars (Union level).	60	60	0	120
9. Orientation of other Sector Field Workers on their role in IA (Courses).	48	48	0	96

Rural Water Supply & Sanitation in Coastal Belt12.9 UNICEF RESOURCE INPUTS

	UNIT	Thousands		of US \$	
	\$	1992-93	1993-94	1994-95	Total
<u>Water Supply Materials</u>					
DTW materials	286	715.0	715.0	715.0	2,145.0
VSST materials	53	18.5	18.5	18.5	55.5
SST materials	57	8.5	8.5	8.5	25.5
PSF materials	140	21.0	21.0	21.0	63.0
		---	---	---	---
Sub-Total:		763.0	763.0	763.0	2,289.0
<u>Vehicles</u>					
1 x truck	25,000	25.0	-	-	25.0
2 x jeep	12,500	25.0	-	-	25.0
5 x boat	5,000	25.0	-	-	25.0
50 x motorcycle	1,000	50.0	-	-	50.0
100 x bicycle	120	12.0	-	-	12.0
		---	---	---	---
Sub-Total:		137.0	-	-	137.0
<u>Research &amp; Development</u>	LS	20.0	20.0	20.0	60.0
<u>Training &amp; Orientation</u>					
a) CTF training:					
Post installation training at site	1.4	4.4	4.4	4.4	13.2
Wrenches for CTF families	4.2	13.2	13.2	13.2	39.6
b) Tubewell Mec./PHP	30	10.0	10.0	10.0	30.0
c) Sub-Asstt. Engineer	60	5.0	5.0	5.0	15.0
d) Sub-Div. Engineer	60	1.0	1.0	1.0	3.0
e) IA Seminars (Upazila)	450	5.4	5.4	-	10.8
f) IA Seminar (Union)	20	1.2	1.2	-	2.4
g) Orientation of other Sector Workers on IA (courses)	20	1.0	1.0	-	2.0
		---	---	---	---
Sub-Total:		41.2	41.2	33.6	116.0
<u>Communication &amp; Health Promotion</u>	LS	20.0	20.0	20.0	60.0
		---	---	---	---
Total:		981.2	844.2	836.6	2,662.0

**12.10 Plan of Operation**  
**Project : Rural Water Supply and Sanitation in Coastal Belt**

Sl. No.	Activities	1991 (QTRS)				1992 (QTRS)				1993 (QTRS)				1994 (QTRS)				1995 (QTRS)				Responsible for	In collaboration with
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		
1	Provide upazilawise physical targets for activities specified (ADP)																					DPHE	UNICEF
2	Procurement of materials																						
3	Distribution of materials upto Sub-Division/Upazila stores as per requirement of the ADP																					DPHE	
4	<u>Site Selection Process</u>																						
a	Unionwise allocation of tubewells																					DPHE	UNICEF
b	Distribution of application forms, collection of application forms, processing site selection and approval																					DPHE	UNICEF
c	Motivation of communities and latrine construction by beneficiaries																					DPHE	UNICEF
5	<u>Installation</u>																						
a	Deep tubewells																					DPHE	UNICEF
b	VSST																					DPHE	UNICEF
c	SST																					DPHE	UNICEF
d	PSF																					DPHE	UNICEF

12.10 Plan of Operation  
 Project: Rural Water Supply and Sanitation in Coastal Belt

Sl. No.	Activities	1991 (QTRS)				1992 (QTRS)				1993 (QTRS)				1994 (QTRS)				1995 (QTRS)				Responsible for	In collaboration with
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		
6	<u>Training/Seminars</u>																						
a	TWM																					DPHE	UNICEF
b	SAE																					DPHE	UNICEF
c	SDE																					DPHE	UNICEF
d	CTF training at site																					DPHE	UNICEF
e	IA seminar, upazila																					DPHE	UNICEF/Upazila
f	IA seminar, union																					DPHE	UNICEF/Upazila
g	Orientation to sectoral staff																					DPHE	UNICEF
7	<u>Research &amp; Development &amp; Studies</u>																						
a	Exploratory drilling in the coastal belt under DPHE's regular programme & identification of new feasible area																					DPHE	UNICEF
b	Exploratory drilling under DANIDA assistance programme and identification of new feasible areas.																					DPHE	DANIDA
c	Monitoring the performance of VSST																					DPHE	WHO/UNICEF
	c.1. Data collection																					WHO	DPHE
	c.2. Data compilation & analysis																					WHO	DPHE/UNICEF
	c.3. Preparation of report																					WHO	DPHE/UNICEF
	c.4. Implementation of recommendation																					DPHE	UNICEF
8	Supervision, monitoring & reporting																					DPHE	UNICEF/WHO

REF: coastal.wk1

19 May'92



13. **RURAL WATER SUPPLY AND SANITATION IN THE SHALLOW WATER TABLE AREA**

This project will be implemented in 176 Upazilas in which the water table lies within 7.75 metres and in which there is no problem of salinity. Upazilas may be added or deleted after joint agreement by Government and UNICEF. The project will also provide shallow tubewells in those Upazilas which fall within the scope of the UNICEF assisted projects for Rural Water Supply and Sanitation in the Coastal Belt (84 Upazilas) and in the Low Water Table Area (200 Upazilas).

13.1 **Physical Objectives**

This project will provide domestic water for approximately 1.0 million people in the underserved pockets within shallow water table area by installing 15,000 shallow handpump tubewells with large platforms, thus improving average coverage to 81 persons per public handpump. It will also promote the construction of 150,000 low-cost simple hygienic latrines by beneficiaries of the handpumps and improve personal hygiene practices of 0.9 million beneficiaries. 800 ring wells will also be installed in the stony area where feasible, in both low water table area and shallow water table area.

13.2 **Serving the underserved Pockets in Shallow Water Table Area:**

Shallow Water Table Area is generally well served with a present (1991) average coverage of 85 persons per operating tubewell. However, underserved pockets still exist. This project will be implemented in these underserved pockets only. The underserved areas are those where access to be public tubewell is more than 150 metres or the number of users per public tubewell exceed 150.

The proposed 15,000 shallow tubewells shall be sunk only in the underserved pocket in shallow water table zone. DPHE will install these 15,000 shallow tubewells in a phased manner as shown in Section 13.7.2. To identify the underserved pocket, a survey will be undertaken during the period April 1992 - June 1992. The following methodology for identification shall be adopted.

- a) All TWMs, Health and Family Planning Workers, and NGOs working in each of these Upazilas will be asked to provide detailed information of the underserved pockets within their respective area of operation. The SDE, DPHE will issue letter/instruction through the respective Upazila heads of each organization.
- b) The information will cover the following aspects:
  - identification of the pocket (Baris/Para, Village and Union)
  - estimated population of the pocket
  - total no. of public tubewells in the pocket, including the numbers which are operating and choked up

- Total no. of private tubewells in the pockets including the number of operational ones
  - description of major physical barriers to access to existing tubewells
  - a sketch of the pocket (if possible)
- c) All these information would be submitted to the SAE of the Upazila. The SAE in consultation with the SDE will compile the information received from various sources and will prepare a preliminary list of pockets. He will then physically check each pocket and finalize the list needing tubewells.
- d) The SAE through the SDE will send a statement to Executive Engineer, Planning & Coordination (P&C) Division, Dhaka and UNICEF Divisional Office showing the population, existing public and private tubewell (running and choked up) in each pocket. A joint DPHE, WHO and UNICEF assessment of the information will be undertaken on a sample basis. The Executive Engineer, P&C will then return those information to the concerned SDE with an indicative upazilawise allocation for the underserved pockets only. The territorial SDE will plot these information into union map before starting the tubewell installation.
- e) Site selection criteria will be followed as per existing norm. CTF training, monitoring of progress, supervision of working, reporting etc. will follow the national system.
- f) Since most of the physical targets of 1988-93 has been achieved successfully, 15,000 shallow tubewell shall be sunk only in the identified unserved pocket of shallow water table area during the period 1992-95. Also during the same period 800 ring wells shall be constructed in the stony areas where soil condition are favourable, of both low water table area and shallow water table areas.

### 13.3 Installation of Shallow Tubewells:

For the installation of shallow tubewell handpump systems, the Government will provide sinking costs, platform and other local construction costs including local materials. UNICEF will provide materials such as PVC pipes, well screens, fillings, handpumps and cement. The beneficiaries will contribute cash Tk. 700.00.

### 13.4 Construction of Ring Wells in stony Area:

This project provides for construction of ring wells in stony areas, where they are feasible. These can be constructed in the stony area of both shallow water table area as well as low water table area. Areas of CHT, Chittagong, Sylhet, Dinajpur needing ringwell are tentatively known. However, DPHE R&D Division with the assistance of DANIDA Hydrogeologist will specify the unions where ringwells are feasible and badly needed by analysing data based on performance of existing wells or under hydrogeological investigation if necessary. DPHE will construct ring well through contractors. The Government will provide construction costs including local materials. UNICEF will provide materials such as PVC pipes, screens, fittings,

handpumps and cement. The beneficiaries will contribute cash (Tk. 1000.00 for each ring well). DPHE will construct 800 ring wells as shown in Section 13.7.3.

13.5 **Training:**

DPHE will conduct training for the Caretaker Families of the 15,800 handpump systems. This training will be conducted at site in presence of all members of the user families. This phase will cover both maintenance and repair as well as hygiene and sanitation. A set of wrenches will be provided to the caretaker family. DPHE will also conduct annual in-service refresher training for DPHE implementing staff of Sub-Divisional Engineer (SDE) level and below. UNICEF will provide funds for all of the above training activities.

13.6 **Future of the Project:**

The coverage in terms of population per tubewell is good. In addition, the shallow tubewell technology is well known as reflected by the large number of privately owned and mentioned tubewells. Hence, donor assistance to this hydrogeological area will be phased out by 1995. DPHE will formulate in mid 1994 the strategies for this area.

Rural Water Supply & Sanitation in Shallow Water Table Area

13.7 Phasing of Implementation (1992-95)

The annual physical targets are as follows:

	<u>1992-93</u>	<u>1993-94</u>	<u>1994-95</u>	<u>Total</u>
1. No. of inter-personal contact on health, hygiene and sanitation at site for beneficiary families	4,000	5,000	6,000	15,000 *
2. Shallow Tubewells	4,000	5,000	6,000	15,000
3. Ring well for stony area	200	300	300	800
4. Training of caretaker families	4,200	5,300	6,300	15,800
5. Refresher training for:				
a) Public Health Promoters (Tubewell Mechanics)	704	704	704	2,112
b) Sub-Asstt. Engineers	176	176	176	528
c) Sub-Div. Engineers	25	25	25	75
6. IA Seminar:				
a) Upazila level	40	40	40	120
b) Union level	200	200	200	600
7. Orientation of other sectoral field workers including women on IA courses	160	160	160	480

\* The target includes installation of shallow tubewells for UNICEF assisted Integrated Community Development programme for CHT and Family Development Project. DPHE will install the tubewells following the national system in the sites selected following the respective projects criteria.

Rural Water Supply & Sanitation in Shallow Water Table Area

13.8 UNICEF RESOURCE INPUTS

	UNIT	Thousands		of US \$	
	\$	1992-93	1993-94	1994-95	Total
<u>Water Supply Materials</u>					
Shallow TW materials	74	296.0	370.0	444.0	1,110.0
Ringwell materials	300	60.0	90.0	90.0	240.0
		---	---	---	---
Sub-Total:		356.0	460.0	534.0	1,350.0
<u>Training &amp; Orientation</u>					
a) <u>Caretaker Family Training</u>					
CTF training at site (post installation)	1.4	5.9	7.2	8.6	21.7
Wrenches for caretaker families	4.2	17.6	21.8	26.1	65.5
b) Public Health Promoter (TWM)	30.0	21.1	21.1	21.1	63.3
c) Sub-Asstt. Engineer	60.0	10.5	10.5	10.5	31.5
d) Sub-Div. Engineers	60.0	1.5	1.5	1.5	4.5
e) IA Seminar (Upazila)	450	18.0	18.0	18.0	54.0
f) IA Seminar (Union)	20	4.0	4.0	4.0	12.0
g) Orientation of other Sectoral Worker on IA (courses)	20	9.6	0.0	0.0	9.6
		---	---	---	---
Sub-Total:		88.2	84.1	89.8	262.1
<u>Communication &amp; Health Promotion</u>					
	LS	10.0	10.0	10.0	30.0
		---	---	---	---
Total:		454.2	554.1	633.8	1,642.1

13.9 Plan of Operation  
 Project : Rural Water Supply & Sanitation in Shallow Water Table Area

Sl. No.	Activities	1991 (QTRS)				1992 (QTRS)				1993 (QTRS)				1994 (QTRS)				1995 (QTRS)				Responsible for	In collaboration with
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		
1	Identification of underserved pocket areas																					DPHE	UNICEF
2	Procurement of materials																					UNICEF	DPHE
3	Provide Upazilawise physical targets for activities specified (ADP)																					DPHE	UNICEF
4	Distribution of materials upto Sub-division/upazila stores as per requirement of the ADP																					DPHE	UNICEF
5	<u>Allocation of Tubewells</u>																						
a	Unionwise allocation of tubewells and other activities																					DPHE	UNICEF
b	Distribution of information leaflet, application forms among the public, collection of forms, processing site selection and approval																					DPHE	UNICEF
c	Motivation of communities and latrine construction by beneficiaries																					DPHE	UNICEF
6	<u>Installation</u>																						
a	Shallow																					DPHE	UNICEF
b	Ring wells																					DPHE	UNICEF

13.9 Plan of Operation  
 Project : Rural Water Supply & Sanitation in Shallow Water Table Area

Sl. No.	Activities	1991 (QTRS)				1992 (QTRS)				1993 (QTRS)				1994 (QTRS)				1995 (QTRS)				Responsible for	In collaboration with
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		
7	<u>Training</u>																						
a	Tubewell Mechanics/SAE																					DPHE	UNICEF
b	SDE and EEs																					DPHE	UNICEF
c	Caretaker families training at site																					DPHE	UNICEF/ WHO
8	<u>IA Seminar</u>																						
a	Upazila level (IA)																					DPHE	UNICEF/ UPAZILA
b	Union level (IA)																					DPHE	UNICEF/ UPAZILA
c	Sectoral briefing on IA																					DPHE	UNICEF/ UPAZILA
9	Supervision, monitoring and reporting																					DPHE	UNICEF/ WHO

## 14. WATER SUPPLY AND SANITATION IN URBAN SLUMS AND FRINGES

This project covers 33 Pourashavas. Since inception of the project, no activities could be undertaken pending the approval of the project. It has now been approved and the Project Director, 2 Asstt. Engineers and 1 Sub-Assistant Engineer and some supporting staff have been appointed. The remaining AE and the SAE will be recruited by June 1992.

The Pourashavas will be responsible for running the latrine production centres set up with the capital investment made from the project. They will provide their share of cost for rehabilitation of choked up tubewells and installation of new systems. To this effect, an agreement has already been signed between DPHE and 33 Pourashavas.

### 14.1 Physical Objectives

This project will provide domestic water supply for approximately 0.36 million people in fringe and slum areas of municipal towns, by installing 3,350 handpump systems. It will also construct latrine production centres in each project Pourashava and produce water seal latrine components according to the demand. Tentatively 19,800 components are envisaged.

### 14.2 Establishment of Pourashava-level Implementation Committee:

Pourashavas receiving assistance under this project will first set up a Pourashava Water Supply and Sanitation Committee. This Committee will, in particular, include elected representatives from the fringe areas and slum communities, as well as representatives from major NGOs working in water and sanitation.

Once formed, the Committee will function as per guidelines formulated by DPHE and UNICEF.

### 14.3 Identification of Fringe and Slum Areas and Establishment of Ward Committees:

DPHE and UNICEF, in collaboration with the municipal authorities, will conduct a survey and produce a map of the fringe and slum areas of each Pourashava based on defined criteria. This map will define the area which may receive assistance from this project. Each ward within the project area will then establish a Ward Committee, which will include representatives from slum and fringe communities. One member of each Ward Committee will sit on the Pourashava Water Supply and Sanitation Committee.

### 14.4 Identification of NGOs and Other Resource Agencies:

While conducting the survey of each Pourashava, NGOs and other resource agencies will be identified, which may be willing to assist, with their own resources, in certain geographical sections of the slum and fringe areas. The Pourashava Water Supply and Sanitation Committee would select NGOs to assume responsibility for implementation of the project in certain defined areas.



14.5 **Identification of Appropriate Tubewell Technology and Scheme Allocation:**

DPHE, in consultation with the municipal authorities, will indicate on the aforementioned map the appropriate tubewell technology or technologies for respective areas. Based on the existing service coverage (population per tubewell) in the Pourashava and the number of handpump systems available, each Pourashava will be allocated a total number of components, known as the scheme allocation. Service coverage will be determined for slums and fringes separately.

14.6 **Installation of Handpump Tubewell:**

DPHE in consultation with the Pourashavas will arrange for the installation of handpump tubewells according to the technology indicated.

The Pourashavas, NGOs and/or the DPHE will provide sinking costs, platform and other local construction costs including local materials (except for sinking and resinking of shallow tubewells). UNICEF will provide materials such as PVC and G.I.pipes, well screens, fittings, handpumps and cement. For sinking or resinking of shallow tubewells, the beneficiaries will provide sinking costs, platform and other local construction costs including local materials. In other cases the beneficiaries will contribute cash, the amount being the same as under the Rural Water Supply Programme.

14.7 **Construction of Iron Removal Plants:**

Iron removal plants will be constructed as indicated in Section 14.14 except that instead of the Government, the Pourashavas will provide supervision, materials and labour. DPHE will assist Pourashava in supervision and quality control.

14.8 **Construction of Latrine Production Centres:**

To accelerate the sanitation coverage throughout the Pourashava area, interested Pourashavas will have one latrine production centre. The selection of the site for new centres will be made by the Pourashava Water Supply and Sanitation Committees according to the guidelines established by DPHE. UNICEF will provide materials and local costs for the construction of these centres as well as tools and other equipment necessary for the production of latrines.

The Pourashavas will arrange for mistris to be employed at each new production centre, who will be paid from funds generated by the sale of latrines.

14.9 **Production and Sale of Water Seal Latrine Components:**

The Pourashava with technical support from DPHE will arrange for the production of water seal latrine components. Both single pit and twin pit latrines will be produced for sale. The centre will be run on commercial basis and no subsidy will be given to the buyer of the latrine component. DPHE will arrange for the purchase of local materials (such as khoa, sand) for the production of the latrine components during the first lot as seed material which will be reimbursed by UNICEF. It is equivalent to 100 complete latrines of which 50 will be twin pit with a total of 10 rings and 50 will be single pit with 5 rings. UNICEF/DPHE will provide other materials (cement, M.S.

wire, M.S. rod and wire mesh) for the production of water seal latrine components for the first lot only. No more material will be provided by DPHE-UNICEF. Pourashava will use all the seed materials to operate latrine production centre on revolving basis.

The financial proceeds from the sale of latrines will be deposited in a revolving account as in practice in DPHE VS project and will be operated by the Pourashava. A guideline will be prepared by DPHE. The latrine parts will be sold at competitive price prevailing in the open market and should generate adequate funds for sustained operation of the Centre. DPHE-UNICEF will periodically supervise and monitor the operation and the Pourashava will submit bimonthly progress reports on production and sale to DPHE and UNICEF.

14.10 **Promotion of Homemade Latrines:**

To promote sanitation among those who cannot afford to buy a water-seal latrine, all latrine production centres will construct a set of homemade hygienic latrine of different design, as a demonstration. The costs for the demonstration latrines will be borne by the project. Information leaflets with drawings of homemade latrines will be made available to the public at the production centre. However, home made latrine will be applicable in the fringe area only, not in slums, where a concrete slab will be an acceptable minimum.

14.11 **Training:**

DPHE, in collaboration with the Pourashavas, will conduct training for the Caretaker families of the handpump systems in accordance with existing guidelines. DPHE will also conduct annual in-service refresher training for implementing staff of the Pourashavas. DPHE will conduct orientation of Pourashava officials related to the implementation of the project. DPHE will also arrange training for latrine production mistris, including mistris from the non-government sector.

14.12 **Assistance to UNICEF assisted Slum Improvement Project (SIP):**

In addition to implementation of this project by DPHE, a UNICEF assisted Slum Improvement Project (SIP) for a limited number of Pourashava is also being undertaken by an other Government agency. Provision for materials and partial cost of installation for the water and sanitation related components of the SIP has been kept in this project. (Please see Section 14.14).

14.13 **Future of the Project:**

The project has a provision to include 85 Pourashavas and many will be taken care of on a bilateral basis with different donors. So far the project has been expanded to 33 Pourashavas and no further Pourashava will be taken up during 1992-95. However, if the US&F project is merged with a water supply and sanitation project covering the entire Pourashava, another Pourashava in the US&F project may be considered.

The project is expected to continue in each of these Pourashavas upto the year 2000 subject to any of these conditions mentioned below:

- 1) Water supply and sanitation activities in slums and fringes of the Pourashava are not and will not be started through any other project. The US&F project should,

whenever possible, be merged with future water supply and sanitation projects covering the entire Pourashava.

- 2) Minimum coverage by water supply has not been achieved in the slums and fringes of the Pourashava.
- 3) Pourashava fulfils its obligation and meets site selection criteria as prescribed.

Any Pourashava that does not meet any of the above conditions will not be eligible for continuation of the project and will be excluded accordingly.

It has to be mentioned that the US&F project was planned at a time where urban slums and fringes were not included in urban water supply projects. This practice has been changed since then. Consequently the US&F project will gradually be phased out. However additional Pourashavas may be included in the project after 1995, if they are not covered under any other urban slums and fringes project. The number of Pourashavas to be covered after 1995 will be determined during 1994/95.

Water Supply & Sanitation in Urban Slums & Fringes14.14 Phasing of Implementation (1992-95)

The annual physical Targets are as follows:

	<u>1992-93</u>	<u>1993-94</u>	<u>1994-95</u>	<u>Total</u>
Pourashavas covered		<----- 33 ----->		
No. of inter-personal contacts on health, hygiene and sanitation at pump sites for beneficiary families.	1,270	1,270	1,270	3,810
Shallow Tubewells	750	750	750	2,150
STW (SIP)	100	100	100	300
Deepset Tubewells	195	195	195	585
Deepset (SIP)	30	30	30	90
Deep Tubewells	25	25	25	75
DTW (SIP)	10	10	10	30
Very Shallow Shrouded Tubewells	20	20	20	60
Shallow Shrouded TWs	15	15	15	45
Pond Sand Filters	5	5	5	15
Iron Removal Plants	10	10	10	30
Desanding	-	250	250	500
Resinking	250	250	250	750
Construction of Latrine Production Centres.	15	0	0	15
Production of Latrines	6,600	6,600	6,600	19,800
Training of Caretaker Families	1,270	1,270	1,270	3,810
Training of Caretakers (SIP)	140	140	140	420
Training of Pourashava Staff (No.)	75	75	75	225
Training of Masons	33	15	0	48
Orientation of Pourashava Officials (Courses)	10	10	0	20

Water Supply & Sanitation in Urban Slums & Fringes14.15 UNICEF RESOURCE INPUTS

	UNIT	Thousands of US \$			Total
	\$	1992-93	1993-94	1994-95	
<u>Water Supply &amp; Sanitation Materials</u>					
Materials for shallow TW	74	62.9	62.9	62.9	188.7
Materials for TARA deepset TW	153	34.4	34.4	34.4	103.2
Materials for Deep TW	286	10.0	10.0	10.0	30.0
Materials for VSST	53	1.0	1.0	1.0	3.0
Materials for SST	57	0.9	0.9	0.9	2.7
Materials for PSF	140	0.7	0.7	0.7	2.1
Materials for IRP	52	0.5	0.5	0.5	1.5
Materials for STW resinking	22	5.5	5.5	5.5	16.5
Materials for latrine production centres	930	13.9	0.0	0.0	13.9
Construction cost of latrine production centres	1,238	18.5	0.0	0.0	18.5
Materials for twin pit & single pit latrine	21.3	70.3	0	0	70.3
		---	---	---	---
Sub-Total:		218.6	115.9	115.9	450.4
<u>Training &amp; Orientation</u>					
a) CTF training:					
Pre-installation CTF training for STW in batches	11	0.6	0.6	0.6	1.8
Post installation CTF training for STW at site	1.4	1.1	1.1	1.1	3.3
Post installation CTF training for DTW, VSST, SST, PSF, IRP at site	1.4	0.1	0.1	0.1	0.3
Phase I training for TARA at site	1.4	0.3	0.3	0.3	0.9
Phase II training for TARA in batches	25	0.2	0.2	0.2	0.6
Post resinking train- ing for STW at site	1.4	0.4	0.4	0.4	1.2
Wrenches for STW, DTW, VSST, SST, PSF, IRP and resunk STW	4.2	4.9	4.9	4.9	14.7
Kit 'A' for TARA TW	2	0.4	0.4	0.4	1.2
Kit 'B' for TARA TW	26	1.1	1.1	1.1	3.3
b) Training of masons	20	0.6	0.3	-	0.9
c) Training of Pourashava staff	20	1.5	1.5	1.5	4.5
d) Orientation of Pourashava officials (courses)	20	0.2	0.2	-	0.4
		---	---	---	---
Sub-Totals:		11.4	11.1	10.6	33.1
<u>Commun., Health Promotion and demonstration latrine</u>					
	LS	5.5	5.5	5.5	16.5
		---	---	---	---
Total:		235.5	132.5	132.0	500.0

14.16 Plan of Operation  
Project : Water Supply and Sanitation in Urban Slums and Fringes

Sl. No.	Activities	1991 (QTRS)				1992 (QTRS)				1993 (QTRS)				1994 (QTRS)				1995 (QTRS)				Responsible for	In collaboration with
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		
1	Provide Pourashovawise annual physical targets (ADP) of different components																					DPHE	UNICEF
2	Procurement of materials																					UNICEF	DPHE
3	Distribution of materials upto Sub-Divisional/Pourashova stores as per requirements of ADP																					DPHE	Pourashava
4	<u>Site Selection Process</u>																						
a	Distribution of the TWs among the identified slums and fringes																					DPHE	Pourashava
b	Distribution of application forms among the public; collection of application forms; checking of sites and processing site selection																					Pourashava	DPHE/UNICEF
c	Communication, health promotion and construction of latrines by beneficiaries																					DPHE	UNICEF
5	<u>Installation</u>																						
a	Shallow tubewells																					Beneficiaries	Pourashava
b	Deepset tubewells																					DPHE	Pourashava
c	Deep tubewells																					DPHE	Pourashava
d	VSST																					DPHE	Pourashava
e	SST																					DPHE	Pourashava
f	PSF																					DPHE	Pourashava
g	IRP																					DPHE	Pourashava
h	Desanding																					Beneficiaries	Pourashava
i	Resinking																					Beneficiaries	Pourashava

14.16 Plan of Operation  
 Project : Water Supply and Sanitation in Urban Slums and Fringes

Sl. No.	Activities	1991 (QTRS)				1992 (QTRS)				1993 (QTRS)				1994 (QTRS)				1995 (QTRS)				Responsible for	In collaboration with
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		
6	<u>Sanitation</u>																						
a	Construction of latrine production centres																					DPHE	Pourashova UNICEF
b	Production of latrines																					Pourashova	DPHE
7	<u>Training</u>																						
a	Training of caretakers families of all types of water supply systems																					Pourashova	DPHE
b	Training of Pourashova staff																					Pourashova	DPHE UNICEF
c	Training of Pourashova officials																					Pourashova	DPHE UNICEF
d	Training of Poura Masons																					Pourashova	DPHE UNICEF
e	Supervision, monitoring and reporting																					Pourashova	DPHE UNICEF WHO

## 15. RURAL WATER SUPPLY MAINTENANCE, REHABILITATION AND UPGRADING

This project will be implemented in all Upazilas of the country.

### 15.1 Physical Objectives

The specific objectives of this project are:

1. To reduce the proportion of non-functional handpumps by training caretaker families, providing tools and transferring the responsibility for maintenance to the beneficiaries. (Ref. to caretaker family training programme of different projects).
2. To reduce the proportion of choked up tubewells by desanding 40,000 shallow tubewells, resinking 60,000 shallow tubewells and rehabilitating 300 deepset and 450 deep tubewells.
3. To maintain water quality through the reconstruction or repair of 13,650 platforms on existing deep, deepset and shallow tubewell.
4. To enhance water utilisation through the enlargement of 10,500 existing one-bag platforms in DTW, STW and deepset wells.
5. To bring all existing non-functioning IRP into operation and 2 upgrade 2,000 existing tubewells with iron problem by constructing new 2,000 iron removal plants.

### 15.2 Upazilawise Scheme Allocation:

Territorial staff of DPHE will conduct investigations into each Upazila to ascertain the number of choked-up tubewells belonging to each of the various technologies. Based on this figure and the existing service coverage in the Upazila (population per functioning tubewell), DPHE will prepare a scheme allocation for each Upazila. An annual phasing of implementation will then be developed in consultation with DPHE Upazila field staff. The aggregate of these Upazila plans will form the overall implementation plan for the project.

### 15.3 Sale of Spare Parts:

The Government will ensure that spare parts of all types of pumps are available at the Upazila level for the beneficiaries of handpumps to purchase as required. The system already developed and operationalized for No.6 handpumps in 1988-89 shall be restored. However, the restoration will also include the sale of spare parts for the TARA pumps. The sale of spare parts will be given effect from July 1992. The Government will procure all spare parts for handpumps. The revenue generated from the sale of spares will be used as a cost recovery mechanism to make the provision of spare parts a self-financing scheme.



**Maintenance:** The responsibility of maintenance of Handpump No. 6 and No. 4 will be given to the beneficiaries. A protocol to study the mechanism of handing over the maintenance of No. 6 and No. 4 handpump has been developed covering 7 upazilas in 7 DPHE Circles. It is envisaged that during the financial year 1994-95, the DPHE Tubewell Mechanics can be disengaged from maintenance of Handpump No. 6 and No. 4, if the final evaluation of pilot study proves to be positive.

15.4 **Rehabilitation of Choked-up Shallow Tubewells (Desanding and Resinking):**

This project includes for the desanding and resinking of choked-up shallow tubewells. DPHE will implement the desanding through its staff at upazila level. A technical and financial investigation for the desanding in the form of pilot study will be taken up in 1992-93 in 7 upazilas in 7 DPHE Circles for desanding at least 100 choked-up tubewell in each upazila and then applied nationally, if found feasible. DPHE will meet the cost of desanding until 1995, after which the cost will be transferred to the beneficiaries. During this period, a mechanism will also be developed on how to transfer the cost of desanding to beneficiaries. UNICEF will provide desanding equipment.

This project provides for resinking of tubewells which are permanently choked. UNICEF will provide replacement materials (PVC pipes, well screens, fittings and cement). DPHE will withdraw and resink the permanently choked up tubewells through Contractors. The beneficiaries will contribute Tk. 700, which will be gradually increased as shown in Section 7.3. The implementation of resinking of choked up shallow tubewells will follow the **Integrated Approach (IA)**.

15.5 **Rehabilitation of Deepset Tubewells:**

This project provides for the desanding of choked-up conventional and TARA deepset tubewells. The procedure will be the same as for desanding shallow tubewells. (See section 15.4 above).

In cases where the tubewell itself is serviceable (or successfully desanded) but where the conventional deepset handpump is unserviceable, this project provides for replacement with a TARA or other pump inside the 4" upper well casing. DPHE will arrange for the replacement of the pump and the extension of the platforms by providing labour costs, supervision and local materials. UNICEF will provide the handpump and cement. The beneficiaries will make a cash contribution which will be the same as for a new deepset installation (Tk. 1,000). DPHE will prepare a guideline for this activity.

15.6 **Rehabilitation of choked-up Tubewells in the Coastal Belt:**

This project provides for the desanding of deep tubewells, Very Shallow Shrouded Tubewells (VSST) and Shallow Shrouded Tubewells (SST) in the coastal belt. The technology for desanding and rehabilitation of deep tubewells has been developed, but still under field testing.

Those choked up deep tubewells which cannot be revived by desanding will be rehabilitated following the guidelines developed. The Government will organize and provide the labour cost and local materials for desanding/rehabilitation of the deep tubewell and the extension of the platform. UNICEF will provide the rehabilitation

materials (PVC pipe, and cement). The beneficiaries will make a cash contribution of Taka 2000 for DTW. Choked up VSST and SST will be desanded/resunk following the same procedure as for the resinking of shallow tubewells (see Section 15.4). The beneficiaries will make cash contribution of Tk. 700 for resinking only.

**15.7 Phasing out of Obsolete Handpumps:**

There are an estimated 200,000 Old No. 4 and No. 6 handpumps installed. These require different spare parts. In order to standardize on one type of suction handpump in the country, a policy of gradual replacement of old-type handpumps will be followed whereby a new No. 6 handpump will be provided from DPHE stock whenever a choked well with old-type No. 6 or No. 4 handpump is resunk. There will be additional provision for outright replacement of existing No.4 handpump.

**15.8 Rehabilitation of On-Site Water Treatment Plants:**

Beneficiaries of Iron Removal Plants, Pond Sand Filters (PSF) and other plants in need of repair may receive assistance in the form of UNICEF-supplied materials from DPHE stock. Labour costs must be borne by the beneficiaries.

**15.9 Construction of Platforms:**

This project provides for construction of new platforms on non-existing/broken platforms based on demand by the beneficiaries. DPHE will motivate the beneficiaries to construct/reconstruct the nonexistent or damaged platforms of DTW, deepset wells and shallow tubewells according to the current designs for the specific type. Beneficiaries will provide labour cost, local material khoa and sand. UNICEF will provide the cement needed through DPHE. DPHE will follow up and supervise the works.

**15.10 Enlargement of Existing One-Bag Platform:**

This project provides for construction of large platform on existing small (one bag) platform based on demand by the beneficiaries. DPHE will motivate the beneficiaries to enlarge the existing one bag platforms in DTW, Deepset and STW, VSST and SST having more than 25 beneficiaries by an appropriate design to be developed by DPHE and UNICEF. The beneficiaries will provide labour cost, khoa and sand and UNICEF will provide cement through DPHE. DPHE will follow up and supervise the works.

**15.11 Construction of Iron Removal Plants (IRPs):**

This project provides for the construction of IRPS on existing tubewells in iron problem areas based on demand by the beneficiaries. However, the construction of new IRPs will be taken up from the financial year 1993-94. During the period 1992-93, all existing non-functioning IRPs will be rehabilitated. DPHE will bear the labour cost and other required materials. UNICEF will provide cement, CI sheet, PVC and GI pipes. In addition all caretakers family of existing IRPs will be retrained on maintenance. For new construction of IRPs, Government will provide supervision, materials and labour. UNICEF will provide Cement, CI sheet, PVC and GI pipe. The beneficiaries will provide a cash contribution of Tk. 400.

**15.12 Training:**

DPHE will, with 6 months interval, conduct two rounds of post installation training for the caretaker families and other beneficiaries of new iron removal plants. The CTF and other beneficiaries of IRP and PSF constructed before 1992 will also be retrained. This will be conducted at the site of the tubewell in presence of all user family members including the Caretaker family and other beneficiaries. This training will cover both repair and maintenance aspects as well as hygiene and sanitation. During the training, DPHE will provide to the Caretaker family a set of wrenches. UNICEF will provide funds for these training activities. The outstanding Phase I and Phase II CTF training of Tara and Phase I training of HP No.6 installed during 1991-92 will be completed by end 1992 (ref. Section 15.14 item 10,11,12). DPHE has already issued instruction to start these activities.

**15.13 Transportation:**

For this project UNICEF will consider providing up to a maximum of 2 trucks, 4 jeeps, 100 motorcycles and 200 bicycles on the understanding and stipulations indicated in section 12.7.

Rural Water Supply, Maintenance, Rehabilitation & Upgrading

15.14 Phasing of Implementation (1992-95)

The annual physical Targets are as follows:

	<u>1992-93</u>	<u>1993-94</u>	<u>1994-95</u>	<u>Total</u>
1. Provision of spare parts for TARA				
(a) Nos. of Kit 'B'	3,000	3,000	3,000	9,000
(b) Nos. of Kit 'A'	10,000	-	-	10,000
2. Desanding: Shallow TW	0	20,000	20,000	40,000
3. Resinking: Shallow TW	20,000	20,000	20,000	60,000
4. Rehabilitation: Deepset TW	100	100	100	300
: Deep TW	150	150	150	450
: IRP	3,000	200	200	3,400
5. Reconstruction: Platform SWT	4,000	4,000	4,000	12,000
: Deep TW	400	400	400	1,200
: Deepset	150	150	150	450
6. Construction of IRP for STW/TARA/Deep TW	0	1,000	1,000	2,000
7. Replacement of Handpump #4 and old #6	3,500	3,500	3,500	10,500
8. Enlargement of one-bag platforms	3,500	3,500	3,500	10,500
9. Training of all Caretakers families of Iron Removal Plant	*			
	4,500	1,000	1,000	6,500
10. <u>TARA Deepset Caretaker Family**</u>				
** (a) Phase I training at site for those installed during 1991-92.	18,150	-	-	18,150
** (b) Phase I training for those installed before July 1991 (including refresher training for 7,000 CTFs).	31,000	-	-	31,000
** (c) Phase II training for those installed during 1991-92 in 1,210 batches	18,150	-	-	18,150
11. Phase I Training of Caretakers families of pond sand filters (PSF) constructed upto June 1992 at site 472		-	-	472
12. Phase I Training of CTF of TWs installed during 1991-92 at site:				
(a) Shallow tubewells	10,000	-	-	10,000
(b) Deep tubewells	3,150	-	-	3,150
(c) VSST	350	-	-	350
(d) SST	100	-	-	100

\* Retraining of CTF of IRP constructed upto June 1992 only.

\*\* Also includes all Tara installed by DPHE from its own resources and those installed under Urban Slums and Fringes Project.

Rural Water Supply, Maintenance, Rehabilitation & Upgrading15.15 UNICEF RESOURCE INPUTS

	UNIT	Thousands		of US \$	
	\$	1992-93	1993-94	1994-95	Total
<u>Water Supply Materials</u>					
a) <u>Spare parts for TARA</u>					
(a) Kit "A"	2	20.0	-	-	20.0
(b) Kit "B"	26	78.0	78.0	78.0	234.0
b) Materials for resinking of STW	22	440.0	440.0	440.0	1,320.0
c) Materials for Deepset TW Rehabilitation	119	11.9	11.9	11.9	35.7
d) Materials for DTW Rehab.	70	10.5	10.5	10.5	31.5
e) Materials for rehabilitation of IRP	15	45.0	3.0	3.0	51.0
f) Materials for STW platform reconstruction	15	60.0	60.0	60.0	180.0
g) Materials for DTW platform reconstruction	15	6.0	6.0	6.0	18.0
h) Materials for deepset TW platform reconstruction	15	2.2	2.2	2.2	6.6
i) Materials for construction of IRP in STW, DTW & TARA	52	0	52.0	52.0	104.0
j) Materials enlargement of small platform	10	35.0	35.0	35.0	105.0
k) Replacement of Handpump #4 and old #6	22	77.0	77.0	77.0	231.0
l) Spare parts for IRP	10	10.0	20.0	20.0	50.0
m) Spare parts for PSF	10	3.0	3.0	3.0	9.0
		---	---	---	---
Sub-Total:		798.6	798.6	798.6	2,395.8
<u>Vehicles</u>					
2 x truck	25,000	50.0	-	-	50.0
4 x jeep	12,500	50.0	-	-	50.0
100 x motorcycle	1,000	100.0	-	-	100.0
200 x bicycle	120	24.0	-	-	24.0
		---	---	---	---
Sub-Total:		224.0	-	-	224.0

15.15 UNICEF RESOURCE INPUTS (continued)

Pilot Study	LS	10.0	0.0	0.0	10.0
<u>Communication &amp; Health Promotion</u>	LS	5.0	5.0	5.0	15.0
<u>Training &amp; Orientation</u>					
(a) Training of IRP-CTF at site	1.4	6.3	1.4	1.4	9.1
(b) Training of TARA CTF at site	1.4	68.8	-	-	68.8
(c) Training of TARA CTF in batch	25	30.3	-	-	30.3
(d) Training of PSF-CTF at site	1.4	0.7	-	-	0.7
(e) Training of shallow TW - CTF at site	1.4	14.0	-	-	14.0
(f) Training of deep TW-CTF at site	1.4	4.4	-	-	4.4
(g) Training of VSST and SST-CTF at site	1.4	0.7	-	-	0.7
Sub-Total:		125.2	1.4	1.4	128.0
<u>Tools and Equipment</u>					
(a) Desanding tools	60	28.0	-	-	28.0
(b) Maintenance tools for Tubewell Mechanics	200	92.0	-	-	92.0
Sub-Total:		120.0	0.0	0.0	120.0
Grand Total:		1,282.8	805.0	805.0	2,892.8

ref: C:\REPORTS\BORD\_REV.92  
22 Aug'92

**15.16 Plan of Operation**  
**Project: RWS Maintenance, Rehabilitation and Upgrading**

Sl. No.	Activities	1991 (QTRS)				1992 (QTRS)				1993 (QTRS)				1994 (QTRS)				1995 (QTRS)				Responsible for	In collaboration with
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		
1	Provide upazilawise physical targets for activities (ADP)																					DPHE	UNICEF
2	Procurement of materials																					UNICEF	DPHE
3	Distribution of materials and tools upto upazila stores as per ADP requirements																					DPHE	UNICEF
4	<u>Allocation of Activities</u>																						
a	Unionwise allocation of activities																					DPHE	UNICEF
b	Distribution of information leaflets, application forms and public, collection of forms, processing, approval																					DPHE	UNICEF, NGO & other Govt. Agencies
c	Motivation of communities and latrine construction by beneficiaries																					DPHE	Beneficiaries
5	<u>Rehabilitation</u>																						
a	Desanding of choked up wells																					DPHE	Beneficiaries
b	Rehabilitation of choked up shallow wells, rehabilitation of deepset and deep tubewells. Construction of broken platforms, enlargement of small platform platform.																					DPHE	UNICEF
c	Construction of IRP																					DPHE	UNICEF
d	Repair & reconstruction of IRP																					DPHE	UNICEF
6	Training of CTFs of IRP both backlog & current																					DPHE	UNICEF

15.16 Plan of Operation  
 Project: RWS Maintenance, Rehabilitation and Upgrading

Sl. No.	Activities	1991 (QTRS)				1992 (QTRS)				1993 (QTRS)				1994 (QTRS)				1995 (QTRS)				Responsible for	In collaboration with
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		
7	Training of CTF of TARA																					DPHE	UNICEF
8	Training of CTF of PSF																					DPHE	UNICEF
9	Training of CTF of Deep TWs																					DPHE	UNICEF
10	Training of CTF of VSST and SST																					DPHE	UNICEF
11	<u>Studies</u>																						
a	Handing over of maintenance of No.6 & No.4 TWs																					DPHE	UNICEF/WHO
b	Feasibility studies on desanding																					DPHE	UNICEF/WHO
12	Supervision and monitoring																					DPHE	UNICEF & WHO

ref: upgrading/tk-lotus



15.17 Plan of Operation

Project: Rural Water Supply and Sanitation Programme  
Preparation of Annual Development Programme (ADP)

Sl. No.	Activities	1991 (QTRS)				1992 (QTRS)				1993 (QTRS)				1994 (QTRS)				1995 (QTRS)				Responsible for	In collaboration with	
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV			
1	<u>Collection of unionwise data:</u>																						DPHE	UNICEF
a	Nos. of tubewells of different type(s)																						DPHE	UNICEF
b	% of area technologywise																						DPHE	UNICEF
c	Population																						DPHE	UNICEF
2	Compilation of unionwise TW, area and population																						DPHE	UNICEF
3	Identification of underserved area																						DPHE	UNICEF & WHO
4	Preparation of upazilawise ADP																						DPHE	UNICEF
5	Unionwise allocation by SDE																						DPHE	
6	Finalization of ADP unionwise for approval																						DPHE	UNICEF & WHO
7	Approval by Ministry																						LGAD	DPHE & UNICEF
8	Despatch ADP to field offices																						DPHE	

15.18 Plan of Operation

Project: RWS Maintenance, Rehabilitation & Upgrading  
 Pilot Project on handing over repair/maintenance of No.6 and No.4 handpump to Caretaker Family

Sl. No.	Activities	1991 (QTRS)				1992 (QTRS)				1993 (QTRS)				1994 (QTRS)				1995 (QTRS)				Responsible for	In collaboration with
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		
1	Finalization of study protocol for pilot project																					DPHE	UNICEF & WHO
2	Selection of study area																					DPHE	Do
3	Baseline data collection																					WHO	UNICEF & DPHE
4	Withdrawal of Mechanics from maintenance through notification																					DPHE	
5	Bi-annual surveys																					WHO	UNICEF & DPHE
6	Analysis of survey data																					WHO	UNICEF & DPHE
7	Final evaluation & submission of recommendation to Technical Committee for necessary action																					WHO	UNICEF & DPHE

ref: upgrad\_3.wk1/TK-LOTUS

15.19

Plan of Operation

Project :

Project: RWS Maintenance, Rehabilitation & Upgrading

Study on Technical & Financial Investigation related to Desanding of Shallow Tubewells

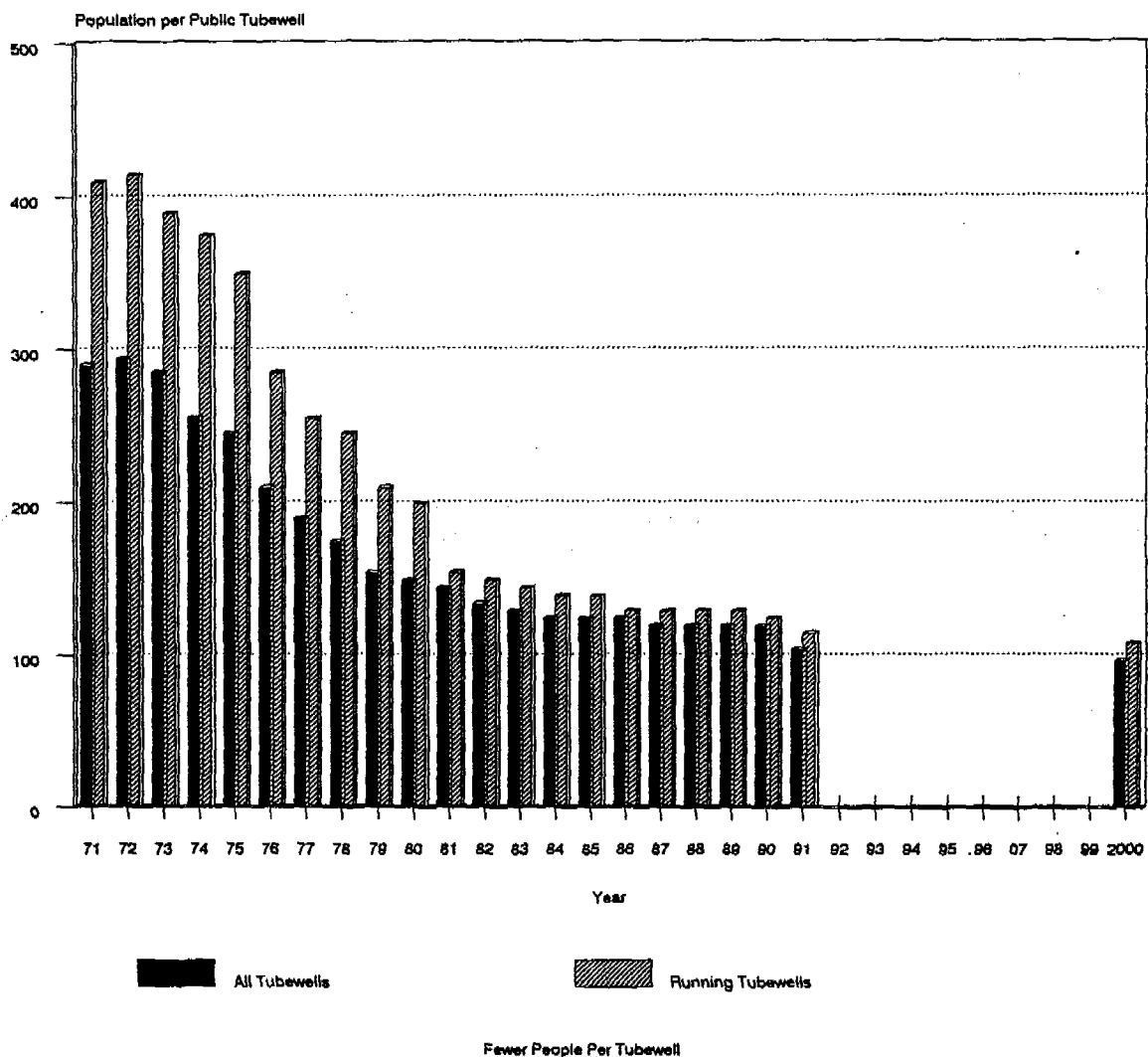
Sl. No.	Activities	1991 (QTRS)				1992 (QTRS)				1993 (QTRS)				1994 (QTRS)				1995 (QTRS)				Responsible for	In collaboration with	
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV			
1	Preparation of protocol																					DPHE	UNICEF & WHO	
2	Finalization of protocol and selection of pilot area																						DPHE	UNICEF & WHO
3	Implementation of the pilot project as per protocol																						DPHE	UNICEF & WHO
4	Evaluation of the pilot project and submission of final recommendations for implementation nationally.																						WHO	UNICEF & DPHE

# PROVIDING UNIVERSAL ACCESS TO RURAL DRINKING WATER IN BANGLADESH BY THE YEAR 2000

## INTRODUCTION

Stimulated by the challenges of the International Drinking Water and Sanitation Decade (1981-1990), the government of Bangladesh (GOB) has dramatically changed the water utilisation pattern. Today, over 80 percent of the rural population take their drinking water from a tubewell accessible within 150 metres (Figure 1). The urban drinking water coverage

FIG. 1 RURAL WATER SUPPLY COVERAGE



is 75 percent, while the urban fringes and slums is 58 percent. The task of the 1990's is to achieve universal coverage, taking into due consideration the underserved areas and the implication of the declining water table caused by the competing irrigation needs. The position paper analyses the state of the art and formulates a strategy to provide universal coverage, focussing on the rural areas and the urban slums and fringes.

### **DEFINITION OF THE GOAL**

The goal is to provide universal access to drinking water. Access is defined as a reasonable distance the consumer has to walk and carry the water to the home. Consumer surveys (1) indicated 150 metres as reasonable. Almost 90 percent of the users take home 10 litres of water per capita, out of which 4 litres are for drinking. A tubewell fitted with the No 6 suction or forcelifit TARA pumps and serving a respective population not exceeding 100 and 200 persons can meet the total domestic requirements of 50 litres per person (1) for 5 hours of pumping time. Hence, the consumer would be educated to use tubewell water for all purposes. Presently, it is estimated that 12 percent of the users utilise handpump for all their water needs.

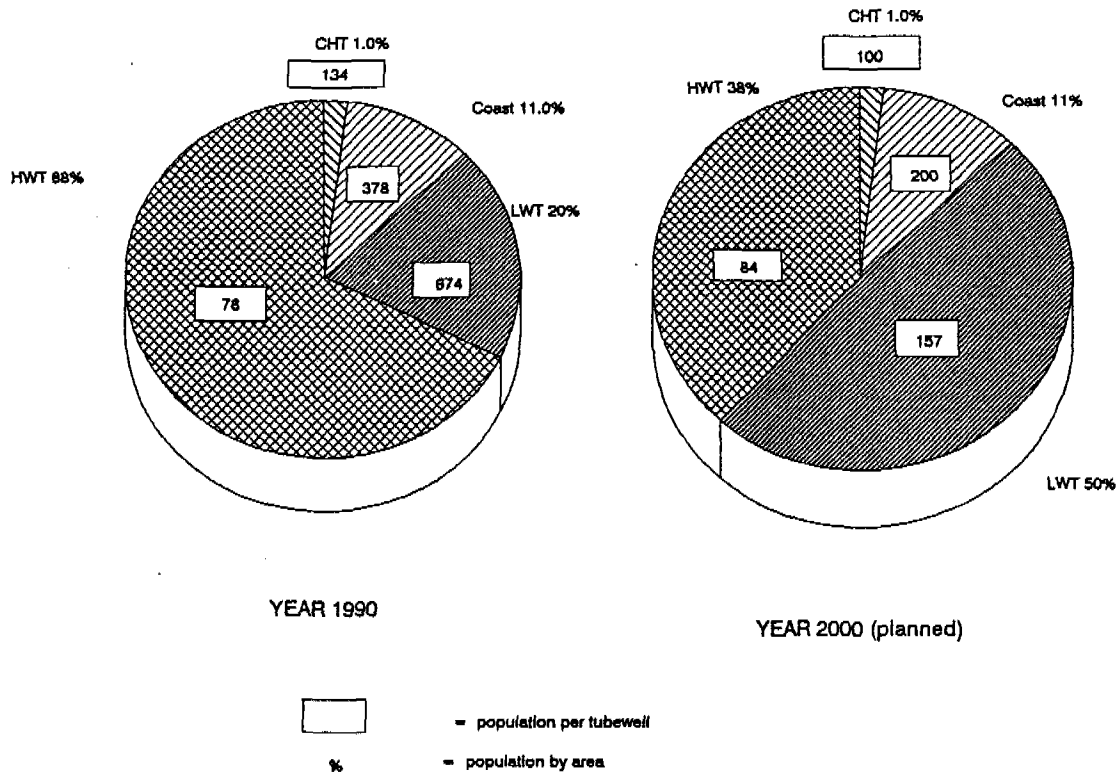
### **PRESENT WATER SUPPLY STATUS (DECEMBER 1990)**

The country can be divided into three major hydrological zones, namely the high water table, low water table and the coastal belt. (Standing groundwater level below the suction limit of 8 metres is termed low water table). About one million people live in the Chittagong Hill Tracts characterised by rocky formation. The number of people served per tubewell varies from a few families, for private tubewells, to over 600 persons as elaborated below. However, it is estimated that presently over 80 percent of the population have easy access to a handpump within 150 metres (1). The status at the end of 1990 is given in Table 1 and illustrated in Figure 2.

High Water Table Area. Owing to ease of drilling in the alluvial soil formation, about 729 000 public tubewells sunk by DPHE and an estimated 700 000 private tubewells, all fitted with the No 6 suction pump, have been installed serving a rural population of 62 million. Excluding 10 percent needing repair at any given time, the operating handpumps serve a population ranging from 15 persons (3 families) for private units to 78 persons for public ones. Since about 20 percent of the tubewells (2) become inoperative, as per the 1990 groundwater data, for part of the year, mainly April-June, due to declining water table, the consumers per tubewell rise to 98 during that period.

Low Water Table Area. This region which comprises a population of 18 million in the year 1990 is served by 26 550 operating tubewells fitted with deepset Tara handpumps. Each tubewell therefore serves 674 people. Owing to the declining water table, the population that would require forcelifit pumps in the future is increasing, as discussed below.

**Fig. 2 Rural Area-wise Coverage and Population Per Public Tubewell**



**Coastal Belt.** The population of 10 million in the coastal belt is served by 26 020 operating tubewells, thus averaging 378 persons per tubewell. A small population is drawing water from the increasingly popular Pond Sand Filter units which purify adjoining polluted pond water. In addition, about 1000 Very Shallow Shrouded tubewells have been sunk to exploit very shallow lenses of fresh water perched above the saline layer.

**Chittagong Hill Tracts** While certain areas have been adequately served, the hydrogeologically difficult areas consisting of rock formation has so far received inadequate attention. The common drinking water sources in the underserved areas are the perennial streams which are open to pollution. Very few exploratory drilling or alternative water sources investigation have been carried out.

**Urban Slums and Fringes.** This sector has been largely neglected, causing the majority to use polluted water sources. About 42 percent of the population is yet to be served.

## ANALYSIS OF PAST PERFORMANCE

Despite the impressive performance during the last decade, the major shortcoming is the disparities in tubewell density and inadequate attention to the Hill Tracts and Urban slums. During the period 1985-1990, 3 times as many tubewells were installed in the high water table areas compared to the other areas. However, due to the higher cost of installation in the "less easy" areas, the expenditure in the underserved regions compared to the high water table zones was in the ratio of 3 to 1.

The operation and maintenance of the pumps are highly encouraging. A national survey (1) supplemented by continuous field observations confirmed that over 90 percent of the hand-pumps are in working conditions. This is largely due to the robustness of the No 6 handpump, the simplicity of maintenance, people's participation, and the availability and affordability of spare parts on the market. The evaluation of the Tara pump (3) also indicated that 90 percent of the users liked them and 85 percent were in operating condition. The Tara technology requires more elaborate maintenance procedures and greater attention on training is therefore necessary.

## THE DECLINING WATER TABLE

The continuous expansion in irrigated agriculture has led to a continual lowering of the water table. The regular monitoring of the water table since 1986 using a network of some 3000 observation tubewells scattered across the country confirmed the earlier prediction that 20 percent of the tubewells in traditionally high water table regions are beyond the suction level in 1990 (2). It is predicted that this area will expand to 50 percent by the year 2000. One possibility is to provide Tara tubewells to cater for the water needs when the suction tubewells become ineffective prior to the recharge of the aquifer by the monsoon rains. The cost implication is enormous. Furthermore, unlike No 6 tubewells which can be installed at the family level, the Tara tubewells will require substantial involvement of the government in the foreseeable future. The UNICEF Research & Development (R&D) Unit recently tried out successfully the application of a modified TARA pump (mini TARA) into a NO.6 tubewell, as discussed under R&D.

## THE FOURTH FIVE-YEAR PLAN AND BEYOND

The Fourth Five-Year Plan (1990-1995) envisaged a National average coverage of 106 persons per tubewell. The Plan did not elaborate on the programme but the financial allocation appears to fall considerably short of this ambitious target. The background paper (4) by DPHE based on a UNICEF strategy paper (5), however, proposed a National average coverage of 142 persons per tubewell by 1995 and reduced to 120 persons by the year 2000.

## THE STRATEGY FOR THE 1990's

Except for the Hill Tracts and stony areas where geophysical investigations are warranted, and for certain areas of the Coastal Belt where alternative technologies are necessary, the technology for the rest of the country is well in place; however, research and development will continue in specific areas of the programme as described later. The effective community participation as demonstrated by the large number of private tubewells complementing the public water supply should be capitalised upon. Given the constraints of financial resources, and drawing from the valuable lessons of the past, the approaches outlined below are recommended. The plan envisaged an average of 105 persons per tubewell on the national basis; this includes the rehabilitation of No.6 pump/tubewells falling under low water table conditions by the Mini TARA. Table 2 gives the additional tubewells required supplemented by detailed information in Table 1.

**Table 1. No. of Public Tubewells required as at specified**

Year	LWT			HWT	COAST	CHT
	TARA	Rehab by Mini TARA	Total			
1990	29,502	-	29,502	728,909	28,916	6,486
1995	73,926	100,000	173,926	620,520	45,177	8,320
2000	123,633	250,000	373,633	498,155	68,000	10,778

- (i). High Water Table. The region is adequately saturated with tubewells. Any further requirements to fill any gaps should be met by the community since the technology has been popularised. All the government tubewells should be handed over to the community to maintain as the spare parts are cheap and readily available on the market. They should also be authorised and encouraged to desand any choked-up tubewells. It is recommended that by the year 1993, a mechanism should emerge to transfer new installation, operation and maintenance to the private sector.
- (ii). Low Water Table. The number of users per tubewell should be reduced from 650 to 200 (35 families) by the year 2000 in considering the increased population requiring Tara pumps due to the lowering of the water table, about 121 000 TARA tubewells will be required. The present contribution of Tk 100 (US\$ 2.8) per family should be



maintained, if not marginally increased, thus providing 23 percent of the average cost of Tk 12 500 for installation cost at 1991 prices. In addition, 364 500 tubewells fitted with No. 6 pumps will be rehabilitated in the areas which were earlier designated as high water table. For the overall area, the number of persons per tubewell is 119.

- (iii). Coastal Belt. The number of users per tubewell should be reduced to 200 by the year 2000 . The vast amount of data from existing tubewells have led to the establishment of guidelines on the optimal drilling depths on a unionwise basis (6,7). These should be adopted to minimise wastage in overdrilling. The existing maximum salinity level of 1000 parts per million should be maintained until the proposed tubewell density level is achieved. Wherever feasible, the construction of Pond Sand Filters and very shallow shrouded tubewells which tap the shallow lenses of sweet water perched above the saline layer should be promoted. Exploratory drilling in certain "unknown areas" should be carried out, and alternative water sources/technologies should be tried out where tubewells have failed.
- (iv). Chittagong Hill Tracts. More information on the hydrogeology of the area and the appropriate drilling techniques are urgently required to investigate the potential of groundwater for drinking purposes. In addition, other alternatives, such as rainwater collection, gravityfeed schemes tapping spring sources and improvement of traditional sources should be explored. Presently, estimates have been made based on drilling of tubewells in the hard rock formation.
- (v). Urban Slums and Fringes. Special attention should be directed at this underserved area and increased tubewell installation to the level of 200 users per handpump. The major areas that require consideration are the strengthening of the technical and implementation capability of the Pourashavas, and high level of participation of the community in terms of cost sharing, and operation and maintenance.
- (vi). Rehabilitation, Operation and Maintenance. The limited experiences have demonstrated the economic viability of desanding choked-up tubewells. This should be pursued systematically. The training on the operation and maintenance of the Tara pumps should be given the highest priority until the technology is well established. In order to popularise the Tara technology, the sale of spare parts by the year 1993 by the commercial sector should be considered. All damaged and small platform should be replaced by the larger design to facilitate users in pumping water for all their domestic needs.
- (vii). Research and Development (R&D). The existing design does not permit the interchangeability of handpumps for a tubewell. Thus, when the No 6 handpump becomes inoperative as the groundwater table recedes below the suction limit, the Tara pump designed for a 50 mm borehole cannot fit into the 37 mm borehole for No 6 pump. A breakthrough in the recent months by UNICEF R&D Unit in modifying the conven-

tional TARA pump to fit into a "No. 6 pump" tubewell and work effectively will save the programme about US\$ 80 million which will otherwise be needed to replace 350,000 No. 6 tubewells with TARA tubewell by the year 2000. Further research is being conducted on a wider scale before large scale implementation is planned.

### MONITORING

Close monitoring will be an integral part of the programme. The DPHE field officers would collect data on the monthly progress. All the data will be fed into the Management Information System currently being planned for implementation by DPHE. In late 1991, a national survey will be undertaken to assess the status of the water supply and sanitation activities in terms of usage, access, quality and other aspects. In addition, an assessment of the programme on a national basis should be undertaken in 1995 through a national survey in order to take stock of coverage, level of maintenance, access, usage and related aspects to provide a firmer basis for more precise future course of action for the rest of the decade. During project implementation the quality of the programme will be regularly monitored and reviewed through zonal review committee meeting and technical committee. In addition, periodical review by donors will be undertaken.

### RESOURCE REQUIREMENTS

The costs to implement the plan as outlined in Table 3 is @ \$133 million for the rural sector and US\$ 20 million for the urban slums and fringes. It is estimated that people's contribution, based on the present norms is about 7 percent.

### CONCLUSION

The goal of universal access is achievable, judging from the past experiences. With the hope that the Tara pump can be modified so that it can replace the No 6 pump in existing boreholes, the problem created by the declining water table will accordingly be largely reduced. Safe drinking water for all purposes combined with proper human excreta disposal and personal hygiene should significantly improve the quality of life of the people in Bangladesh.

PW/psb

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8 October 1991 (revised)

TABLE 2

Public Tubewell Coverage in Rural Bangladesh  
Proposal for Universal Access by Year 2000

Year	CHT Popl. (('000)	Total TWs	Ope- ra- ting per TW	Est. Popl. (excl. CHT) (('000)	Low Water Table					Coastal Belt					High Water Table (2)								
					% of Rural Popu- lation	Popu- lation to be served (('000)	Total TWs (('000)	Opera- ting TWs (('000)	Popu- lation per opera- ting TW's	% of Rural Pop'n	Popu- lation to be served (('000)	Total TWs (('000)	Oper. TWs (('000)	Popu- lation per opera- ting TWs	Rural Popl'n (('000)	Oper. TWs (('000)	Private Popl'n served by Private tubewells (('000)	Public Popl'n served by Public tubewells (('000)	No. of Pub. TWs (('000)	No. of opera- ting TWs (('000)	Popl. per TW	Nation Popl. per TW	
1990	780	6486	5837	134	89511	20	17902	29.5	26.6	674	11	9846	28.9	26.0	378	61763	700	10500	51263	729	656	78	137 (3)
1995	870	8320	7487	115	99800	35	34930 <sup>(4)</sup>	216	195	174	11	10978	45.2	40.7	270	53892	548	8217	45675	621	558	82	114
2000	970	10778	9700	100	111272	50	55636 <sup>(5)</sup>	488	439	120	11	12240	68.0	61.2	200	43396	396	5935	37461	498	448	84	108

Ref: TW-3/WATER  
7 October '91

- (1) All population assumed at annual increase of 2.2 per cent.
- (2) As the area with high water table recedes, the reduction in the number of private and public tubewells pertaining to the smaller area has been effected accordingly.
- (3) This figure takes into account non-operation of 20 per cent of public tubewells in HWT area due to lowering of water table.
- (4) An estimated 1.14 million people are served by private tubewells fitted with mini TARA.
- (5) An estimated 2.63 million people are served by private tubewells fitted with mini TARA.

Table 3. Financial Resource Requirements

Region/Activities (Rural)	Unit cost (1991 prices) US \$	1990-1995		1995-2000		Total Cost 1990-2000 (Mill. \$)	Urban Fringes Year 1990-2000	
		Nos. TWs	Cost (million \$)	Nos. TWs	Cost (million \$)		Nos. TWs	Cost (Mill. \$)
1. High Water Table	83	50,000	4.15 (1)	50,000	4.15 (1)	8.30 (1)	23,400	1.94 (1)
2. Low Water Table								
- TARA	347	44,426	15.42	49,707	17.25	32.67	30,000	10.41
- Rehab. of suction TWs by mini TARA	100	100,000	10.00	150,000	15.00	25.00		
3. Coast	1,110	16,277	18.07	22,823	25.33	43.40	6,600	7.32
4. CHT	500	1,834	0.92	2,458	1.23	2.15		
Maintenance			4.44		5.88	10.32		2.00
			48.85		64.69	113.54		19.73

(1) It is recommended that the costs be borne by the community

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07 October'91

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# UNIVERSAL ACCESS TO SANITATION IN BANGLADESH BY THE YEAR 2000 IS A POSSIBLE GOAL

(by P. WAN)\*

## 1. Introduction

The response of the Government of Bangladesh (GOB) to the International Drinking Water Supply and Sanitation Decade (IDWSSD; 1981 - 1990) was very impressive in the field of water supply. Over 80 percent of the rural population have access to a tubewell within 150 metres, and drink tubewell water. However, the sanitation coverage in terms of sanitary latrines, is estimated at only about 6 percent at 1990, based on the latrine components sold by government centres. Hence, the full health impact of a water and sanitation package has yet to be realized. The challenge is to create a clean and healthy environment. This position paper analyses the experiences and initiatives to-date on sanitation, and formulates a strategy to make sanitation a "way of life" during this decade. It focusses on the rural areas with accounts for 83 percent of the population, and the urban slums. It complements the companion paper<sup>(1)</sup> on water supply

## 2. Why Sanitation?

A precious national asset, namely children, is being constantly lost, as many fall victims to disease, disability and deaths. One third of the annual child victims, or about 300,000, die of diarrhoea due to poor hygienic practices (Figure 1).

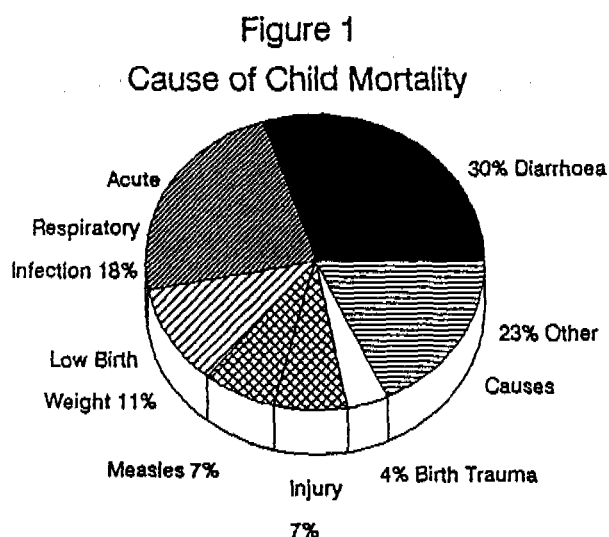
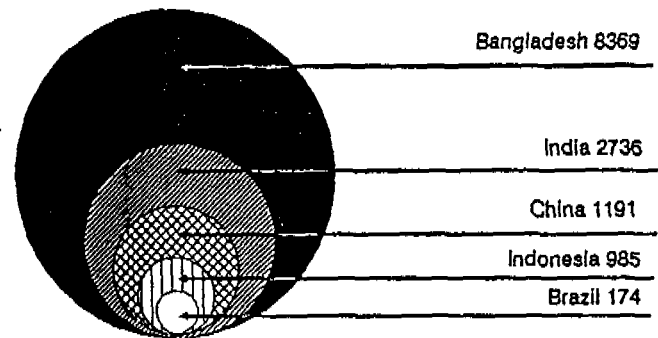


Figure 2  
Comparative Population Density (Per 1000 Hectares)



This is unacceptably high. Six percent of the world's child death occur in Bangladesh which represents only 2 percent of the world's population. The greatest environmental threat to the country is the large scale deposit of 28 thousand metric tons of human excreta per day in the public domain. This is worsened by the high population density and the humid climate (figure 2).

The Mirzapur study<sup>(2)</sup> demonstrated that increased use of tubewell water for drinking and domestic purposes can reduce diarrhoeal incidence by 25 percent. However, further reduction would be achieved by the use of sanitary latrines and proper handwashing<sup>(3)</sup>. Furthermore, the greater privacy, security and convenience provided to women by a sanitary latrine close to the house add to the quality of life.

Bangladeshis are generally very "latrine-conscious", although the relationship between an unhygienic latrine and disease is not evident to many. About 45 per cent of the population, particularly women, already use latrines largely for privacy<sup>(4)</sup>. However, many latrines overhang water courses, discharging the waste into ponds and streams which are also used for domestic purposes. The urgent task is to educate users of the traditional latrines to change to hygienic units.

## 3. A People's Programme

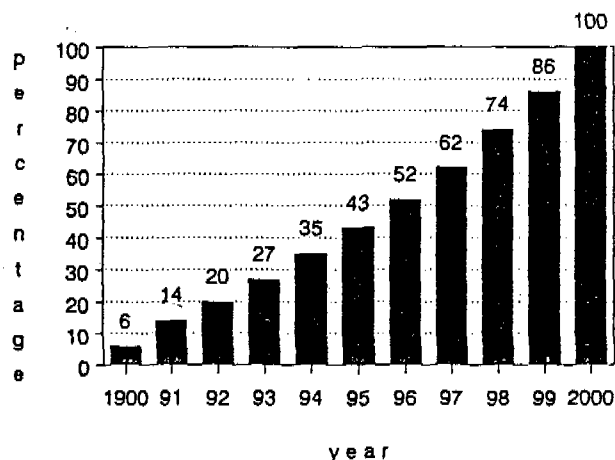
The current GOB's Fourth 5-year Plan (1991-1995) aims to increase sanitation coverage from 6 to 11 percent in the rural areas, while no specific target was set for the urban sector. This goal set by the Department of Public Health Engineering (DPHE) is based on their earlier strategy of producing and selling waterseal latrines.

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Presented at the GOB-UNDP-UNICEF National Seminar on  
"Future Strategies for the Water Supply & Sanitation Sector  
in Bangladesh", Sept. 1991

Engineering (DPHE) is based on their earlier strategy of producing and selling waterseal latrines. Despite the projected two-fold percentile increase, it is far short of universal coverage by the year 2000, which is endorsed by GOB at the 1990 UN World Summit for Children.

From an economical viewpoint, a centralized system serving a community is viable for some basic services, such as electricity and water. On the other hand, sanitary facilities are more a matter for the individual or the household. Therefore, it is unlikely for governments to provide free or heavily subsidized household sanitary facilities on a long term sustained basis. Using the cost of a one-slab and one-concrete ring as a basic latrine unit (excluding local materials for the pit linings and superstructure) Bangladesh needs some US\$ 120 million (at 1991 prices) to satisfy the underserved population. The bulk of this money has to come from the users. Hence it has to be a People's Programme! This will be possible only if people recognise sanitary latrines as a felt need and a valuable commodity, and the programme is backed by an affordable and appropriate technology.

Figure 3  
Coverage to Achieve Universal Access  
to Sanitary Latrines by Year 2000



The DPHE recognizes that going 'universal' by the end of the decade will require alliances with many partners. This concept of a Grand Alliance is fully advocated by DANIDA, Swiss Development Cooperation and UNICEF which are supporting the DPHE. As the ultimate objective of development is to improve the quality of life, sanitation deserves due consideration in the holistic approach to development. Consequently, many

governmental and non-governmental sectors have a role to play in promoting sanitation. By forging alliances, the goals of DPHE can be dramatically increased without overreaching its capability and resources. A profile of the predicted coverage is depicted in Figure 3.

#### 4. Mobilizing the People

The remarkable community response to positive changes as demonstrated by the near universal use of tubewell water and the dramatic increase in child immunization coverage approaching about 80 percent within a short time-frame augurs well for a well orchestrated national sanitation initiative. Despite the modest latrine coverage, the spread of information through DPHE and NGOs has already reached many pockets across the country, as reflected in the growth of commercial latrine production centres<sup>(5)</sup>.

Advocacy at the highest political, social, and religious levels through seminars, media coverage, etc. to accord sanitation a higher priority should be intensified. This should be complemented by a strong social mobilization thrust using traditional and other innovative channels. Institutionalized bodies comprising large groups of people such as Ansar-VDP, health workers, teachers/students/ parents, women's groups and the large number of NGO workers are partners with whom close links should be established. They are also change agents in the community who could initiate a multiplier effect. Focussing initially on large target groups will also be more effective both from resource and time consideration.

The present Integrated Approach system incorporating conditionality, which requires ten families to construct and use sanitary latrines before qualifying for a tubewell, should be extended to educate the existing handpump users to use sanitary latrines. This can be achieved by using the network of tubewell mechanics, health workers, NGO field workers and other change agents identified above.

The programme should be promoted by various government agencies, including DPHE, Health, Environment, supported by increased activities by NGOs. Creation of awareness at community level and development of appropriate information and education materials should receive high priority.

#### 5. Choice of Technology is Fundamental

The success story on water supply rests largely on the application of low-cost and appropriate technologies. The drilling of some 45,000 tubewells annually during the last decade, representing some 3000 km of manual

boring, is a classic example. Against a background of poverty permeating to 80 percent of the population, the "do-it-yourself" technology using local resources is an obvious choice. Experiences to-date have demonstrated that home-made simple pit latrines using bamboo/timber as construction materials are both hygienic and acceptable. The home-made latrines should be the backbone of the sanitation revolution. The upgraded technology of the pourflush concrete waterseal pan and ring can be adopted by those who can afford it, or as a subsequent improvement to the home-made design.

In the urban slums where space is a constraint, deeper latrine pits are necessary to avoid frequent emptying or shifting to a new pit. Where space precludes a sanitary latrine for each family, the concept of "shared" latrine could be introduced, where several identified families share a unit; in fact, this approach has proved successful in urban slums where the sharing families adopt their own maintenance system.

## 6. Subsidy or No Subsidy ?

Under the current government programme supported by UNICEF, a subsidy of Tk. 130 (US\$ 3.6) representing 60 percent of the cost, is granted on the sale of a one-slab and one-ring unit at the DPHE centre. The question that often crops up is: Should this system be continued and, if so, for how long? Several allied questions come to mind.

Firstly, how to justify subsidizing those buyers who at least can afford to pay the subsidized cost, while those generally poorer families adopting the home-made latrines receive no financial assistance?

Secondly, what are the implications of a two-tier price system at the DPHE and commercial centres respectively ?

The first question implies that the subsidy is not necessarily reaching the deserving poorest of the poor. This is true. However, if the subsidy is withdrawn, the lower and lower-middle income groups who are the main beneficiaries will find it more difficult to own the more appealing and permanent concrete unit. It is also argued that the "opportunity" cost of the local materials is comparable to the subsidized cost of prefabricated latrine parts, and therefore, there is no reason to promote the home-made unit. The reality is that the commercial value of the materials can rarely be realized. Besides, many families cannot generate adequate cash and have to start with the home-made latrines.

As to the second question, the fact that the government and the growing commercial sector are coexisting suggests that different clientele are served by the two sectors. A recent study<sup>(6)</sup> showed that the DPHE centres sold 65 percent of their products to the lower-middle income groups while the private sector attracts the middle-upper classes.

It is therefore important to maintain the subsidy system so that the slab-ring technology remains reachable to the less affluent families. The subsidy would also facilitate the transition from the home-made to the higher-level technological option. The point of 'no return' to traditional defecation practices could be reached when a sufficient number of families have a more permanent latrine. As the usage level attain a threshold value of some 40-50 percent by mid-1990s at which a country-wide spread is facilitated, the subsidy element should then be phased out.

## 7. Realization of the Decade's Objective

The plan to achieve the target of one latrine for each family is summarized in table 1. Since many poor families cannot afford concrete latrine parts due to cash flow

Table 1  
Tasks to Achieve Universal Access to Sanitary Latrines

(Million)	1990	1991	1993	1995	1997	2000
Population	110	112	117	122	128	137
No. of families	18.3	18.6	19.5	20.3	21.3	22.8
Proposed Fam-Coverage	1.7	2.7	5.3	8.7	13.2	22.8
Proposed Coverage	06	14	27	43	62	100

(i) Assumed constant annual growth rate of 2.2%

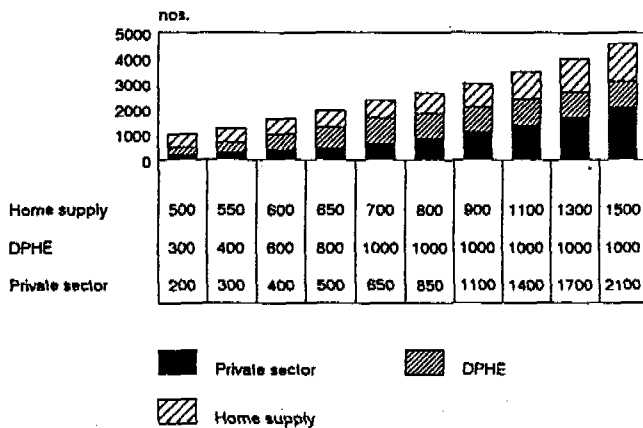
problems, it is anticipated that about 40-50 percent would initially construct home-made units. The demand for the different types of latrine is illustrated in Figure 4 for individual years and summarised in Figure 5

As the programme gathers momentum, the private sector is seen as the major manufacturers and suppliers of the concrete latrine parts. The role of DPHE as a manufacturer/supplier would stabilize in mid-1990s but will retain the major role of technology transfer. Presently, DPHE operates 1,000 Village Sanitation Centres



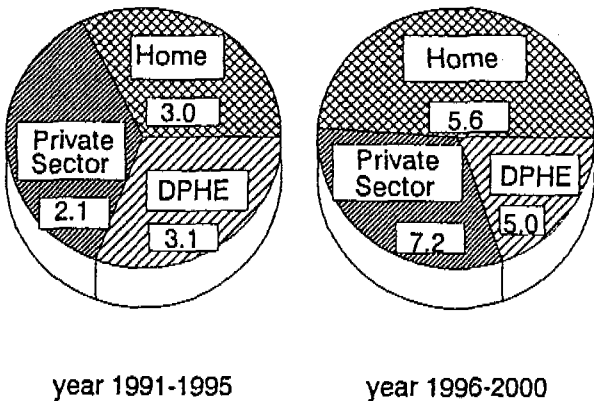
Figure 4

No. of latrine units required from various sectors ('000)



which manufacture and sell concrete latrine parts. Commercial centres estimated tentatively to be in hundreds<sup>(5)</sup> and located primarily in towns and alongside the main roads presently supply largely the urban and semi-urban population.

Figure 5  
Requirements of latrine sets by sources of supply (in million)



Note: Private Sector & DPHE provide the slab & ring units

## 8 Financial and Resource Requirements

The financial requirements of US\$ 131.8 million, as shown in table 2 include the promotional costs on advocacy, social mobilization, information transfer, etc. as

Table 2  
Cost of Promotion of Latrine Programme in Million US Dollars (at 1991 prices)

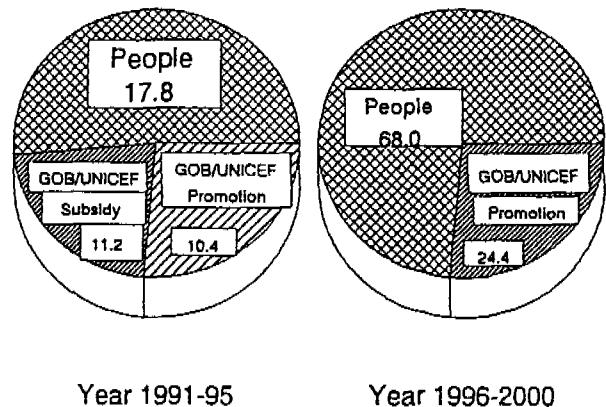
	91-93	94-95	96-97	98-2000	Total
No. of unit <sup>(1)</sup> (Million)	2.2	3.0	4.0	8.2	17.4
Cost of Units (Million)	12.3	16.8	22.4	45.2	97.0
Cost of Prog. Promotion <sup>(2)</sup>	4.4	6.0	8.0	16.4	34.8

(1) Only one-slab and one-ring option (excluded do-it-yourself units); cost per latrine (one slab and one ring) = \$5.6

(2) At US\$ 2.00 per latrine.

well as the cost of the facilities. The departmental costs by government agencies have been excluded as the existing infrastructure would be effectively utilised. For latrine costs, the basic one-ring and one-slab design is

Figure 6  
Requirements and Sources of Funding (in US \$ Million)



Note: "People" represents beneficiaries payment for latrine parts at either DPHE or private centres

assumed, excluding the cost of locally available materials for superstructure and pit lining where necessary, although certain families have to purchase them. The source of funding is depicted in Figure 6.

The promotional cost is likely to reduce as the programme expands and gains acceptance. It is envisaged that peoples contribution to the total programme, by purchasing latrine parts, would be about 65 per cent. The remaining cost, particularly on promotion, would be borne by the government and its donors.

## 9. Monitoring

Close monitoring should be an integral part of the programme. The DPHE, in collaboration with the Union Parishad, should collect basic data annually on the number and type of sanitary latrines constructed/used on a village/union/upazila basis using the union parishad staff. The data should feed into the Management Information System currently being planned for implementation by DPHE. Besides tracking the progress in terms of coverage, the data would provide the basis to monitor the usage level and the user's long-term acceptability of the new habits. In addition, an assessment of the programme on a national basis in 1993/1994, through a national survey, will help to take stock of progress and determine more precisely the future course of action.

## 10. Conclusion

The proposed strategy is to promote sanitation as an integral part of development and a People's Programme, by forging alliances with other partners. Awareness building complemented by the promotion of an affordable and appropriate technology are the corner stones. With a successful social mobilization drive, which in ef-

fect is sharing the challenging task to individual families, the "universal" goal becomes more manageable and realistic.

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NATIONAL ACTION PLAN FOR RURAL WATER SUPPLY AND SANITATION  
TO ACHIEVE THE GOALS FOR CHILD DEVELOPMENT SET OUT IN  
THE DECLARATION OF THE WORLD SUMMIT FOR CHILDREN

1. INTRODUCTION:

Bangladesh is basically a deltaic island situated at the estuary of Bay of Bengal. The country experiences recurring flood causing environmental degradation. The population density is one of the highest in the world.

About 28,000 metric tons of human excreta that are produced each day are disposed into the public domain. This large volume of pollution coupled with hot and humid climate has given rise to pathogenic overload, creating multiple chances of frequent faecal-oral transmission of diseases.

The children of Bangladesh face some formidable obstacles in the exercise of their basic right to survival and development. The current infant mortality rate is 110 per 1000 live births and under -5 mortality rate is 188 per 1000. Out of these child victims, around 30% is caused by water borne and sanitation related diseases. Therefore, primary emphasis must be directed to the lowering of the unacceptably high rates of infant and child mortality and towards supporting interventions that either directly reduce the wastage of precious infant and child lives, or that have a beneficial convergence with child-related programmes. An interesting case of convergence is provided by an ICDDR,B study in the Teknaf area of Bangladesh in 1983 which suggested that the use of sanitary latrines reduced post-neonatal (1-12 months) mortality by 3 times. However, the coverage of sanitary latrines in Bangladesh is about 7 percent in 1991. Despite the encouraging 800,000 public tubewells sunk with UNICEF assistance since 1972 to provide safe water, and despite the fact that some 80 percent of the rural population use tubewell water for drinking, only about 12 percent use tubewell water for all their needs. The vast majority of people still use pond and other surface water for most of their other needs. The vast majority of children are exposed to fecal pollution in the surface water used for domestic purposes and home environments.

The Department of Public Health Engineering (DPHE) is responsible for planning and implementation of water supply and sanitation throughout the country, rural and urban, except two cities (Dhaka and Chittagong). Its major emphasis is to improving water supply coverage in underserved areas and in such largely neglected aspects of the programme as environmental sanitation and health education (with particular reference to personal, family and food-hygiene), through social mobilization.

## 2. WATER SUPPLY:

The water supply coverage in the country varies, depending on the hydrogeological zones. The high water table is generally well served with public and private tubewells. However, underserved areas such as the coastal belt and low water table areas have high average population per public tubewell. Much work then remains to be done in this domain. The coverage per tubewell in high water table, low water table and coastal belt area is 78, 674 and 378 respectively as of 1990. The situation at 1990 is given in Table 1.

- 2.1 Coverage: At present 80% of the rural people have access to tubewell water. This coverage relates to the water use mostly for drinking purposes. To increase the water usage in all domestic purposes, the users need to be further motivated and greater awareness creation is needed.
- 2.2 Plans for 1990s to reach universal access: The strategies proposed are as follows and summarized in tables 2 and 3.
  - (a) High (shallow) water Table area. This area is generally well served. However, a limited number of shallow tubewells have been proposed to meet any underserved pockets. It is suggested that, as far as possible, the community should contribute to the cost of installation. Due to irrigation abstraction resulting in the lowering of water table, a large number of tubewells fitted with No.6 suction pumps become non-operative in the dry season of April-June. Presently about 20 percent of suction pumps are being affected, and it is predicted that 50 percent of some 700,000 tubewells will be affected by the year 2000, as the area becomes a low water table region.
  - (b) Low Water Table: In the underserved area, the Tara tubewell coverage should be increased to attain at least a level of 200 persons per tubewell by the year 2000. In the areas which were earlier designated as high water table but has since been affected by declining water table due to irrigation abstraction, the tubewells fitted with suction pumps should be rehabilitated by the mini Tara which has recently been developed by UNICEF-DPHE. With the rehabilitation of affected suction tubewells and new Tara tubewells installation implemented concurrently, the coverage per tubewell for the combined area will be 157 by the year 2000.

Table 1. STATUS OF TUBEWELLS AS OF YEAR 1990  
Investment 1985-1990

Type of tubewells	No. of existing tubewells (considering the active tubewells)	Coverage (number of person/ tubewells)	Percent of rural people under the category	Total amount (Taka in Million)	Equivalent US\$ (M)	UNICEF Commitment (Tk. M)	GOB fund (Tk. M)
1. Shallow (for shallow water table area)	656,000	78	69%	2617.00	74.77	1634.00	983.00
2. TARA (for low water table area)	26,600	674	20%	1397.00	39.91	934.00	403.00
3. DEEP (for coastal belt area)	26,000	378	11%	2243.00	64.08	1513.00	730.00
				6257.00	178.76	4141.00	2116.00

- (c) **Coastal Belt:** The coverage per tubewell should be decreased to 200 persons by the year 2000. The needs can be served by a mix of shallow and deep tubewells, depending on the hydrogeological features of the areas. A detailed study based on the existing data was recently undertaken by DANIDA-DPHE which gave guidelines on the depths of tubewells on a union/upazilla basis. These should be followed to maximize the investment, as the cost of deep tubewells is also 8 to 10 times that of a shallow tubewell. Other technologies such as Pond Sand Filters, Shallow Shrouded and Very Shallow Shrouded tubewells should be adopted wherever feasible. It may be also required to dig fresh water ponds (protected) in some places and provided with PSFs.
- (d) **Chittagong Hill Tracts:** The current coverage is about 100 persons per tubewell, but in reality all tubewells are installed in 50% of the paras leaving 50% with no safe water sources. Focus should be on the underserved pockets and by the year 2000, a coverage of 100 persons per tubewell is envisaged. Possibilities of applying other technologies such as spring development and rainwater harvesting should be investigated.

2.3 **Urban Slums and Fringes:** The water and sanitation status is poor, with an estimated coverage lower than those of rural areas. With the rapid pace of urbanization, the situation in the urban slum and fringes will become more acute. Since the urban water supply and sanitation issues are addressed largely by projects supported by bilateral agencies such as ADB, JICA, DANIDA, Netherlands Government etc., it is envisaged that DPHE-WASA would channelise their inputs to fulfil adequately the needs of the population in the slums and fringes. Hence, this aspect will not be elaborated in this document.

2.4 **Maintenance:** The maintenance cost for rural tubewells covers the cost of spare for maintaining pumps and the establishment cost of the tubewell mechanics. At present four tubewell mechanics are provided per upazila and their salaries are borne from the revenue budget i.e. from GOB. Repairing cost for a No. 6 handpump is Tk. 100 per year (excludes the costs for mechanic/establishment).

In order to establish self sustained maintenance system for rural water supply, training programme for caretakers from the beneficiaries have been going on. Restoration of selling of spare parts to the beneficiaries is also under the consideration of the Government.

2.5 **Training:** The technology of No. 6 suction handpumps is simple and has contributed to easy maintenance. In fact, the large number of operating tubewells owned privately indicates that training of caretakers to maintain these tubewells is not critical. However, emphasis will be given to train caretaker families to maintain the Tara pumps. In addition, orientation courses for tubewell mechanics as well as Engineers will be imparted on both water and sanitation/hygiene aspects as well as in communication skills so that they can improve their ability to motivate and educate community members.

2.6 **Participation:** In the 4th Five Year Plan, Government has provisions to increase the share of responsibility and cost of installation and maintenance of tubewells by the beneficiaries to achieve sustainability. In the implementation of rural water supply, the beneficiaries participation is also ensured in the process of site selection by the beneficiaries themselves under the guidance of Union Parishad and Member of Parliament. At present beneficiaries share sinking cost of tubewell at the rate of Tk. 350/- (Taka three hundred fifty) for shallow and deep set and Tk. 1000/- (Taka one thousand) for deep tubewell.

It is anticipated that the level of contribution by the beneficiaries will increase.

Women now jointly apply with the male counterpart for tubewells, and they are engaged to decide on the exact location of a proposed tubewell. They also participate in the caretakers' training for maintenance of tubewell.

- 2.7 **Technology:** Some new technologies such as Iron Removal Plants and Pond Sand Filters have been successfully developed during the late 1980s and have hitherto been implemented in small scales. However, during 1990s these will be applied wherever needed in larger scales.

3. **SANITATION:**

The Government is committed to achieve universal coverage of both rural water supply and sanitation. The coverage of sanitation is about 7% by 1991. A major reason is the lack of consciousness among the rural people and lack of motivation. Furthermore, the almost exclusive promotion of the concrete ring and slab (waterseal) latrine which is not affordable by a large majority of the population is also a contributory factor.

The sanitation program during 2nd Five Year Plan (1980-85) was a demonstration project, mainly to transfer the construction technology acceptable to the rural community. By the end of 2nd FYP it was possible to establish production and sales centre in each upazila. At present DPHE has established a total of one thousand centres out of which 460 are at the upazila and 540 at the union level. The capacity of these centres is about 5,00,000 per year. It is therefore imperative that private sector should be encouraged to supplement public sector production. In addition, the do-it-yourself (homemade) latrines should be promoted as a first step to more durable concrete latrines for the majority who have low purchasing power.

3.1 **Social Mobilization, Education and Communication:**

During the 4th Five Year Plan period, a social mobilization project has been launched to convince the society to make at least a homemade pit latrine by themselves and whoever cannot afford to buy a waterseal type latrine. This change of habits will eventually create more demand for hygienic latrine and private enterprise will establish more production centres. This activity will require advocacy at all levels of society, social mobilization drive including seminars and orientations, training of change agents and the development of supporting publicity/education materials. The DPHE will empower their staff, through orientation courses, to play a more active role in informing, educating and motivating community members on the need to use sanitary latrines and improve personal hygiene. It will also seek the collaborations of other allied government department, such as Health, Education, Environment, as well as partners outside the Government.

The benefits of privacy and convenience, particularly for women, will be emphasized. For families who are already using the unhygienic hanging latrines, the benefits of improved health from the use of a hygienic latrine will be promoted. It is estimated that the cost required per family for this combined activity will be about Tk. 72 (US\$ 2). This will include orientation and training courses for change agents, the development and production of information/education materials as well as the use of various media and methods to motivate community members.

Conditionality for installation of 10 latrines against each new tubewell to be installed has been imposed since 1989 and will continue through the 1990s.

### 3.2 FORGING OF ALLIANCES:

While DPHE has been instrumental in promoting sanitation in the early 1970s, the achievement of high level coverage will be possible only through forging of alliances with other partners. In this connection, the involvement of such organization as Ansar-VDP, Non-Governmental organizations and the Primary/Secondary school channels is crucial. In fact, Ansar-VDP have already started implementation of a programme of construction/usage of a sanitary latrine by each of their members. The primary and secondary schools have initiated programme in certain districts already, and collaboration with NGOs has been initiated.

### 3.3 PRIVATE SECTOR:

Similar to the effective role of the private sector in mobilizing the community to construct over 700,000 private tubewells, the private sector has an important role in sanitation. It is anticipated that the 1000 village sanitation centres will reach its maximum optimal production capacity of 1 million latrine sets around 1995. Hence, any demands for concrete latrine parts generated by the social mobilization drive will be met by the private sector. Strategies are being worked out to determine ways of supporting the private sector so that it plays a complementary role to DPHE in the programme.

### 3.4 INVESTMENT COST:

Until recently, DPHE has been promoting the use of one slab and 5 rings waterseal latrines; the cost implications are given in Table 4. However, realizing the low affordability levels of the population and the appropriateness of the one-slab and one-ring option, this technology has been more widely promoted and,



in fact, fast gaining favour. Alongside the concrete latrine option, the do-it-yourself latrines are also being widely promoted. The investment costs given in Table 4 relate to the one-ring and one-slab design, on the basis that all families will eventually own such a unit. However, many families will be constrained by cash flow to start with a do-it-yourself latrines using home-available materials.

Table 4 shows the physical inputs and investment cost involved to increase the present coverage.

Table 4. Physical Inputs and Investments (At 1990-91 price)

Year	Cove- rage	Physical (input) No. of units	Investment Cost					
			One slab and one ring				One Slab and five Rings	
			Investment Cost		Net investment (after Sale proceeds)		Production Cost	
			Million (Taka)	Million (US \$)	Million (Taka)	Million (US \$)	Million (Taka)	Million (US \$)
Upto 1990	6%	902,000						
1990-1995	11%	944,000	222.00	6.16	156.00	4.32	548.00	15.20
	35%	4970,000 360,0000 <sup>(1)</sup>	1168.00 846.00	32.44 23.50	820.00 594.00	22.77 16.50	2883.00	80.07
1995-2000	80%	9094,000 5000000 <sup>(1)</sup>	2137.00 1175.00	59.36 32.60	1500.00 825.00	41.68 22.90	5275.00	146.51
1990-2000		14064,000 8600000 <sup>(1)</sup>	3305.00 2021.00	91.80 56.10	2320.00 1419.00	64.45 39.40	8158.00	226.58

(1) Maximum numbers that DPHE can manufacture.

4. **MONITORING OF WATER AND SANITATION ACTIVITIES:**

Close monitoring will be an integral part of the programme. The DPHE, in collaboration with Union Parishad would collect basic sanitation data annually on the number and type of sanitary latrines constructed/used on Village/Union/Upazila basis using the Union Parishad staff. The progress of the water supply programme will be collected by the DPHE officials in the field offices. All the data will be fed into the Management Information System currently being planned for implementation by DPHE. In late 1991, a national survey will be undertaken to assess the status of the water supply and sanitation activities in terms of usage, access and other aspects. In addition, an assessment of the programme on a national basis will be undertaken in 1995 through a national survey in order to take stock of progress and determine more precise future course of action for the decade. During project implementation the quality of the programme will be regularly monitored and reviewed through zonal review committee meeting and technical committee. In addition, periodical review by donors will be undertaken.

5. **RESOURCE REQUIREMENTS:**

The estimated resource requirements as per planned target for water supply, sanitation and maintenance, are as summarized in Table 5, 5.1, 6 and 6.1(page 8&9). The total funds required for the period 1990-1995 for water supply and sanitation coverage considering 35% sanitation coverage with one slab five ring option are Tk. 4265.00 million (US\$ 118.47 million). The requirements for the period 1990-2000 is Tk. 6590.00 million (US\$ 183 million).

Table 5. Year : 1990-95 Cost at 1990-91 price (In Million)  
(One slab one ring option)

Activities	Total	GOB	PA
Water Supply	<u>Tk. 2167</u> \$ 60.18	<u>Tk. 759.00</u> \$ 21.06	<u>Tk. 1408.00</u> \$ 39.12
Sanitation	<u>Tk. 224.00</u>	<u>Tk. 78.00</u>	<u>Tk. 146.00</u>
i) for 11% coverage	\$ 4.32	\$ 1.51	\$ 2.81
Education/Motivation	\$ 1.90	\$ 0.67	\$ 1.23
ii) for 35% coverage	<u>Tk. 952.00</u>	<u>Tk. 333.00</u>	<u>Tk. 619.00</u>
	\$ 16.50	\$ 5.78	\$ 10.72
Education/Motivation	\$ 9.94	\$ 3.48	\$ 6.46
Maintenance	<u>Tk. 100.00</u> \$ 2.78	<u>Tk. 100.00</u> \$ 2.78	-
Total	<u>Tk. 2491.00</u> <sup>(1)</sup> \$ 69.18 <u>Tk. 3219</u> <sup>(2)</sup> 89.40	<u>Tk. 937.00</u> <sup>(1)</sup> \$ 26.02 <u>Tk. 1192</u> <sup>(2)</sup> \$ 33.10	<u>Tk. 1554.00</u> <sup>(1)</sup> \$ 43.16 <u>Tk. 2027</u> <sup>(2)</sup> \$ 56.30

1. Considering 11% sanitation coverage.
2. Considering 35% sanitation coverage.

Table 6. Year : 1995-2000 Costs at 1990-91 prices (In million)  
(one slab one ring option)

Activities	Total	GOB	PA
Water Supply	<u>Tk. 2804.00</u> \$ 77.88	<u>Tk. 981.00</u> \$ 27.25	<u>Tk. 1823.00</u> \$ 50.63
Sanitation (from 35% to 80%)	<u>Tk. 1480.00</u>	<u>Tk. 518.00</u>	<u>Tk. 962.00</u>
Latrines	\$ 22.90	\$ 8.02	\$ 14.88
Education/Motivation	\$ 18.20	\$ 6.37	\$ 11.83
Maintenance	<u>Tk. 130.00</u> \$ 3.61	<u>Tk. 130.00</u> \$ 3.61	-
Total	<u>Tk. 4414.00</u> \$ 122.61	<u>Tk. 1629.00</u> \$ 45.25	<u>Tk. 2785.00</u> \$ 77.36

- (1) Assuming subsidy on latrines maintained till year 2000.

Table 5.1. Year: 1990-95 cost at 1990-91 price (in million)  
(One slab five rings option)

Activity	Total	GOB	PA
Water supply	<u>Tk. 2167.00</u> \$ 60.18	<u>Tk. 759.00</u> \$ 21.06	<u>Tk. 1408.00</u> \$ 39.12
Sanitation	<u>Tk. 380.00</u>	<u>Tk. 133.00</u>	<u>Tk. 247.00</u>
i) For 11% coverage	\$ 8.66	\$ 3.03	\$ 5.63
Education/Motivation	\$ 1.90	\$ 0.67	\$ 1.23
ii) For 35% coverage	<u>Tk. 1998.00</u>	<u>Tk. 699.00</u>	<u>Tk. 1299.00</u>
Education/Motivation	\$ 45.57	\$ 15.95	\$ 29.62
	\$ 9.94	\$ 3.48	\$ 6.46
Maintenance	<u>Tk. 100.00</u> \$ 2.78	<u>Tk. 100.00</u> \$ 2.78	
Total:	<u>Tk. 2647.00</u> <sup>(1)</sup> \$73.52	<u>Tk. 992.00</u> \$ 27.54	<u>Tk. 1655.00</u> \$ 45.98
	<u>Tk. 4265.00</u> <sup>(2)</sup> \$ 118.47	<u>Tk. 1558.00</u> \$ 43.278	<u>Tk. 2707.00</u> \$ 75.20

1. Considering 11% coverage and one slab 5 rings option.
2. Considering 35% coverage and one slab 5 rings option.

Table 6.1. Year: 1995-2000 costs at 1990-91 prices (in million)  
(One slab five rings option)

Activities	Total	GOB	PA
Water Supply	<u>Tk. 2804.00</u> \$ 77.88	<u>Tk. 981.00</u> \$ 27.25	<u>Tk. 1823.00</u> \$ 50.63
Sanitation (from 35% to 80%)	<u>Tk. 6356.00</u>	<u>Tk. 1280.00</u>	<u>Tk. 2376.00</u>
Latrines	\$ 83.37	\$ 29.18	\$ 54.19
Education/Motivation	\$ 18.20	\$ 6.37	\$ 11.83
Maintenance	<u>Tk. 130.00</u> \$ 3.61	<u>Tk. 130.00</u> \$ 3.61	
Total:	<u>Tk. 6590.00</u> \$ 183.00	<u>Tk. 2391.00</u> \$ 66.41	<u>Tk. 4199.00</u> \$ 116.65

- (1) Assuming subsidy on latrines maintained till year 2000.

6. RESOURCE ALLOCATION IN THE FOURTH FIVE YEAR PLAN (1990-95)

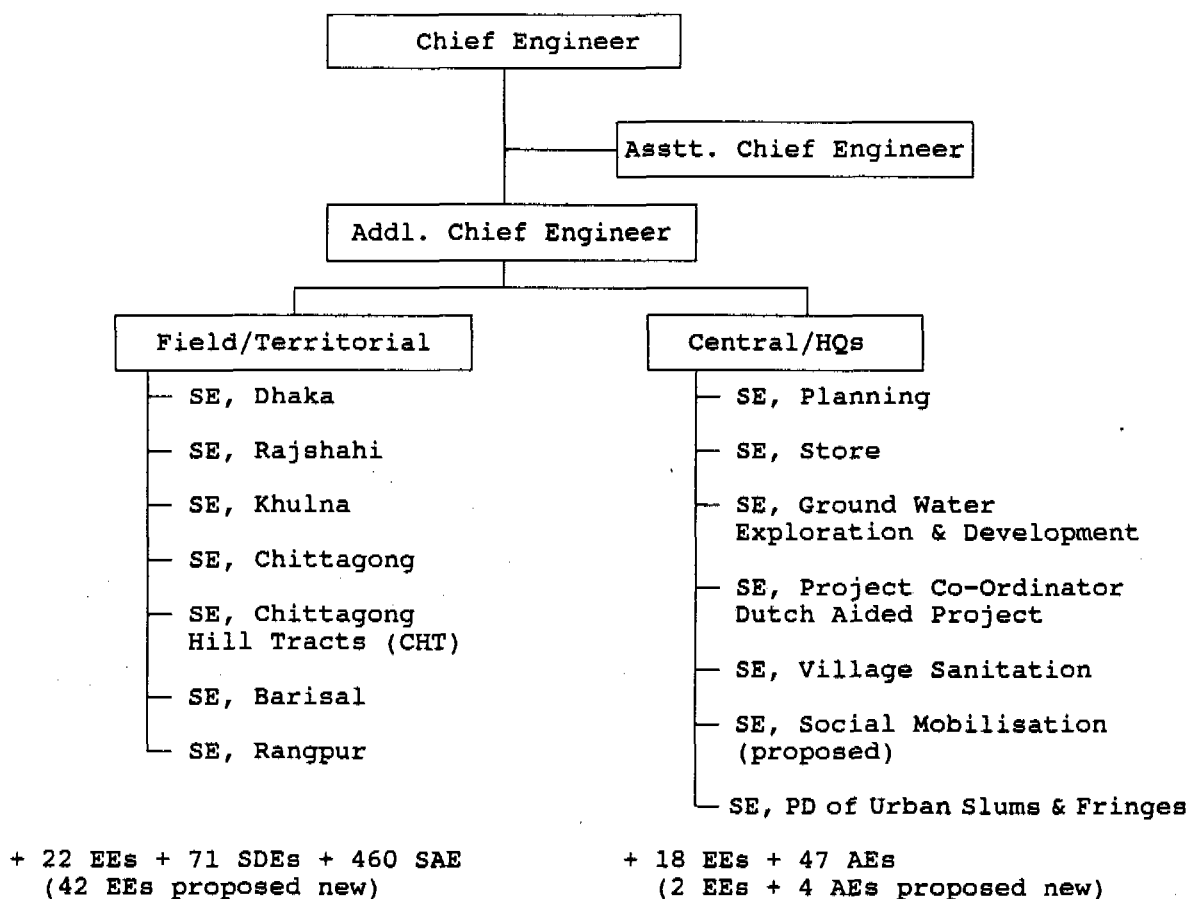
The UNICEF will continue to cooperate with the Government in implementing the six on going programmes. These are (a) Rural Water Supply and Sanitation in coastal belt, (b) Rural Water Supply and Sanitation in the low water table area, (c) Rural Water Supply and Sanitation in the shallow water table area, (d) Rural Water Supply, Maintenance, Rehabilitation and Upgrading, (e) Water Supply and Sanitation in urban slums and fringes and (f) Village Sanitation. Under these programmes 60,000 shallow hand tubewells, 15,000 deep hand tubewells and 60,000 deepset Tara pumps will be installed and 75,000 choked up tubewells will be replaced regenerated in rural areas during the Plan period. For environmental improvement 7,50,000 water sealed sanitation units will be produced with UNICEF assistance for sale.

The requirement of fund for rural water supply and sanitation during 1990-1995 is Tk. 4265 million where external assistance is expected Tk. 2707 million (US\$ 75.20 million) and GOB is Tk. 1558 million. The sectoral allocation (rural and urban) for (1990-1995) is Tk. 2509.5 million. It is therefore expected that Planning Commission may revise the allocation on the recommendation of JGUAG to cover the increased planned programme to achieve the Goals for child development set out in declaration of the World Summit for children.

7. CONCLUSION:

The challenge of the 1990s is to transform sanitation into as successful a programme as the water supply in the 1980s. This will require not only the application of innovative strategies as outlined in the plan but equally strong political commitment. In the water sector, emphasis will be on disparity reduction and the rehabilitation of suction tubewells affected by declining water table. Increased community participation will be sought to make the water and sanitation programme more sustainable.

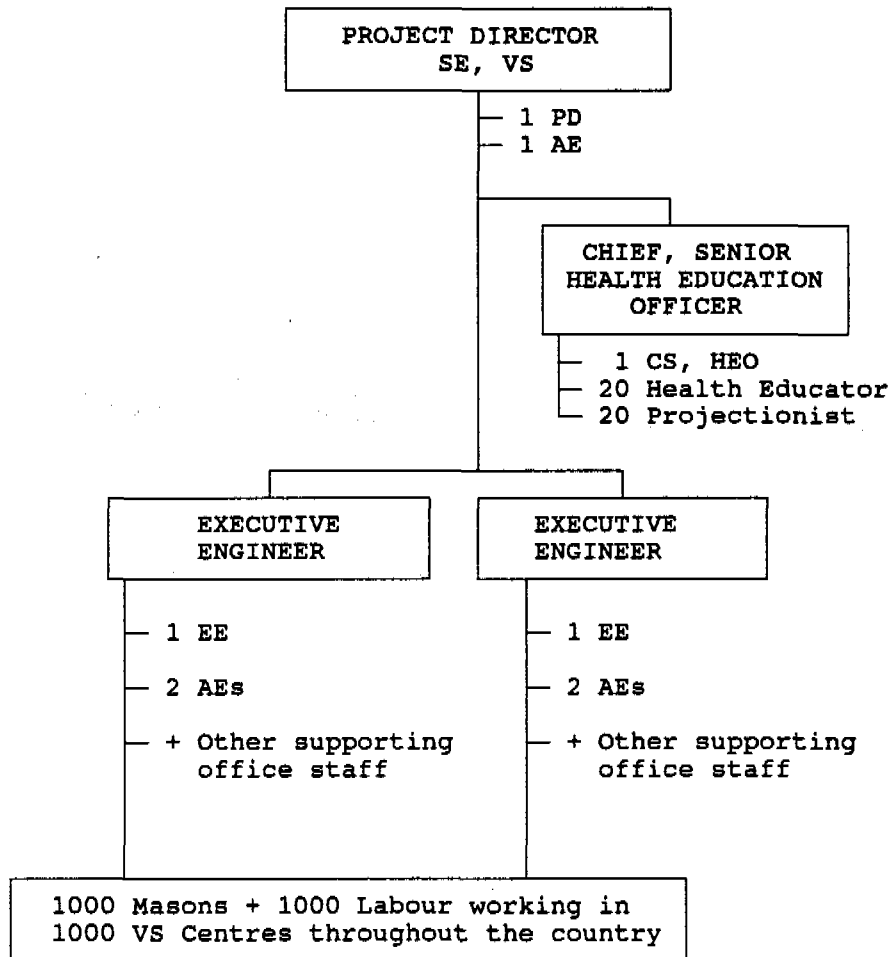
Organogram of the  
Department of Public Health Engineering (DPHE)



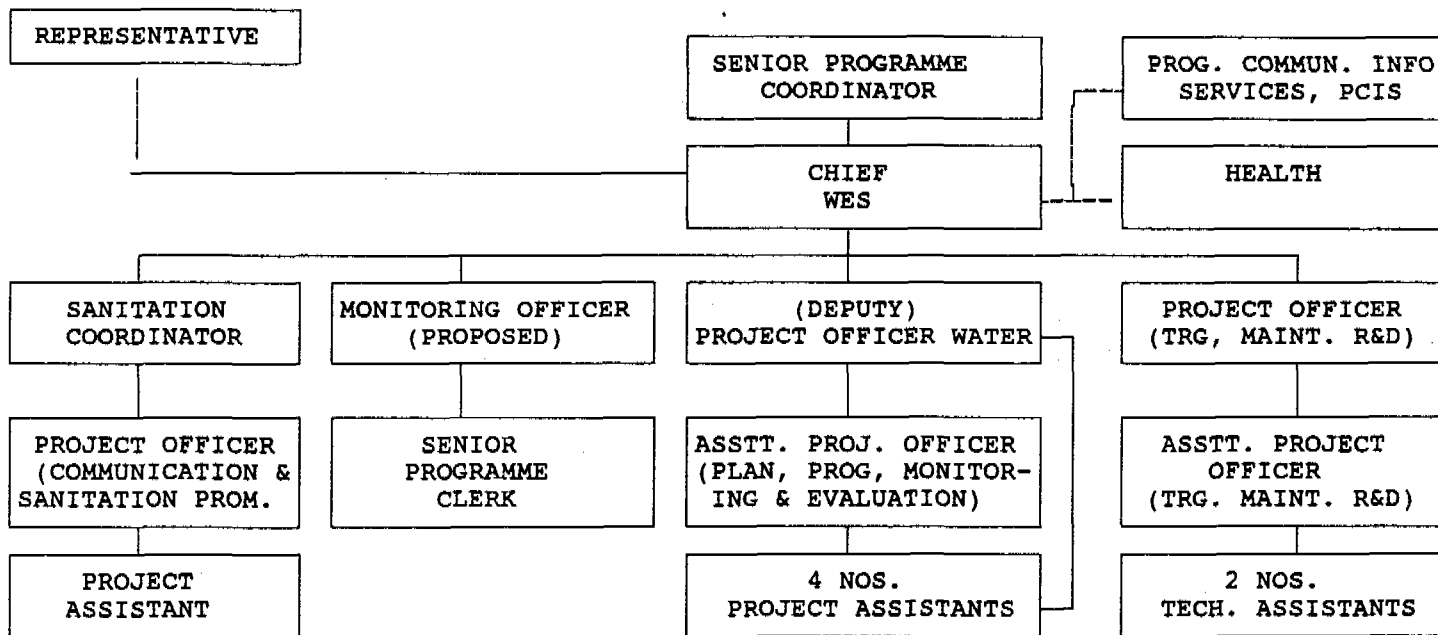
Note:

1. SE, Rajshahi Working as Project Director of Low Water Table Area.
2. SE, Rangpur Working as Project Director of Shallow Water Table Area.
3. SE, Barisal Working as Project Director of Coastal Belt Area.
4. SE, Khulna Working as Project Director of Rehabilitation & Upgrading Project.
5. SE, VS-1 Working as Project Director of VS Project.
6. SE, Urban S/F Project Director of Urban Slums & Fringes Project.
7. SE, VS Will work as Project Director till SE, Social Mobilisation take over charges as PD.

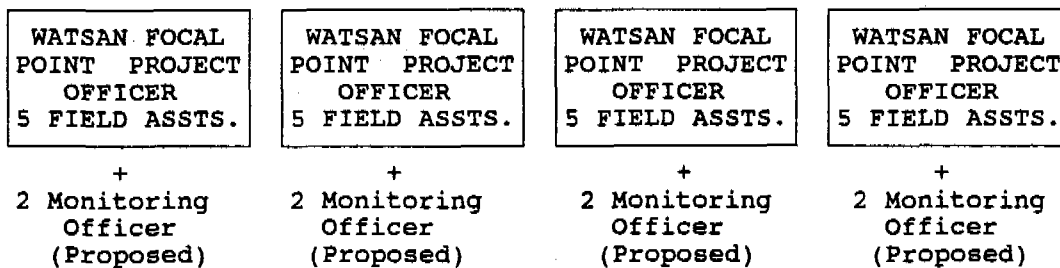
Set Up of  
Village Sanitation Project



Organogram of the  
Water & Sanitation Section, UNICEF



4 DIVISIONAL OFFICES





**PILOT PROJECT FOR  
HANDING OVER REPAIR/MAINTENANCE WORKS OF NO. 6/NO.4 HANDPUMP  
TO CARETAKER FAMILY/BENEFICIARIES**

**BACK GROUND**

Tubewell fixed with Handpumps are the main source of safe water for domestic use in the rural areas of Bangladesh. There are approximately 0.8 million such public tubewells and equal nos. private tubewells as of June 1991. The maintenance, rehabilitation and repair of the public tubewells are the responsibility of DPHE and those of private tubewells lie with the owner. DPHE, with 1840 nos. tubewell mechanics posted in the Upazilas, maintains and repairs these tubewells since 1972. The number of tubewell mechanics has not increased since 1972 though the number of tubewells increased approximately from 0.2 to 0.8 million. However, because of simplicity and wide spread knowledge of repair and maintenance and country wide caretakers training over the last 10-12 years, the caretaker/ beneficiaries have been maintaining their pumps. DPHE mechanics also have been helping in repair and maintenance, but because of increase in their workload, they can not give full attention. This did not deteriorate the maintenance status, mainly because, the people are very alert to keep their TWs running. In view of this it has been proposed that the maintenance of No.6/ No.4 Handpump (not tubewell) be handed over to the community through a pilot study.

**OBJECTIVE OF THE STUDY:**

To make comparative study on the status of the running TWs in the Pilot Project Area after withdrawing the services of DPHE TWMs in respect of repairs and replacement of parts.

**METHODOLOGY:**

The following activities will be taken up before/during the study period:

- a. Base line survey of the project area to determine a status of running public tubewells prior to withdrawal of tubewell mechanics Services through a random sample survey. Field Sanitation Officers from WHO will carry out the work.
- b. Public notice will be served about the withdrawal of the tubewell mechanics and people's expected role will be notified. Also a leaflet regarding withdrawal of tubewell mechanics from repair works will be produced for mass circulation.
- c. After the base line survey one mid term survey will be done at the end of six months. The final survey will be carried out at the end of two year.

- d. During the period of study tubewell mechanics of DPHE will not do any repair work except major works like threading of pipe and desanding of tubewells.
- e. SAE / Mechanics will sale spare parts to the users at the approved price.
- f. One district (say Manikgonj) within Dhaka Circle will be taken up for the study.
- g. The whole study should be completed in one year.

After the end of the each survey, WHO will prepare a report on the findings and submit to the SE Planning Circle and UNICEF for joint review.

Final evaluation report will be submitted to the Technical Committee and finally to the Ministry.

BASELINE SURVEY OF STATUS OF MAINTENANCE OF NO. 6 AND NO. 4 HANDPUMPS

District: \_\_\_\_\_

Upazila: \_\_\_\_\_

Union: \_\_\_\_\_

Sl. No.	Name of the Caretaker Father's/ Husband's name	Village	Year of installation	Type of pump No.6 or No.4	Depth of water table	Is TW running	Discharge L/min	If not running			
								Date of out of order	Reasons, like choked up; low WT; missing/ worn out parts	Alternate source of water for	
										Drinking	Other uses
1	2	3	4	5	6	7	8	9	10	11	12

Date of last repair	Nature of repair works done	Last repair			Cost of spares by type	Details of missing parts of HP (if any) by observation	Who maintains regularly, female/male	Was caretaker trained? Yes / No	Maint. status, greasing/ oiling/ by observation	List of tools at hand. (to be noted by physical inspection)	Reason for missing of tools
		Who repaired self/private Mech/GOB TWM	Labour cost for repair, if any	Source of spares GOB/Private							
13	14	15	16	17	18	19	20	21	22	23	24

ref: baseline.wk1/TK-LOTUS  
24 May'92