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BANGLADESH

RURAL WATER SUPPLY AND SANITATION PROGRAMME

DPHE/UNICEF

Review and Appraisal Report prepared by a  
Danida Mission Visiting Bangladesh from 30/11 to 11/12 1987

Volume I - Main Report

This report contains restricted  
information and is for official  
use only.

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Danish International  
Development Agency  
Asiatisk Plads 2  
DK-1448 Copenhagen K  
Tel: 45-1-92.00.00

R022-6729

PROJECT IDENTIFICATION

Title of Project: Rural Water Supply and Sanitation Programme

Recipient Country: The People's Republic of Bangladesh

Project Area: Rural Areas and Urban Slums and Fringes in Bangladesh

Sector: Water and Sanitation

Responsible Authority: Ministry of Local Government and Rural Development

Implementing Agency: Department of Public Health Engineering and UNICEF

- Objectives:
1. To reduce the incidence of diarrhoeal diseases and parasitic infections in children by providing clean water facilities integrated with improved sanitation and promotion of personal hygiene.
  2. To strengthen the national capacity to provide water supply facilities for rural areas and urban slums and fringes in a way that will achieve the maximum health impact and with particular emphasis on the under-served coastal and low water table areas.

Duration of Project: 5 years, from 1 July 1988 to 30 June 1993  
(Continuation of Programme 1972-88)

Proposed Budget:	Total project cost	US\$ 40,6 mill.	} 65 mill.
	Government of Bangladesh contribution	- 9,8 mill.	
	UNICEF contribution	- 30,8 mill.	
	Proposed funding of UNICEF contribution:		
	UNICEF General Funds	US\$ 1,3 mill.	
	UNCDF	- 2,5 mill.	
	SDC	- 10,1 mill.	
	DANIDA	- 15,2 mill.	
	Carried over from old project	- 1,7 mill.	
	To donors' contributions shall be added overhead charges to UNICEF.		

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CENTRE FOR COMMUNITY WATER SUPPLY  
AND SANITATION (IRC)  
P.O. BOX 3190, 2809 AD The Hague  
Tel. (070) 2.49.11 ext. 141/142

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LIST OF CONTENTS

Page

Project Identification .....	i
List of Contents .....	ii
Abbreviations .....	iv
Map .....	v
1. INTRODUCTION .....	1
2. EXECUTIVE SUMMARY .....	3
2.1. Major Findings and Recommendations .....	3
2.2. General Findings and Recommendations .....	4
2.3. Specific Findings and Recommendations .....	4
2.3.1. Government Budget and Sector Allocations .....	4
2.3.2. Organization .....	5
2.4. Findings and Recommendations .....	6
2.4.1. Rural Water Supply, Coastal Belt .....	6
2.4.2. Rural Water Supply, Low Water Table Area .....	7
2.4.3. Rural Water Supply, Shallow Water Table Area .....	7
2.4.4. Rural Water Supply, Areas with Drilling Problems.....	8
2.4.5. Village Sanitation .....	9
2.4.6. The Integrated Approach (IA) .....	10
2.4.7. Training .....	11
2.4.8. Maintenance, Rehabilitation, and Upgrading .....	11
2.4.9. Health and Hygiene Education .....	12
2.4.10. Research and Development .....	14
2.4.11. Water Supply in Urgan Slums and Fringes .....	15
2.4.12. Community Participation and Women's Involvement .....	16
2.4.13. Monitoring and Evaluation .....	17
3. PROJECT BACKGROUND .....	18
3.1 General Background .....	18
3.2 Water & Sanitation Sector .....	19
3.2.1. Government Budget and Plans .....	19
3.2.2. Overall Sector Planning .....	20
3.2.3. Government Programmes .....	20
3.3 Project Description .....	21
3.3.1 Project History .....	21
3.3.2 Project Objectives .....	22
3.3.3 Project Components .....	23
4. PROJECT PERFORMANCE .....	23
4.1 Rural Water Supply .....	23
4.1.1. Targets and Achievements .....	23
4.1.2. UNICEF's Assessment of Performance .....	25
4.1.3. The Mission's Assessment of Performance .....	27
4.2 Rural Sanitation .....	30
4.2.1. Target Achievements .....	30
4.2.2. Assessment of Performance .....	30
4.3 The Integrated Approach .....	32
4.4 Training and Orientation .....	34
4.5 Maintenance .....	37
4.6 Rehabilitation of Wells .....	38
4.7 Logistics .....	40
4.8 Research and Development .....	40
4.9 Health and Hygiene Education .....	43

5.	PROJECT ANALYSIS .....	45
5.1	Project Impact .....	45
5.2	Economic Issues .....	45
5.3	Organizational Issues .....	46
5.3.1.	Executing Government Agencies .....	46
5.3.2.	UNICEF .....	47
5.4	Balance between Service to Well- and Underserved Areas	47
5.5	Community Participation - Women's involvement .....	48
5.6	Monitoring and Evaluation .....	50
6.	PROJECT APPRAISAL .....	52
6.1	Project Description .....	52
6.2	Project Objectives .....	52
6.3	Target Groups .....	53
6.4	Project Output .....	54
6.5	Project Strategy .....	54
6.6	Project Components .....	58
6.6.1	Rural Water Supply .....	58
6.6.2	Rural Sanitation .....	63
6.6.3	Integrated Water and Sanitation .....	66
6.6.4	Training and Orientation .....	68
6.6.5	Rehabilitation and Maintenance .....	69
6.6.6	Research and Development .....	71
6.6.7	Health Promotion and Communication .....	72
6.6.8	Urban Fringe and Slum Area .....	74
6.7.	Plan of Operation .....	75
6.7.1	Organization and Administration .....	75
6.7.2	Implementation Schedule .....	77
6.7.3	Budget .....	82
6.8.	Reporting, Monitoring and Evaluation .....	84
6.8.1.	Reporting .....	84
6.8.2	Monitoring .....	84
6.8.3	Reviews and Evaluation .....	86

## ANNEXES

I	Terms of Reference
II	Programme of the Mission
III	List of Persons Met During Visit
IV	DPHE/UNICEF Project Proposal
V	Budget Details
VI	TOR for Danida Sponsored Hydrogeology Adviser to DPHE
VII	TOR for Danida Sponsored Monitoring Officer in UNICEF
VIII	Selective List of References

ABBREVIATIONS AND GLOSSARY

ADP	Annual Development Programme
BADC	Bangladesh Agricultural Development Corporation
BHE	Bureau of Health Education
B.O.	Bridging Operation
BRAC	Bangladesh Rural Advancement Committee
BRDB	Bangladesh Rural Development Board
DPHE	Department of Public Health Engineering
D-STW	Deep-set Tubewell
DTW	Deep Tubewell
GOB	Government of Bangladesh
HA	Health Assistant
HFP	Health and Family Planning
IA	Integrated Approach
IRP	Iron Removal Plant
JGUAG	Joint Government UNICEF Advisory Group
LGEB	Local Government Engineering Bureau
MLGRD	Ministry of Local Government, and Rural Development and Cooperation
MOHFP	Ministry of Health and Family Planning
MPO	Master Plan Organization
NGO	Non-Government Organization
PHP	Public Health Promotor
R&D	Research and Development
RWSS	Rural Water Supply and Sanitation
SAE	Sub-Assistant Engineer
SDC	Swiss Development Corporation
SDE	Subdivisional Engineer
SFYP	Second Five Year Plan (July 1980 - June 1985)
SES	Socio-Economic Studies
STW	Shallow Tubewell
TAG	Technology Advisory Group UNDP/World Bank
TFYP	Third Five Year Plan (July 1985 - June 1990)
TOR	Terms of Reference
TW	Tubewell
TWM	Tubewell Mechanic
UE	Upazila Engineer
UNDP	United Nations Deveopment Programme
UNICEF	United Nations Children's Fund
UNO	Upazila Nirbahi Officer
UWSSC	Upazila Water Supply and Sanitation Committee
UzP	Upazila Parishad
V.S.	Village Sanitation
VSC	Village Sanitation Centre
VSST	Very Shallow Shrouded Tubewell
WES	Water and Environmental Sanitation Section, UNICEF
WSS	Water Supply and Sanitation
WHO	World Health Organization

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Exchange Rates Used:

1 US\$	=	Taka	30,50
1 US\$	=	DKK	6,50
1 DKK	=	Taka	4,69

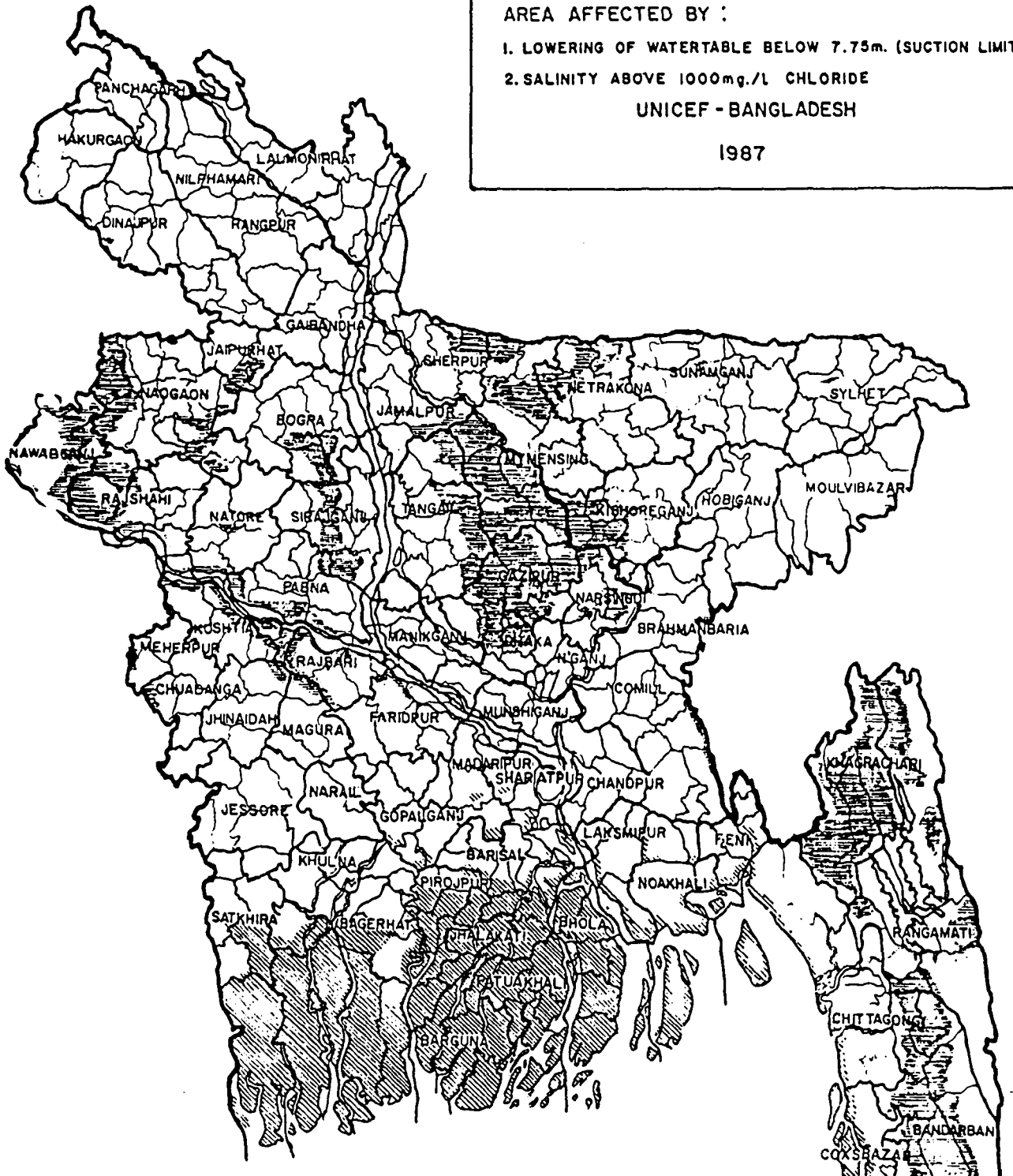
# BANGLADESH

AREA AFFECTED BY :





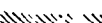
1. LOWERING OF WATERTABLE BELOW 7.75m. (SUCTION LIMIT)
2. SALINITY ABOVE 1000mg./L CHLORIDE

UNICEF - BANGLADESH

1987



## LEGEND

- INTERNATIONAL BOUNDARY : 
- DISTRICT BOUNDARY : 
- UPAZILA BOUNDARY : 
- LOW WATER TABLE AREA : 
- SALINE AREA : 

## I. INTRODUCTION

Since 1972 Danida has, through UNICEF, supported the Rural Water Supply and Sanitation Programme in the People's Republic of Bangladesh with DKK 103 mill. (app. US\$ 11,2 mill.)

The programme has been subject to several Danida appraisals, reviews, and evaluations, most recently a review in March 1986. Since 1982 the programme has been developing a long term programme strategy with focus on integration of water supply and sanitation services, community participation, and improved balance in programme delivery between well- and underserved areas and between service to the poor and the better-off sections of rural communities.

The developments have now been incorporated in the 5 year programme for "Rual Water Supply and Sanitation 1988-1993" to which Danida support is sought.

A combined review and appraisal mission visited Bangladesh from 30 November to 11 December 1987. The mission had the following members:

Niels Dabelstein            Technical Adviser to Danida (Economist)  
and Head of Mission

Steffen Hvam                External Consultant to Danida  
(Civil Engineer)

Kurt Mørck Jensen        Technical Adviser to Danida  
(Social Anthropologist)

Mr. Georg Roth, External Consultant (Civil Engineer) to the Swiss Development Corporation participated in the mission as an observer and will prepare a separate report.

Detailed Terms of Reference for the mission are enclosed in Annex I. The mission's programme is contained in Annex II, and a selective list of persons met in Annex III.

The mission made excursions to inspect field operations and discuss the programme with selected Upazila Parishads. However, most of the time was spent in Dhaka in extensive sessions with UNICEF and the technical staff of the DPHE on the findings and recommendations emerging from the Bridging Operation and reports by the Danida advisers (e.g. Socio-economic Studies, Hydrogeological Studies and Proposed Strategy for Health Promotion).

The work of the mission was greatly facilitated by the extensive documentation provided by UNICEF. Many of the observations made, and solutions to probems discussed in these papers are endorsed by this mission and are enclosed in this report.

The mission drafted general and specific findings, conclusions and recommendations which were presented to and discussed with UNICEF and DPHE and, subsequently, with representatives from the Ministry of Local Government and Rural Development (MLGRD), Planning Commission and External Resources Division.

The findings and recommendations of the mission are summarized in chapter 2 of this report. The project background is summarized in chapter 3 while performance is reviewed and analyzed in chapters 4 and 5, and the appraisal of the 5 year programme is enclosed in Annex IV. Detailed Plans of Operation are available in Danida.

The mission's recommendations naturally form an area of difficulty, but this should in no way detract from the merits of a programme which has made significant contributions to improve the water supply and sanitation in rural areas of Bangladesh.

The mission would like to express its thanks to all officials and individuals met for the kind support and valuable information which the mission received during its stay in Bangladesh and which highly facilitated the work of the mission.

This report contains the views of the mission which do not necessarily correspond to the views of Danida, UNICEF, or the Government of Bangladesh. All proposals are subject to approval by UNICEF and the Governments of Bangladesh and Denmark.



## 2. EXECUTIVE SUMMARY

### 2.1 Major Findings and Recommendations

The mission finds that:

- the programme has achieved the physical targets of supplying tube wells and sanitary installations as planned
- although one of the project objectives is to improve the health status of the population through a decrease in waterborne diseases it is unrealistic to expect an identifiable change which can be clearly attributed to this programme
- the programme has relied too much on mass communication for health and hygiene education and information and not fully utilized the potential of interpersonal communication
- although improved the programme is still biased in favour of the better off section of the rural population and the already better served areas
- the 5 new year Rural Water and Sanitation Programme (1988-93) proposed for funding contains constructive concepts and is reasonably balanced between well- and under served areas.

The mission consequently recommends that:

- Danida, through UNICEF supports the programme with US\$ 15 mill. (50% of programme cost)
- the proposed subsectoral balance be implemented throughout the programme period
- any necessary adjustments should reflect higher priority on underserved areas: deep water table areas, coastal belt, hard/stony soil areas and urban fringes and slums
- the integrated approach with certain modifications should be implemented at greater speed than proposed
- a systematic in-depth monitoring of sanitation health promotion and training components be established
- the hydrogeological surveys imperative to development in coastal and low water table areas be initiated immediately and that necessary funds, manpower, consultancies and advisers be approved without delay
- intensified efforts should be made to increase utilization of existing facilities through desanding/resinking of wells and by constructing and enlarging pump platforms.

## 2.2. General Findings and Recommendations

### General

During the past two decades the coverage of rural water supply has increased at an impressive rate from one well per 448 users to one well per 143 users. However, more than 30 mill. people live in areas which are still underserved (800-1250 people per well). Progress in reducing this imbalance has not been satisfactory.

The sanitation programme has been progressing well but does primarily benefit the better-off villagers who can afford to buy the (subsidized) water seal latrines whereas no feasible options have been made available for or promoted among the poorer sections.

Health and sanitation information and education plays a substantial role at project policy level, but this does not yet adequately materialize into effective action and activities in the programme.

The mission supports the objectives and general strategies as presented in the plans of action for the next five years as a sound approach to reduce the above imbalances.

The mission recommends that Danida supports the programme with US\$ 15 mill. during the period 1988-93 and that the programme is reviewed in September 1989 to ascertain the degree to which the project has been able to transform the strategies and plans into concrete effective action and to adjust plans, budgets and project proformas as needed. An in-depth evaluation should take place in 1990/91.

The mission has some specific operational recommendations and suggestions to improve the programme. These recommendations will be dealt with under the relevant subsections below.

## 2.3. Specific Findings and Recommendations

### 2.3.1. Government Budget and Sector Allocations

The Physical Planning and Housing sector has experienced a cut-back in the third five year plan both in relative and real terms: from Taka 5740 mill. (5.2%) in 1980-85 to Taka 5500 mill. (2.2%) in 1985-90.

Within the PP&H the water and sanitation sector has received an increased allocation (57% against 41%) but this increase has mainly benefitted the urban sector.

The rural water and sanitation sub-sector, however, has experienced a real decline in allocation from 36% to 26% of water and sanitation budget which to a certain degree reflects the good average coverage in rural areas and the increased need of urban areas and towns. Some of the negative effects of reduced budgets are offset by large contributions from beneficiaries, sales of spare parts, recycling of funds in the village sanitation programme, and by increased spending on water and sanitation from the upazilas' own development funds.

Within the rural sector there has been a tendency to favour the already well served areas. This tendency is reversed in the proposed 5 year programme and will be reinforced by UNICEF matching government expenditures on well sinking in coastal and low water table areas. The effect of this matching should be monitored closely and the increased number of wells sunk should not lead to subsequent reduction of government allocations during the project period.

Release of funds are usually delayed up to 6 months into the FY due to late release of ADPs. Implementing agencies should be allowed to start work at the beginning of the FY up to 50% of anticipated ADP allocation for either the last year or the current year. For activities reimbursable by UNICEF work should commence immediately at the start of FY.

### 2.3.2. Organization

As a consequence of the decentralization to upazila administration the programme management has been in a flux for some time resulting in sub-optimal project implementation. The problems seem to be subsiding and the ongoing inter-departmental meetings should continue in order to facilitate smooth management.

The programme will be the responsibility of MLGRDC and will be implemented by DPHE in partnership with the upazila parishads and the pourashavas. DPHE will depute one SAE to each upazila and pourashava for implementation. The SAE will work under the supervision of the upazila/pourashava engineer.

Other UNICEF assisted government projects and NGOs involved in water and sanitation programmes will be supported by the programme by release of materials. DPHE will release materials to such organizations at the request of UNICEF.

UNICEF field staff has primarily been monitoring the project with emphasis on physical activities. As the new programme puts more emphasis on education and communication the field staff should be augmented with the purpose of monitoring, supporting, and interacting with implementing government staff, particularly in connection with the integrated approach.

## 2.4. Findings and Recommendations

### 2.4.1. Rural Water Supply, Coastal Belt

#### Findings

The tubewell implementation has been somewhat speeded up by increasing the number of deep tubewell drilling and by introducing shallow shrouded tubewells/very shallow shrouded tubewells as a regular project component. However the coverage is far from being satisfactory and is far behind the national average.

The success rate of the drilling and the appropriateness of the tubewell design and the drilling procedures have not been investigated systematically.

Hydrogeological mapping is a precondition for a proper and cost efficient implementation. The hydrogeological mapping is lagging behind schedule primarily due to lack of staff. During a 2½ years period only parts of one upazila have been mapped, and the mapping technique applied needs further elaboration.

The staff allotted to hydrogeological activities in DPHE is inadequate. DPHE will provide two hydrogeologists and two technical assistants to support the existing senior hydrologist. Danida will recruit one expatriate hydrogeological adviser. None of these posts have been cleared by the GOB.

#### Recommendations

The targets for the period 1988-93, which will ensure substantial improvements of the coverage by water supply installations, shall be adhered to.

The hydrogeological mapping must be revitalized immediately and mapping must be completed within a two year period. This is proposed to be done by:

- sanctioning and employing the proposed staff without delay including the agreed Danida hydrogeological adviser
- recruitment of a short term hydrogeological adviser for further elaboration on the mapping technique and for starting up of the mapping
- recruiting a local consulting company supported by a foreign consultant who jointly can assist DPHE in the mapping

The success rate of the different types of tubewells together with the applied drilling methods and design should be reviewed by a technical short term Danida mission in order to recommend modifications, if necessary, in the tubewell design in coastal Bangladesh.

#### 2.4.2. Rural Water supply, Low Water Table Areas

##### Findings

The tubewell implementation has been speeded up primarily by introducing the Tara pump as a regular activity.

DPHE and UNICEF are attributing considerable emphasis to the successful introduction of the Tara pump through intensified training, supervision and control and by a gradual introduction of the pump.

The hand pump coverage is still far from being satisfactory and is far behind the national average.

The Depth Book indications of necessary drilling depths need revision to avoid unnecessary high drilling cost.

The monitoring of the pre-monsoon water table is hampered by lack of staff. DPHE has proposed to upgrade the groundwater monitoring by employing additional staff for this purpose, but none of these posts have yet been cleared by GOB.

##### Recommendations

The target for the period 1988-93, which will ensure substantial improvements of the coverage by handpumps, shall be adhered to.

The introduction of the Tara pump shall be continued in a phased manner and with the necessary intensified support until the successful introduction of the pump is ensured.

The water table monitoring must be continued, and the quality of the data must be ensured by proper guidance and supervision of the staff involved. The proposed staff must be sanctioned and recruited without delay.

The Depth Book must be revised taking into consideration aquifer characteristics and water quality aspects.

The possibility of converting the programme from a contractor based to a self-help programme shall be investigated during the second half of the planning period.

#### 2.4.3. Rural Water Supply, Shallow Water Table Area

##### Findings

The coverage by handpump installations is impressive and above the national average.

A deterioration of quality in terms of adherence to site selection criteria and of technical installations has been observed by UNICEF, this is attributed to inadequate supervision and follow up actions.

The self help system appears to work satisfactorily and has apparently reduced the cost of the installations.

#### Recommendations

The target for the period 1988-93, which will ensure a certain improvement of the coverage by handpumps including coverage of underserved pockets, shall be adhered to.

The supervision and inspection conducted by DPHE and UNICEF staff shall be strengthened. Appropriate follow-up procedures shall be identified and implemented to ensure that problems are highlighted and rectified whenever possible.

#### 2.4.4. Rural Water Supply, Areas with Drilling Problems

##### Findings

Conventional hand drilling techniques (water jet drilling for deep tubewells and sludging for shallow tubewells) are inadequate in parts of Northern Bangladesh and in the Chittagong Hill Tracts due to stoney or hard layers.

Approx. 5 million people are reportedly affected by these problems. The coverage by water supply installations is not known but it is anticipated to be considerably below the national average.

Apparently introduction of adequate drilling technique and supply to these areas have received inadequate priority.

##### Recommendations

The extent of the stoney and hard layers should be mapped.

An inventory of the existing water supply installations should be prepared.

The hand drilling technique should be improved e.g. by substituting the sludging method by the more powerful water jet method and by improving drill bits etc.

The feasibility of introducing light mechanized rigs should be investigated.

In areas where even improved drilling techniques are not feasible, steps should be taken to increase the coverage by constructing and rehabilitating alternative water supply installations such as sanitary dug wells and spring chambers.

#### 2.4.5. Village Sanitation

##### Findings

The physical achievements of the village sanitation programme have shown encouraging progress during 1987 with regard to production and promotion of the water seal latrine.

The production capacity of the VSCs is underutilized due to limited materials, late announcement of ADPs, and subsequent delay in budget disbursement.

VSCs are able to increase, maybe even double, production at existing capacity if more materials are supplied and a recurrent financing of production can be established.

The water seal latrine is well accepted and suitable for the environmental conditions of the rural areas; demand for water seal latrines is higher than supply.

The water seal latrine is in high demand among all income groups, irrespective of willingness and capacity to pay for the latrines, which makes the promotion of very low cost and less hygienic solutions for excreta disposal difficult.

Promotion of very low cost latrines constructed from local materials appears not to be implemented outside the IA upazilas.

##### Recommendations

The capacity of the existing VSCs could be fully utilized by supplying more materials rather than constructing new VSCs.

If new VSCs are constructed, supply of the necessary materials for achieving optimal production according to capacity should be ensured.

In order to reach a larger target group of beneficiaries the present subsidy on water-seal latrines should be maintained.

In a few upazilas (say 4) mobile latrine construction units should be tested with regard to cost-efficiency, service delivery and reduction of transportation costs.

The mission supports UNICEF's proposal to provide material assistance to NGOs to set up latrine production centres.

The water-seal latrine unit consisting of one slab and only one pit ring should be promoted on a subsidy basis as one of the project's very cheap latrine type in the IA upazilas. The private sector (private manufacturers) shall be encouraged to produce and supply the additional pit rings.

Taking into consideration the limited purchasing capacity of the poorest sections of the population, the project shall continue to give high priority to the promotion of cheap and simple technology solutions for excreta disposal in addition to the water seal latrine.

#### 2.4.6. The Integrated Approach (IA)

##### Findings

The framework for implementation of the IA as formulated in previous Danida documents is being followed in principle. However, certain suggested activities, like health promotion by HAS of the MOHFP, are not yet being implemented.

The mission observes that implementation of the IA is essential for fulfilling the longer term objectives of substantially improving the sanitation coverage and subsequently the health status of people.

The IA has only been in operation for a short time (not even one year). The mission agrees with UNICEF's own assessment that results are promising. It is furthermore observed that the eager involvement and commitment of DPHE and UNICEF territorial staff is the major vehicle behind the encouraging progress.

The inadequate supply of water-seal latrines has had an adverse effect on the progress of activities incl. tube well installation, which has fallen behind ADP targets.

There is a very high demand for water-seal latrines, but due to limited supply the project has had to motivate some applicants to construct cheaper solutions for excreta disposal instead. This has had an adverse effect on the programme and may impede motivational efforts by the DPHE/UNICEF staff operating at the field level.

The progress of NGO activities in the IA is very encouraging and signals potential for a further increase in NGO involvement as the IA has expanded to more upazilas.

##### Recommendations

The IA should be continued and strengthened but only to the extent that water-seal latrines can be made available to beneficiaries as per their demand/need and capacity to pay the subsidized price of the latrine.

If the production capacity of VSCs can be adequately expanded the IA shall be introduced in two upazilas in each UNICEF zone by mid 1988.

*done* | To ensure the successful expansion of the IA as proposed UNICEF will have to increase its local staff with one assistant project officer and one field assistant at each zonal office as the programme expands to all country zones.



The UNICEF project officer to be in charge of the IA in all upazilas shall be located at the Dhaka UNICEF office.

When expanding to new upazilas increased involvement of NGOs and HAS/FWWs of the MOHFP should be sought.

#### 2.4.7. Training

##### Findings

The concept of family caretaker training has been introduced but the post-installation training is reported not to take place. In general little is known about the quality of training and participation rates. Its quality and the extent to which in particular women are participating and benefiting is not known.

Orientation meetings involving senior DPHE staff and upazila officials appear to have been useful in spreading information about the programme and in facilitating cooperation between DPHE and LGEB staff at the upazila level.

Training of TWM in their new role as PHP has been initiated in the IA upazilas. The training curriculum puts emphasis on health promotion activities.

Health Assistants (MOHPC) have not yet been trained properly in connection with the IA.

In general little is known about the quality and impact of training activities.

##### Recommendations

It is recommended that follow-up orientation and training sessions for DPHE staff (EES, SDEs, SAEs) and upazila officials shall be held at regular intervals.

Strong emphasis should be put on training of TWMs, HAS, and FWWs in the upazilas under the IA approach.

Higher priority shall be given to the monitoring of training activities and their impact.

Training curricula for all field level trainee categories shall give priority to communication techniques and the need for community participation in site selection and tube-well installation.

#### 2.4.8 Maintenance Rehabilitation and Upgrading

##### Findings

The record for maintenance of handpumps appears remarkably good. The cost of spare parts amounts to less than 1 Taka per user per year.

9 | Caretaker training is lagging behind handpump installation.  
| A caretaker family concept, where the caretaker's wife is  
| given some health education, has been introduced.

UNICEF's supply of spare parts was discontinued two years back pending a policy decision regarding selling of spares. This decision was taken recently by the cabinet. Spares for the Tara pump will, however, at present be supplied free of charge by UNICEF.

Rehabilitation of existing installations is in general not given the same priority as drilling of new tubewells. Resinking of choked tubewells is lagging behind the estimated 15,000 a year necessary to keep up with the annual rate of choking. Desanding appears feasible in 25% of the choked tubewells, and is gradually being introduced.

A large number of tubewells does not have a platform. A platform rehabilitation programme has been implemented on a pilot basis, but with modest success, apparently due to inadequate promotion among the beneficiaries.

#### Recommendations

The backlog in caretaker training should be alleviated and timely training of caretakers for new installations should be conducted. The quality of the training must be ensured, and further introduction of the important family caretaker concept must be given the necessary support.

↙ [ The implementation of the new spare part selling strategy including establishing of revolving funds shall be monitored properly and be given the necessary support in order to ensure a successful introduction of the strategy.

The rehabilitation programme is in general implemented as proposed by DPHE/UNICEF. However, the demand for resinking of choked tubewells appears to be underestimated and must be reconsidered.

A platform rehabilitation programme is recommended to be introduced on a pilot basis in a few upazilas in the shallow water table area.

↙ Upgrading of existing traditional water supply installations in areas, where hand drilling is not feasible should, if necessary, be intensified.

#### 2.4.9 Health and Hygiene Education

##### Findings

↙ Health promotion in addition to water supply and sanitation is primarily limited to the distribution of different communication materials produced by UNICEF.

No mass media campaign has yet taken place but has been planned.

Very limited achievements have been made in terms of inter-personal health communication.

TWMs in the IA upazilas receive training in health promotion activities, but so far little is known as to how and to which degree health and hygiene messages are being disseminated by them. They have not yet attained the envisaged role and status as Public Health Promoters (PHP).

The mission supports the concept of converting TWMs to PHPs. However, the feasibility of doing so, which regard to credibility in the village community, is not yet known.

HAs from MOHFP and the DPHE Health Educators have not yet been involved in the programme, but it is planned to involve the HAs in the IA upazilas.

In establishing an interlinkage between safe water supply, improved sanitation, and health education it is observed that health education has so far been given a low priority.

Caretaker families are given health and hygiene education as part of the caretaker training curriculum, but very little is known as to whether and how they disseminate health messages afterwards.

The impact from health promotion activities of the TWMs - who are males - is limited with respect to women.

The promotion of health and hygiene education by the NGO involved in one of the two IA upazilas appears to be effective by linking improved hygiene and sanitation to a reduction in people's medical expenditures.

#### Recommendations

As UNICEF's target for the next 5 years' programme is to improve the personal hygiene practices of 25 mill. beneficiaries the health and hygiene education activities need to be dramatically upgraded.

Training of caretaker families and TWMs should give a very high priority to health and hygiene education. The TWMs should be trained and supported in attaining their role and status as PHPs.

HAs and FWAs of the MOHFP and DPHE Health Educators should be incorporated in the programme, in particular in the IA upazilas as far as possible.

The mission strongly supports UNICEF's recommendation that DPHE will recruit female PHPs (now known as TWMs) into existing vacancies aiming at one per upazila by 1993.

The health and hygiene education strategy to be followed by all personnel involved in the IA should give priority to interpersonal communication.

*Key data  
well*

Printed health promotion materials, audio-visuals and other communication materials should be used primarily to reinforce interpersonal communication.

#### 2.4.10 Research and Development

##### Findings

The Tara pump has been introduced in the regular implementation programme, but the testing programme is continued in order to verify the long term performance of the pump and in order to enable testing of minor modifications, if the large scale implementation implies a need for such modifications.

For water levels below 15m the Tara pump is applicable but is so hard to operate that it is not recommended to use the Tara pump under such conditions. The selection of a pump for these areas is awaiting research and development activities undertaken outside Bangladesh. The Afridev pump is considered by UNICEF but the present state of field testing of this pump does not enable a decision to be taken at present.

The testing of the iron removal plants and the pond sand filters has reached such a state that gradual introduction in the regular implementation programme is justified. The testing has documented that proper community involvement is a pre-requisite for successful operation and maintenance of the plants.

The shallow shrouded tubewells and the very shallow shrouded tubewells have been introduced in the regular implementation programme. The performance of the tubewells drilled in connection with the testing programme has not been monitored systematically. However, reports available imply that a number of these tubewells have run dry or turned saline.

Choking of tubewells is a problem but the extent and the reasons for choking are not fully known. Desanding of choked tubewells has been found feasible and is gradually being introduced in the regular implementation programme.

Stoney layers create problems for drilling by sludging. Various options for solving this problem have been identified but none of these have been converted to field testing.

Areas in the coastal belt have been identified where the available technologies cannot provide portable water throughout the year.

In spite of the successful implementation of most of the research and development activities under the Bridging Operation period there is a continuous need for follow up on completed activities.

### Recommendations

In order to ensure follow up on completed R&D activities and to initiate new activities it is recommended to recruit a local technical R&D adviser. The follow up will comprise technical support for the implementation and if necessary experimenting with modified designs. The mission recommends that Danida expresses its willingness to finance such an adviser.

The rate of choking and methods of prolonging the life of tubewells need to be studied and developed further.

Introduction of improved hand drilling technology or light mechanised rigs in areas with stoney and hard layers should be conducted as a high priority item.

The scope for introduction of alternative water supply technologies in areas, where successful handdrilling is not possible, should be investigated in the light and the experiences gained in similar projects outside Bangladesh.

### 2.4.11 Water Supply In Urban Slums and Fringes

#### Findings

Urban slum and fringe areas are normally not covered by any larger government or other water supply and sanitation programme besides UNICEF's slum improvement project in 16 pourashavas (municipalities).

Available data on water supply in urban slums and fringes show that there is less coverage in these areas than in adjoining rural areas. Sanitation coverage, however, is higher than in rural areas, reflecting the greater felt need for hygienic excreta disposal in urban slum areas. Many existing latrines are open and unsanitary.

Increasing migration to urban areas adds to the pressure on existing water supplies.

#### Recommendations

A water and sanitation project in urban slum and fringe areas as proposed by UNICEF shall be supported.

The project should be implemented according to the principles, strategies and guidelines in the UNICEF plans of action for rural water supply and sanitation, incl. the key principles of the IA.

To avoid duplication and confusion regarding different implementation policies the project shall consider not to provide water supply and/or sanitation to municipalities already receiving adequate donor assistance to these sectors.

Coordination with the LGEB/World Bank/UNDP/Danida low cost sanitation programme shall be established in order to avoid too big differences in subsidy and cost recovery policy.

NGOs shall be invited to assume responsibility for implementation of the project in certain defined geographical areas.

#### 2.4.12 Community Participation and Women's Involvement

##### Findings

Involvement of the users in the project - almost exclusively males - is taking place in varying degrees within site selection, tubewell installation (the "self-help" system), handpump maintenance, training and latrine construction.

The "self-help" system appears to operate satisfactorily although beneficiaries' involvement in site selection and tubewell construction (incl. cost contribution) is frequently limited to 1-2 individuals, most often the future caretaker, representing a tubewell applicant/user group.

Distribution of tubewell application forms by TWMs is not yet being practised. Application forms are still primarily being administered by the Union Council Chairman and distribution of forms through other channels (e.g. SAEs, TWMs) is practically absent.

The role of the UWSSC in safeguarding equal distribution of tubewells to poorer beneficiary applicant groups is at times being restricted by the individual decision making and preferences of the upazila chairman. The number of correctly selected tubewell sites is thereby being reduced.

Post-installation meetings between SAEs and beneficiary householders and their families to assess functionality and quality of installations do not appear to take place.

Besides being the primary drawers and users of water women are only involved in the programme activities to a very limited extent.

Participation of women in the family caretaker training arrangements appears to be related to the daily allowances given rather than to motivation alone. In many cases women are reported not to be turning up.

Involvement of women is hampered due to prevailing socio-cultural norms restricting women's behaviour in public and their participation in decision making processes. The limited achievements within women's participation should be seen within these general constraints.

## Recommendations

Intensified training of TWMs, upazila level officials (Upazila Engineer, SAE, Upazila Chairman) and Union Council Chairmen in the need for, and objectives behind active participation of all beneficiaries in project activities should be carried out.

To ensure that the community, and not only a few individuals, has been actively involved in site selection and tube-well construction DPHE and UNICEF needs to strengthen supervision, guidance and follow-up. It is, however, recognized that limited manpower available may prove to become a major constraint in fulfilling this.

As proposed by UNICEF tubewell application forms should be made available through various channels like TWMs, SAEs, Union Council Members, instead of only through the Union Council Chairman.

UNICEF should make an increased effort in monitoring more closely the actual procedures involved in tubewell application and allocation (e.g. through post-installation meetings with user groups) and take appropriate rectifying follow-up action when required to ensure that tubewells are always allocated to the most needy beneficiaries and that they participate actively in the process.

More qualitative monitoring of women's participation in caretakers' training sessions, as well as their role, status and actual contribution as tubewell caretakers is required.

### 2.4.13 Monitoring and Evaluation

#### Findings

*for comparison*  
The supervision and quality control provided by the DPHE territorial staff and the periodical field visits by the staff of the UNICEF Zonal Offices (up to 5% of all installations) simultaneously provide for the monitoring of physical progress incl. feedback of information to project management. The system developed appears to function well.

Physical progress reports are submitted by each level of staff in DPHE and a record of installed tubewells and latrines is maintained. In addition periodical reviews take place at the different implementing levels. At the apex level biannual progress reviews are made and revised workplans are prepared.

Monitoring of socio-economic and qualitative impact related aspects is less systematic and based on ad hoc observations by staff of the UNICEF Zonal Offices. The result is a lack of feedback of information to the central management concerning important programme effects/impacts, e.g. women's involvement and quality of the family caretaker training programme.

## Recommendations

UNICEF should develop systems for monitoring of socio-economic and qualitative aspects of the programme, e.g. within areas such as participation of users, women's involvement, training, sanitation, and health promotion. As already suggested by DANIDA and UNICEF in previous (1985/86) documents the monitoring system shall be process evaluation oriented and may be based on smaller sample studies.

MEP { When developing a system to monitor qualitative programme effects/impacts the objectives and procedures of WHO's minimum evaluation guidelines for drinking water supply and sanitation should be kept in mind.

Monitoring and evaluation data should be made directly available to project management for operational use in the steering of project activities, which may include revisions of certain policies and implementation strategies.

o → The monitoring package recommended by DANIDA in the "Framework for Implementing the Strategy for Health Promotion" of December, 1985, should be implemented in the IA upazilas.

→ A local Bangladeshi UNICEF programme officer responsible for the monitoring of socio-economic and qualitative aspects should be engaged by the start of the next 5 years' programme. The mission recommends that Danida sponsors this post as an integrated part of the future Danish support to the programme. During the initial development of the monitoring system the programme officer shall be assisted by a short term Danida consultant.

## 3. PROJECT BACKGROUND

### 3.1. General Background

Lack of clean water combined with poor environmental sanitation and poor standards of personal hygiene contribute directly to high rates of diarrhoeal diseases and parasitic infections, particularly in children. In Bangladesh there are an estimated 57,2 million episodes of under-5 child diarrhoea each year, causing 200,000 under-5 child deaths annually. Limited studies have shown that the prevalence of parasitic infections in children under 5 years is frequently over 85 percent, leading to nutritional problems, lowering of resistance and rising mortality from otherwise survivable diseases.

The provision of clean water and 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 fifteen



years, installing some 450,000 public tubewells in addition to the previously existing 200,000, and producing almost 400,000 water seal latrine units. However, despite this improvement, there has been no measurable decline in the incidence of diarrhoeal diseases and parasitic infections in children in this period.

While the improvement of water supply facilities is impressive, it has not been evenly spread throughout the country. As far as rural water supply is concerned, average national coverage in 1985 was an estimated 143 persons per public tubewell. However, coverage rates vary sharply by area, from an average of 100 persons per public tubewell in the shallow water table area, to 880 persons per public tubewell in the coastal belt, and 1240 per public tubewell in the low water table area.

### 3.2. The Water and Sanitation Sector

#### 3.2.1 Government Budget and Plans

Water supply and sanitation were allocated about 2 percent of expenditures during the Second Plan (1980-85), with the cities and the rural areas receiving roughly equal shares of the total. The Third Five Year Plan gives water and sanitation a lower share of plan expenditures - 1.2 percent - with a much larger allocation to urban than to rural areas. Based on 1985 population figures, per capita plan expenditures are estimated at over Tk. 170 in the major cities and Tk. 14 in the rural areas.

In the past, the government has adopted a service delivery approach to water supply and sanitation. In the rural sphere, there has been a steadily increasing involvement of the beneficiaries, both financially and through self-help. The emphasis has been on "hardware" delivery - the installation of hand tubewells, laying of pipelines and production of latrine components. In terms of hardware, this has been very successful, especially in the rural areas. However, in terms of health and social impact, there has been little measurable improvement.

The non-governmental organizations represent both a resource and an outlet for water and sanitation activities. NGOs can reach poorer target groups that are not always reached in the government's programme. Government releases limited quantities of UNICEF-supplied tubewell and sanitation materials to NGOs, many of which are able to integrate water and sanitation with other social and economic development activities. Though small compared with the huge programmes of the government, NGOs are able to give more attention to qualitative aspects and thus to realize the health benefits to children made possible by improved water and sanitation.

### 3.2.2 Overall Sector Planning

In 1984 the Planning Commission of the GOB proposed that a study of the water supply and sanitation sector should be prepared. The objectives of the study were to establish priorities for investment in new schemes and programmes and to improve the efficiency and services of the sector. In order to illustrate the resource implications of various strategies, alternative scenarios for attaining the goal of full access to services were elaborated. The final report was submitted by a Dutch consultancy group to GOB in October 1986.

Since then attempts have been made to ensure that the study should form the basis for the future development within the sector, and that the budget allocations should ensure "full access to services" by year 2010. However, GOB has shown some reluctance to consider the study as an obligatory policy document but rather as a set of guidelines as well as a reference document. Furthermore the budget allocations in the TFYP are not adequate to achieve the coverage target in the study. As the proposed strategy in the Sector Study is a long term strategy, the first real opportunity for GOB to adopt at least parts of the strategy will be in connection with the preparation of the Fourth-FYP in 1989-90. The mission therefore supports that the sector study should be considered in connection with the preparation of the Fourth-FYP.

### 3.2.3 Government Programmes

→ Handpump tubewells have been installed in Bangladesh for over 100 years. By independence in 1947 there were 50,000 public wells and a further 150,000 were installed before 1971. After the liberation war the government embarked on a massive programme to rehabilitate 60,000 tubewells out of repair and install 100,000 new tubewells. This developed into a continuing, nationwide programme implemented by the Department of Public Health Engineering with the assistance of UNICEF. By 1985 there were over 600,000 public tubewells installed.

The government's rural water supply programmes cover all upazilas including upazila centres, i.e. urban areas under upazila administration.

There are four main components of the government's current rural water supply programme. The installation of shallow hand tubewells is now implemented by the beneficiaries, who themselves bear the total cost of and responsibility for sinking the well. DPHE provides logistic support and technical supervision. Secondly, the resinking of choked up wells is also implemented by the beneficiaries at their own cost. The installation of deepset hand tubewells is

expanding rapidly and will eventually become larger than the shallow well component. Fourth, the installation of deep hand tubewells (and very shallow shrouded tubewells) in the coastal belts. This component is constrained by the high cost of deep tubewells. For deepset and deep tubewells and VSSTs, installation is done by contractor with a nominal contribution from the beneficiaries of Tk. 350 for deepset and VSSTs and Tk. 1000 for deep wells. In all tubewell components materials are provided by UNICEF with the exception of brick chips and sand for platform construction.

→ Village sanitation activities in the public sector began in 1954. Early projects were not very successful. Latrine slabs were distributed free and a high proportion fell into disuse. In 1975 an experiment was made to test the willingness of the public to pay. Although sales were slow a subsequent evaluation showed that 60% of latrines sold were in use compared to 30% of free latrines. A new programme was launched to construct a production centre in each upazila and to sell subsidized latrines to the public. The early trickle of demand was gradually transformed as word of the advantages of the new latrine spread rapidly.

By mid-1985 460 production centres had been constructed and a total of 350,000 latrine sets produced with production running at 90,000 per year. The programme has succeeded in stimulating a demand for sanitation where none existed before. The private sector is responding to the demand but finds it difficult to compete with the subsidized price of government produced latrines.

With the population of cities and towns expected to exceed 35 million by year 2000 urban water supply and sanitation will loom larger on the Bangladesh agenda in the future. In 1985 approximately 33% of people living in district towns had a "reasonable" public water supply, 10% by house connections, 6% by public standposts, and 17% by public handpumps. Coverage by private tubewells is not known.

### 3.3. Project Description

#### 3.3.1. Project History

Since 1972 UNICEF has supported the Basic Water and Environmental Sanitation Services Programme in Bangladesh with the general objective of improving infant and child health by reducing incidences of diarrhoeal and parasitic diseases. During the period 1972-1987 UNICEF has contributed app. US\$ 62 mill. of which Danida has provided US\$ 11,2 mill. (DKK 103 mill.).

Until 1982 the programme focused primarily on "hardware delivery" providing handpumps/tubewells. The skewedness towards hardware and the limited impact on health improvement was realized in the late seventies. The first revised long term programme strategies formulated in 1980-81 were

not considered optimal and the project entered a "bridging" phase originally planned to cover the years 1982-83 which was extended to 1985 with a total Danida commitment of US\$ 7.2 mill. Although physical targets were generally achieved during 1982-85 disbursements fell far short of estimates, partly due to overbudgeting, partly due to overstocking and the project will continue until mid 1988 without additional donor support.

The new strategy developed during 1982-85 has as yet only been implemented on a limited scale but will take effect during the implementation of UNICEF's 5-year country programme 1988-1993.

### 3.3.2 Project Objectives

The overall objectives of the programme were in 1982 formulated as follows:

1. to ameliorate the poor health of the rural population of Bangladesh; especially children who are prone to the dangers of water-borne diseases and high worm infestations, by
  - a. continuing the construction and maintenance of hand-pumps/tubewells in the rural areas of Bangladesh with emphasis on the provision of safe water supplied in hardship and underseved areas, and
  - b. strengthening and intensifying sanitation activities in the rural areas of Bangladesh and with special attention to the slums and squatter areas of certain cities and towns.
2. to intensify health education and motivational activities in rural Bangladesh, to ensure the efficacy of the facilities and opportunities provided, and
3. to search for appropriate technology and the most suitable and cost effective substitutes for existing services and materials.

The specific objectives for the bridging phase:

- to further elaborate the Plan of Operation
- to initiate activities aimed at generating the experience and information necessary for developing a long-term programme strategy
- to upgrade the various programme supporting activities, and
- to maintain an acceptable momentum in the present hardware activities (i.e. installation of pumps and latrines), specifically in the unserved and underserved areas.

### 3.3.3 Project Components

In pursuit of these objectives UNICEF supported and assisted DPHE in implementing the following sub-projects:

1. Rural Water Supply
  - a. Shallow Tubewells
  - b. Deep Tubewells
  - c. Deepset Tubewells
2. Rehabilitation of Wells
  - a. Resinking of Choked-up Tubewells
  - b. Desanding of Tubewells
  - c. Construction of New Platforms
3. Rural Sanitation
  - a. Health Education
  - b. Production of Waterseal Slabs and Rings
  - c. Integrated Approach
4. Training of DPHE staff and pump Caretakers
5. Improvement of Logistics
6. Urban Water Supply
7. Research and Development

The physical targets and the approach for the sub-projects will be described below as will the achievements, constraints and solutions.

## 4. PROJECT PERFORMANCE

### 4.1 Rural Water Supply

#### 4.1.1 Targets and Achievements

From a hydrogeological point of view Bangladesh can in principle be subdivided into four distinct areas:

1. Coastal belt comprising approx. 84 upazilas, where salinity prevents implementation of a traditional large scale shallow well programme.

The water supply techniques available are:

- deep tubewells, DTs
- shallow shrouded tubewells (40'-60' deep), SSTs
- very shallow shrouded tubewells (20'-35' deep), VSSTs
- pond sand filters, PSFs.

2. Low water table areas comprising approx. 123 upazilas where the water table at the end of the dry season (March - April) is below the reach of suction pumps and where tubewells fitted with deep set pumps have to be applied, DST.
3. Shallow water table area where supply through shallow tubewells, STs, fitted with suction pumps is possible. This area comprises the majority of the country.
4. Area where drilling of tubewells using traditional (manual) drilling technique is not feasible due to hard/stoney layers. This area comprises Chittagong Hills Tract and patches of North Bangladesh.

The following table shows the physical achievements for 1986-87 against the targets set for the year in the Government's Annual Development Plan (ADP):

Physical Achievement 1986-87

	<u>ADP Target</u>	<u>Achieve- ment</u>	<u>%</u>	<u>1985-86 Achievement</u>
Coastal Area				
DTs	1,418	1,213	86	178
SSTs	60	42	70	-
VSSTs	260	245	94	-
PSFs	-	-	-	-
Low Water Table Area				
DSTs	2,000	1,644	82	-
Shallow Water Table Area				
STs	35,000	29,424	89	25,619
Stoney Layer Area				
Installations	-	?	-	?

The shallow tubewell programme is implemented under the upazila administration on self-help basis while the other categories of installations are implemented under DPHE.

Assistance is given to other government projects and Non-Government Organizations (NGO's) by releasing materials for the installation of tubewells. The achievement for 1986-87 has been as follows:

NGO Shallow Wells	1,333
NGO Deep Wells	214
NGO Deep Set Wells	-
Grameen Bank Shallow Wells	1,108
ADSS Shallow Wells	467

Hydrogeological mapping in the coastal belt was conducted in parts of one upazila to gain experience and develop procedures.

The union-wise mapping of the water table conducted in 1986 was repeated in 1987 in order to enable a continuous updating of the delineation of the "low water table area".

The recruitment of the hydrogeological consultant offered by DANIDA was delayed by the GOB's insistence to have the post created in a Project Proforma.

The recruitment of 2 hydrogeologists and 2 technical assistants for strengthening of the ground water division in DPHE is still awaiting the approval of the same Project Proforma.

#### 4.1.2 UNICEF's Assessment of Performance

##### General

1986-87 has shown an upturn in the performance of the programme. This should be seen against the disappointing performance in 1985-86, when the programme was afflicted by the problems of decentralization ref. to chapter 5.3.1 and of low government budget, ref. to chapter 5.2. Against this encouraging increase in the physical implementation of the programme components stands an apparent decline in the qualitative aspects. This decline is attributed to various factors of which the key factors are stated to be:

- Impact*
- DPHE's declining interest in and influence over upazila level implementation
  - increased local political influence which was previously to some extent counter-balanced by DPHE's role as supervisor of quality
  - the upazila engineer's unfamiliarity with and interest in the programme
  - the delays by Central Government in publishing the Annual Development Programme, transferring funds and submitting materials. These delays result in the first half of the year being largely wasted and implementation is rushed in the second half of the year.

UNICEF's and DPHE's response to these constraints have been:

- through meetings at various levels to motivate all parties concerned, ref. to chapter 5.3.1.
- to reduce the consequences of bureaucratic delays by proposing modifications, which will enable at least some work to be implemented during the first half of the financial year

- to introduce a site checking form to be completed by the Tubewell Mechanic and by the Sub Assistant Engineer during their separate visits to the sites.

### Coastal Area

The general performance in the Deep Tubewell Programme appears satisfactory and the achievements during 1968-87 demonstrates the considerable implementation capacity of DPHE.

The sinking of shallow shrouded tubewells and very shallow shrouded tubewells was implemented as a regular activity for the first time in 1986 - 87. Physical implementation is satisfactory but the long term success rate of the SSTs and VSSTs remains to be verified.

The hydrogeological mapping was not done thoroughly mainly due to lack of qualified staff, half-hearted support by territorial staff of DPHE and inadequate priority given from the top. The experience acquired is inadequate to form the basis of expansion of the mapping process to other upazilas. The mapping exercise will be repeated in one upazila during 1987 - 88.

The recruitment of the hydrogeological adviser should proceed as soon as a government request is received by Danida. Terms of Reference are appended as Annex VI.

### Low Water Table Area

The year 1986-87 was the first year of large scale implementation using the new Tara deep set handpump. The implementation progressed satisfactorily, except that some problems over distribution of materials locally delayed the implementation.

UNICEF has successfully attempted to increase the number of qualified manufacturers of Tara pumps, and six manufacturers are now pre-qualified for submitting quotations.

UNICEF is inspecting 100% of all Tara installations. The inspections indicate, that the quality of the installation is adequate, considering this is a partly new technology, which demonstrates DPHE's capacity when it is interested.

↘ The quality of the water table measurements may deteriorate as this becomes a more routine exercise in the future.

### Shallow Water Table

The random checking by UNICEF's field staff of installations sunk during 1985-86 by self-help system has revealed a number of quality aspects that need further attention. The most important of these are:

*random checking*



- 87% of the tubewells inspected were shallower than the official depth published in the Depth Book. This implies that the Depth Book figures are too high. (The Depth Book contains Union-wise figures for acceptable drilling depths. As long as the Contractors drill less than 10% more than stated in the Depth Book, this will be accepted even if drilling to these depths is unnecessary).
- 95% of the tubewells inspected were operating satisfactorily in terms of discharge and water quality
- 22% of the tubewells inspected had no platform. Of the platforms constructed the quality was good in about 90% of the cases.

The checking of the 1986-87 installations has not yet been reported, but early reports received suggest some deterioration in the quality of site selection.

#### Areas with Drilling problems

UNICEF has not assessed the performance in these areas.

#### 4.1.3 The Mission's Assessment of Performance

In general the mission has taken note of UNICEF's assessment of the performance during 1986-87 and can basically agree in UNICEF's and DPHE's response to the constraints. The mission recognizes the considerable achievements by DPHE in the coastal belt and in the low water table area, and feels that given the necessary support DPHE will be able to manage an increased level of activity within these two very vital areas. This assumption is supported by the fact, that transfer of some technically less complicated components of the programme to the Upazila Engineer has enabled DPHE to concentrate its effort and technical capability on the more complicated coastal belt and the low water table area.

#### General

- UNICEF's and DPHE's attempts to solve some of the organizational problems through informative meetings at various levels should be strengthened and the meetings should be repeated at regular intervals.
- immediate steps must be taken to alleviate the procedural bottlenecks that hamper the project implementation during the initial stages of the financial years.
- the guidelines for supervision of the DPHE staff at Upazila level (Sub Assistant Engineer and Tubewell Mechanics) must be made clear and operational.
- the UNICEF field staff is supposed to check 3% of all sites selected and new installations, but in 1986 - 87 only 2% was checked. It would be desirable if the following minimum targets could be achieved:

- . 3% of the installations are checked in upazilas, where the previous year's checking has not revealed special quality problems
- . 5% of the installations are checked in upazilas where the previous year's checking has revealed special quality problems.

### Coastal Area

The hydrogeological mapping of the coastal belt is a crucial activity, that should be promoted substantially. Such a mapping is a precondition for systematic selection of the most suitable water supply technology, especially in delineating the areas, where shallow shrouded tubewells (SST) and very shallow shrouded tubewells (VSST) are feasible. As the cost of a deep tubewell is at least 10 times higher than the cost of SST/VSSSTs, this mapping is expected to lead to considerable cost savings through increased application of the latter tubewells. On this background it is disappointing that the hydrogeological mapping has only been conducted in parts of one upazila during the last 2½ years. The mapping must immediately be given a much higher priority. The mapping technique should be reviewed in order to assess, whether the optimal balance has been stricken between:

- study of existing maps etc.
- collection and analysis of existing data
- geophysical investigations.

The sanctioning and the filling in of the hydrogeological DPHE posts mentioned in the Project Proforma for the coastal belt must proceed without delay.

The GOB clearance of the hydrogeological adviser proposed by Danida has been given, so the recruitment process can be initiated by Danida. However, a realistic assessment is that the hydrogeological adviser will not be in position before the end of 1988, which will have a detrimental effect on the coastal belt mapping and the drilling programme. It should be considered to fill in the gap by employing a short term adviser for approx. 4 months during 1988.

The drilling procedures and the tubewell design in the coastal area have been developed by experience and are considered as satisfactory by UNICEF and DPHE. The success rate of the deep tubewell programme as well as the procedures and design applied have, however, apparently never been reviewed systematically. In other areas in the region with very similar hydrogeological conditions, distinctly different procedures and design are applied such as e.g. geophysical borehole logging, use of bentonite drilling mud and saline sealing. These methods increase the cost of a tubewell but are presumed to increase the success rate and the lifetime of the tubewells. In order to ensure the most cost efficient solution, it is recommended to carry out a Danida-review of the drilling methods and the tubewell design applied together with an assessment of the short term as well as the long term success rate of the drilling programme.

### Low Water Table Area

The mission fully supports UNICEF/DPHE's extra attention paid to the introduction of the Tara pump in order to ensure a successful start of this crucial programme. This extra attention includes special training programmes, intensified supervision, UNICEF control of all installations and implementation of the programme through contractors.

The Depth Book's indications of drilling depth should be reduced in accordance with available data in order to avoid unnecessary drilling depth. Such a revision is anticipated to result in a substantial cost saving.

↘ The annual monitoring of the ground water level should be continued and the quality of the collected data must be maintained.

When the 1986-87 data are available, it should be investigated whether the present practice of monitoring 2 tubewells per Union is adequate. The reason for this is that some of the monitored tubewells may be affected by very adjacent irrigation tubewells to such an extent, that the data may not be applicable for a general assessment of the water table conditions.

### Shallow Water Table Area

It is noted with satisfaction that the newly introduced self-help system in general is seen to work satisfactorily, and that it has led to a reduction in the total installation cost.

It is encouraging, that some upazila administrations are willing to allocate parts of their block grant to water supply installations. However, the practice to give these installations free of charge to individuals/groups should be discouraged, as such a practice unavoidably will lead to confusion among the beneficiaries that otherwise have to pay a part of the total cost themselves.

### Areas with Drilling Problems

The areas with drilling problems can be subdivided into:

- areas with stoney layers in parts of Northern Bangladesh
- Chittagong Hill Track

In Northern Bangladesh the drilling is done by the sludging method, that has been found inadequate in penetrating stoney layers. The water jet drilling method that has a considerably higher penetration capacity has apparently not been tried. Light mechanized drilling rigs are not used.

In the Chittagong Hill Tracts, where rock is often prevailing, a wide range of supply techniques as e.g. spring development, sanitary dug wells and tubewells drilled by rig must be applied. The lack of information from this area makes it difficult to comment on the appropriateness of the techniques applied.

Approx. 5 million people are reportedly affected by the above problems. The coverage is not known but it is anticipated to be considerably below the national average.

#### 4.2 Rural Sanitation

##### 4.2.1 Target Achievements

The physical achievements of the village sanitation programme improved substantially during 1986-87 as compared with the poor performance during the fiscal year 1985-86. This was among other things due to increased GOB budget. However, achievements fell 14% below the target. As indicated below the programme is yet to reach its pre 1985-86 capacity (1984-85).

##### Rural Sanitation: Physical Achievements During the Period 1980/81 to 1986/87:

<u>Year</u>	<u>Achievement (latrine units produced)</u>
1980/81	36,000
1982/83	53,000
1984/85	89,000
1985/86	20,550
1986/87	64,335

In UNICEF's Annual Review it is reported that during 1986/87 26 new VSCs were constructed and 43 repaired, against targets of 62 and 102 respectively.

##### 4.2.2 Assessment of Performance

The rural sanitation programme basically consists of providing subsidized waterseal latrines produced at village sanitation centers. Until recently, each latrine consisted of 1 slab and 5 rings produced from ferrocement. The government subsidizes the slab and one ring which are sold at approx. 50% of production cost while the next 4 rings are sold at the market price.

In 1986/87 sale of only one slab and one ring was introduced but with limited success, primarily due to limited promotion. Initially, the public was not aware of this option, which

has not been extensively promoted by DPHE. But there are indications that this option is becoming increasingly popular.

According to UNICEF the sanitation programme has so far been successful in terms of water seal latrines produced and sold. A high demand for latrines has been generated to the extent that a permanent situation of inadequate supply exists. In some places private manufacturers have emerged and are observed to cater for the demand at unsubsidized rates at periods when the VSCs are out of production. However, private manufacturers are not able to compete with the heavily subsidized rates of the VSCs. In order to encourage the private sector UNICEF proposes to gradually withdraw the subsidy on government produced latrines.

The proceeds from the sale of latrines have so far been considered as government revenue. During 1987-88 the principle of recycling the revenue from the sale of latrines within the upazila Upazila will be introduced thus making latrine production self sustaining with respect to local production costs and independent of the government's annual budget. Through the establishment of a revolving fund it is envisaged that production will increase up to the limits set by UNICEF's supply of cement and other materials. To start this system UNICEF will provide initial working capital to the upazilas to cover local production costs. Subsequently the scheme is expected to be self-financing on a cost recovery basis. Detailed guidelines on how to operate the revolving fund is yet to be worked out by UNICEF/DPHE. It is unlikely that the system will be in full operation before the fiscal year 1988/89.

There are 460 VSCs at present. It is planned to increase this to 920 by establishing 2 VSCs per Upazila). The estimated production in 1987/88 corresponds to one latrine unit per VSC per day. The present production capacity is highly underutilized. UNICEF estimates that the VSCs may be able to double production at the existing centres if more materials are supplied and a recurrent financing of production is established.

*impart*

The mission finds that the overall achievements of the sanitation programme in terms of physical achievements may indeed be labelled successful, although there are indications of considerable variation in performance between the VSCs. The immediate effects of the programme with respect to e.g. quality of construction, use, maintenance and duration of the latrines are not documented sufficiently.

*monitor*

A recent WHO evaluation shows that about 70% of latrines are being used properly. While this information may give some indication of programme effects, the mission finds that there is a need for closer programme monitoring and follow-up by DPHE/UNICEF. There will be a particular need to monitor

latrines with pits constructed with only one cement ring (combined with local materials) and simple pit latrines built from locally available materials. Experience gained through such monitoring exercise will hopefully be transformed into better motivation and guidance of villagers, e.g. in cheap and acceptable design solutions.

In terms of sanitation coverage and subsequent health impact the mission agrees with UNICEF that the water seal latrine programme alone will be insufficient. The time horizon for full coverage of water seal latrines is nowhere in sight, partly due to insufficient production capacity at the VSCs and partly due to the poverty situation, which, according to UNICEF makes it impossible for up to 50% of the rural population to purchase water-seal latrines. As a solution UNICEF has followed the recommendations of the 1986 Danida review mission and proposes the promotion of simple pit latrines built from locally available materials and at very little cost. Such solutions are not unknown to villagers. But the mission observes that with the present low level of motivation the target groups' priority for realizing these solutions is very low.

IA

The mission finds that some achievements may be made through reinforced motivation and media campaigns. But the real break through in the adoption of sanitary/hygienic excreta disposal is likely to be achieved only through the Integrated Approach in which a very high priority is given to health promotion as well as acceptable latrine technologies.

Monitoring & evaluation

At the policy level UNICEF puts emphasis on the promotion of very cheap locally made latrines. But apart from printed instruction messages on pamphlets distributed by the DPHE/UNICEF little is being done to implement this policy outside the IA upazilas. In these these two upazilas low cost demonstration latrines have been constructed at the VSCs and UNICEF staff as well as SAEs and TWMs are active in directly motivating tubewell applicant groups to construct low cost latrines. Results from these efforts are yet to be evaluated.

#### 4.3. The Integrated Approach

##### Target and achievements

Implementation of the Integrated Approach (IA) in two upazilas near Chittagong officially started in December, 1986. The programme operates with the usual tubewell construction targets fixed by the ADP allocation. As a major element of the IA, tubewells are only allocated to applicant groups if at least five families construct any type of hygienic latrine in their homestead. This precondition has

resulted in a delay of the tubewell programme (only 1/3 of the ADP target was achieved during the fiscal year 1986/87). There are a number of reasons for the delay. Firstly, the IA as a new strategy started late, everyone was unfamiliar with the IA and procedures took a long time to complete. Secondly, because tubewell applicants have not been willing to construct low cost latrines, and thirdly, because of the VSCs inability to produce enough water seal latrines as per the demand. By December 1987 a total of 22 tubewells have been installed in one of the upazilas since the inception of the IA. In the majority of cases 5 latrines have been constructed in each applicant group. Other activities of the IA are being developed as the strategy and framework of the IA is being implemented. These activities include:

- production of information and communication material on the IA,
- conducting orientation and briefing meetings at Union and Upazila level for different categories of personnel directly or indirectly involved in the programme,
- developing training curricula for TWMs and HAs and conducting training for TWMs,
- constructing demonstration low cost latrines.

#### Assessment of performance

Danida agrees with UNICEF's own assessment of the encouraging results in the initial establishment and development of the IA. The difficulties encountered at this early stage are not surprising considering the novelty of the approach. The suggested response to this would be to strengthen support and if found necessary increase manpower resources, at least temporarily.

The poor progress on physical implementation is explained by e.g. insufficient time and manpower to ensure adequate training of DPHE field staff (TWM). A lot of energy and resources from the UNICEF zonal office has also been used in informing and sensitizing local government and elected officials within the upazilas about the IA.

The mission notes that the framework for implementation of the IA as formulated in previous UNICEF and Danida documents is in principle being followed by DPHE/UNICEF. Some of the proposed activities like health promotion of HAs from MOHPC, recruitment and training of male and female TWM/PHPs and the development of a monitoring-cum-process evaluation system have not yet been implemented in the first year of the IA, but are planned to be incorporated in the second year.

During the mission's field visits to the IA upazilas it was observed that a major cause for delay in the tubewell programme was the inability of the VSCs in supplying the sufficient number of water seal latrines according to the demand.

The staff of the UNICEF zonal office in charge of the IA reports abouts difficulties in motivating people to construct cheap latrines made from local materials. Since the news about the subsidized and widely accepted water-seal latrine are well circulated, villagers have developed a demand for this technology - irrespective of their capability to pay for the latrine. DPHE/UNICEF therefore faces the situation of having to motivate members of tubewell applicant groups to construct the very low cost latrines rather than the waterseal type, either because the VSC cannot supply one ore they cannot actually afford one.

So far acceptance of latrines appears to be very much related to the compulsion to construct at least 5 latrines before a tubewell applicant group receives a tubewell. The fact that normally only the required 5 latrines - and not 6,7 or 8 - are being constructed within an applicant group speaks in favour of this observation.

The mission finds that the short supply of water seal latrines from the VSCs is a serious problem of the IA which has been the major constraint in the development of the IA. It can only be solved by increasing the production capacity of the VSCs to be able to satisfy the demand for water-seal latrines generated by the inbuilt mechanisms of the IA. If this situation cannot be improved the motivational efforts by the DPHE/UNICEF staff may carry only limited results. Health and hygiene education still needs to be introduced as a component in the IA along with water supply and sanitation.

Progress has been made on the formulation of health and hygiene messages which have been printed on tubewell application forms and information pamphlets. Health education is incorporated in the training curricula for the TWMs and caretakers. The next task will be to ensure that the information contained is effectively communicated to the target group. One of the ways to achieve this is to thoroughly train the TWMs as Public Health Promoters (PHP). Another is to train and involve the Health Assistants (HA) of the MOHFP.

#### 4.4 Training and Orientation

##### Targets and Achievements

The training activities undertaken during 1986/87 have concentrated on caretakers, TWMs, DPHE implementing staff and upazila-level officials.

How is  
promotion  
done?





A new system of caretaker training introducing the concept of the caretaker family (typically husband and wife) came into effect during 1986/87. The target is to train one caretaker family per tubewell selected by the tubewell applicant group.

The achievements in caretaker training during 1986/87 were far better than during the previous fiscal year when only 523 caretakers were trained as against more than 25,000 tubewells installed. UNICEF ascribes the poor performance during 1985/86 to late release of funds, inavailability of tools and the general instability in the DPHE staff position caused by the decentralization.

Although improvements have taken place during 1986/87 the previous years' backlog is carried over. The following table shows the physical achievements for 1986/87 against the targets set in the government's ADP:

Physical achievements 1986/87, caretaker training:

<u>Handpump type</u>	<u>ADP target</u>	<u>Achievement</u>
No. 6	54,400 x)	15,856 xx)
TARA	2,000	?

x) This figure to some extent includes the 1985/86 backlog.

xx) Reports available only from 10 out of 22 DPHE Divisions. The total achievement is estimated to be approximately 30,000.

Due to the fund disbursement and decentralization problems mentioned above a similar backlog in the training of TWMs is observed. During 1985/86 and 1986/87 225 and 871 TWMs were trained. In the IA upazilas a new training curriculum has been developed for the training of TWMs. The curriculum emphasizes the health promotion aspects of the TWMs work tasks.

As a means to combat some of the problems of supervision and collaboration at the upazila level caused by the decentralization policy UNICEF took the initiative of arranging senior level orientation meetings in DPHE and local level orientation meetings of upazila officials in order to define the "new" role of DPHE, particularly within the field of supervision at the upazila-level.

In October 1986 and January 1987 such meetings were held in Dhaka to define the new supervision requirements. The one-day briefing given to DPHE and other officials at the upazila level was held at the district level, organized by the UNICEF Zonal Offices, who also acted as resource persons. The briefings were well attended by SAEs, SDEs and Upazila Engineers whereas Upazila Chairmen showed less interest as can be seen from the table below:

Participation in Upazila Briefings Held During 1986/87  
(Total No. of Upazilas: 465)

<u>Participants category</u>	<u>No. of participants</u>
SAEs	400
SDEs	60
Upazila Engineers	300
Upazila Chairmen	149

Assessment of Performance

*monitoring* → It is UNICEF's view that the development of the family caretaker training system depends on close supervision by SAEs and TWMs. Supervision has reportedly declined with the result that the second part of the family caretaker training after tubewell installation does not take place as per schedule. Reports on attendance in the first part of the training (at the time of collection of materials for the tubewell) indicates that women do not usually show up. The attraction to "bring along" women is apparently more related to the additional daily allowance than to motivation to become a caretaker. In general UNICEF puts a big question mark to the present quality and effectiveness of training of the caretaker families.

*very little* → UNICEF voices concern as to the qualifications and willingness of many, especially older generation TWMs to adapt to the requirements involved in becoming PHPs. This problem can only be solved in time and through ensuring that new recruits are suited for the PHP work.

According to UNICEF's own findings the briefing of upazila-level officials has resulted in a significant improvement in the understanding of the programme by Upazila Chairmen and Upazila Engineers, who were previously largely ignorant about most issues related to the programme. The mission, however observes from field visits and discussions that there still is a long way to go before good collaboration between DPHE officials and other upazila officials is established.

The mission agrees with UNICEF's overall assessment of the performance of training activities. However, as compared to other well defined programme components with clearly set targets, training activities are rather elusive in character, some of them suffering from a tendency towards ad hoc implementation being given less priority. Monitoring and documentation of training activities is very weak resulting in inadequate information about actual performance, quality, and impact.

HAs have not yet been trained properly in connection with the IA. HAs from one upazila have participated in a 1/2 day information meeting. During the mission's visit another

meeting was being arranged, but UNICEF appears to have mixed opinions on the prospects of motivating HAs to become active contributors to the promotion of health/hygiene and sanitation within the IA. In the view of the mission it is essential to work hard for their incorporation in the IA. Otherwise the IA may end up being confined to the construction of a fixed number of latrines in return of a tubewell - or the other way around, depending on one's position in this "relation of reciprocity".

#### 4.5. Maintenance

##### Findings

Two sets of persons perform handpump maintenance, the tubewell mechanic (TWM) and the pump caretaker. Each pump has its caretaker and each upazila has an allocation of four TWMs. TWMs are responsible for routine maintenance and repairs while the caretaker's task is supposed to be limited to minor repairs and reporting to the TWM when breakdowns occur. In reality, however, the maintenance burden is increasingly borne by the caretakers.

So far spare parts have been provided from the DPHE stores to the TWM free of charge. The system's weakness has been a high ratio of repairs and high turnover of spare parts. Although being supplied free of cost the beneficiaries rarely receive spare parts without payment. The circumstance that spare parts are widely circulated in local bazars also reflects the "leakage" in the system which adds to the overall expenditures for maintenance. In spite of this the average cost of spare parts has been calculated to amount to less than one Taka per user per year.

During the last two years UNICEF's supply of spare parts has been discontinued awaiting a government decision on the selling of spare parts. In the meantime the ministry and upazilas have been spending their own resources for the procurement of spares for the No. 6 handpumps. During this period the private sector has also been observed to be manufacturing some of the most rapidly wearing spare parts for sale on the open market.

The above spare parts supply situation has not, apparently, influenced negatively on the quality of maintenance and subsequent functioning of handpumps. According to UNICEF's inspection of handpumps installed in 1985-86 95% of the handpumps were operating satisfactorily. This figure is higher than the normal average of 80-85% of all public tubewells being in operation at any time. Approximately 5-7% of handpumps are out of order at any time due to failure of the pump mechanicsm.

During the mission's stay in Bangladesh the government announced the introduction of a spare parts selling system. This means that DOHE/UNICEF can go ahead with the establishment of a spare parts selling system as envisaged in the plan of operation for the five year period July 1988 - June 1993. Spares for the Tara pumps will, however, at present be supplied free of charge by UNICEF.

Caretaker training is lagging behind handpump installation. A caretaker family concept, when the caretaker's wife is given some health education, has been introduced. Aspects of maintenance related training have been dealt with in section 4.4.

#### Assessment

Based on the assessment of performance of the caretaker training system in section 4.4. it can be concluded that an early alleviation of the backlog in caretakers training will improve the quality of maintenance and repairs to be carried out. Likewise, the further introduction of the important family caretaker concept must be given the necessary support, in particular with respect to the practical role of women in handpump maintenance. It is important to identify and allocate specific maintenance responsibilities to women to make sure that the family caretaker system becomes a qualitative innovation compared to the previous caretaker system.

The implementation of the new spare parts selling arrangement incl. the establishment of revolving funds, needs to be given strong support and supervision initially in order to ensure that the beneficiaries receive spare parts timely and at approved rates.

For both of the above activities it is important to closely monitor the development.

#### 4.6. Rehabilitation of Wells

##### 4.6.1 General

The main activities under the tubewell rehabilitation programme are:

- desanding of choked tubewells
- redevelopment of clogged strainers in deep tubewells
- resinking of tubewells, that cannot be desanded or redeveloped
- rehabilitation of platforms including construction of platforms on tubewells without a platform

The following table shows the physical achievements for 1986-87 against the target set for the year in the Government's Annual Development Plan (ADP):

Physical Achievement 1986-87

	<u>ADP</u> <u>Target</u>	<u>Achieve-</u> <u>ment</u>	<u>%</u>	<u>1985-86</u> <u>Achievement</u>
Desanding	10,000	670	7	0
Redevelopment, DT	0	0	-	0
Resinking	20,000	11,645	58	9,051
Platform	-	-	-	-

The rehabilitation programme is implemented under the upazila administration on self-help basis.

4.6.2 UNICEF's Assessment of Performance

It is assumed that 2.5% of the approximately 600,000 operating public tubewells choke up each year. Though improvement has been observed, the achievement is still lagging behind the estimated 15,000 a year necessary to keep up with the annual rate of choking. There are five main reasons for this:

- lack of public awareness
- no one is specifically responsible for tubewells located at public places like markets etc.
- from the beneficiaries' point of view it is cheaper to sink a new tubewell than to withdraw and resink the old pipes
- desanding equipment supplied by UNICEF was not always distributed to upazila level by DPHE
- local DPHE staff pays little attention to the programme.

A campaign has been launched in 1986-87 to encourage DPHE field staff to promote resinking and desanding of tubewells and a leaflet has been prepared for distribution at upazila level.

Desanding costs only 40 Taka and is successful in about 25% of the choked tubewells. Under new guidelines a choked tubewell may only be resunk after an attempt to desand it has been made.

#### 4.6.3 The Mission's Assessment of Performance

The mission finds that rehabilitation of existing installations is a very viable component in the programme and should be given the necessary priority. In general this has been reflected in the programme and especially the promotion of desanding procedures reflects this high priority.

No records of handpumps without platforms are available, but a previous Danida Review Mission stated in 1986 that approximately 50% of all handpumps were without platforms. UNICEF implies that, though widespread, the problem may not be that extensive.

Attempts to rehabilitate platforms have previously been conducted on a trial basis; but with modest success. As per verbal information from UNICEF this is primarily due to inadequate promotion among the beneficiaries by the DPHE field staff which resulted in a modest interest in rehabilitating the platforms. Furthermore, the wide range of applicability of cement for other purposes necessitate a relative high degree of follow up on the platform construction which in a situation with limited manpower resources may tend to downgrade this activity.

In 1986 UNICEF conducted an assessment of average period elapsed between sinking and choking of tubewells. The assessment comprised 930 cases of choked tubewells with proper records of sinking and development. The study comprised old GI tubewells with brass strainers and new PVC tubewells with PVC strainers and contains valuable statistical data. However, the study does not inform about the number of unchoked tubewells within the investigated area which make a conclusive interpretation of tubewell lifetime aspects rather uncertain. It is therefore recommended that the study is updated and the data are reinterpreted accordingly.

#### 4.7 Logistics

The material distribution system seems in general to function satisfactorily, except that distribution of materials in the beginning of the financial year poses some problems for a smooth implementation. UNICEF reports that there have been several indications, that the DPHE's fleet of vehicles is falling into increasing disrepair. The progress of rehabilitating DPHE's trucks has been slow.

#### 4.8 Research and Development

A keypoint in the Bridging Operation was to initiate various research and development activities simultaneously with the ongoing regular implementation. After proper testing of new components and concepts these are, whenever successful, introduced in a phased manner into the implementation programme. This approach has so far been implemented as scheduled and with encouraging results:

The integrated approach, linkage of water supply, sanitation and health promotion, is being tested in two upazilas near Chittagong as described in chapter 4.3.

The Tara pump testing programme has concentrated on three main topics:

- continuation of the monitoring and evaluation of the pumps installed under the test programme
- promotion of pump production
- monitoring of pumps installed under the regular implementation

Approx. 120 pumps have now been working for 3 years in a test area at Mirzapur. The performance of the pumps is monitored every 2 weeks by performing a pump test and a discharge test. Whenever a pump can not pass one of these tests, it is dismantled, and the cause for failure is identified and the necessary corrective steps are taken.

An evaluation of the monitoring results reveals virtually no decline in the pump performance during the last 2 years in terms of average number of parts replaced, average cost of parts replaced and average active repair time. The monitoring is envisaged to continue to late 1988. Minor modifications are being tested but most of these were not found feasible, which may imply that the pump is near its final shape. The acceptability of the Tara has been monitored by UNICEF who reports no negative response from the users at a time where more than 300.000 people get their water through this type of pump. The demand for Tara pumps is increasing and the impression gained during field observations by UNICEF staff is that the Tara is an extremely popular pump. These observations are supported by the fact, that the manufacturer has sold at least 1000 Tara pumps within the last year to private users. The mission has no reasons to doubt these observations, but adds:

- the water table in Mirzapur, where the intensive testing has been conducted, is 0 - 9 m below ground level. The pumps are designed for 7 - 15 m lift, which means, that the pumps in Mirzapur are easier to operate than in normal low water table areas.
- the pumps installed under regular implementation are installed in heavily under-served areas where virtually any type of pump will be accepted.

The promotion of pump production has concentrated on quality control aspects. A production manual has been developed, and potential manufacturers have been given assistance and guidance with the objective of achieving the required quality. Based on evaluation of sample orders from various manufacturers, six manufacturers have been prequalified for future delivery of Tara pumps. Of the 1644 Tara pumps installed in the low water table area during 1986-87 265 pumps will be monitored every second month for at least a 2 years period. The monitoring is done by a NGO on contract basis.

Selection or development of a very deepset handpump suitable for areas with a water table below 15 m below ground has at present been given a low priority.

The development of proper iron removal plants (IRPs) and pond sand filters (PSFs) has reached a stage, where the plants are ready for inclusion in the regular implementation programme. The old designs have been improved resulting in longer filter runs and easier backwashing. An important feature in the development work was the degree of community involvement, which in the opinion of UNICEF is the main reason for the significant progress achieved in 1986-87. Another reason is that two expatriate volunteers have been assigned exclusively for this task, which has ensured the necessary continuity in the testing, not the least in the field. DPHE/UNICEF recommend the testing to be followed up in two ways:

- 60 IRPs and 40 PSFs will be constructed under the regular programme as a training and promotion activity,
- the testing will be continued in order to improve the plant performance and achieve cost savings.

Attempts to manufacture locally a drill bit for cutting in stoney layers have failed. Experiences from similar areas outside Bangladesh are called for.

The development of shallow shrouded tubewells and very shallow shrouded tubewells has been completed and introduced in the regular programme as described in chapter 4.1.

An analysis of the choking of 930 tubewells has been conducted. The survey indicates a drastic reduction of average periods elapsed between sinking and choking of PVC tubewells compared to the older design of G.I. pipes with brass strainers. As the majority of the recently installed and all the future tubewells are PVC tubewells, UNICEF correctly feels the matter calls for urgent attention. However the survey does not include unchoked tubewells, and as the number of unchoked PVC tubewells is anticipated to be substantially higher compared to G.I./brass tubewells, the conclusion is somewhat doubtful. However the mission agrees that an analysis of the choking problems (based on a survey of all tubewells within an area) can contribute to improvements of tubewell design and implementation practice, and should be conducted.

Desanding procedures have been field tested and is being introduced. The desanding is successful in 25% of the choked tubewells. The low cost of desanding, 40 Taka, makes this procedure feasible even with the reported success rate.



#### 4.9 Health and Hygiene Education

##### Targets and Achievements

There are no separate targets set for health and hygiene education. Printed health messages appear on tubewell application forms, on a number of information pamphlets and on posters aimed at the general public. During periods of diarrhoeal disease epidemics health and hygiene education materials are distributed through the government health system and to primary schools. Within the DPHE/UNICEF programme health and hygiene education is one of the communication components within health promotion.

Health education is an important ingredient in the training curriculum for caretaker families, where it is hoped that women will pass on health messages and demonstrate improved environmental sanitation to neighbouring women. TWMs in the IA upazilas are also given health education and are expected to act as Public Health Promoters (PHP) within the villages under their jurisdiction.

UNICEF has plans to develop a mass media (radio) campaign to promote awareness of healthy water use, sanitation and hygiene practices. This has not yet been accomplished.

##### Assessment of Performance

At the policy level UNICEF strongly emphasizes the need to incorporate health and hygiene education as a vital component within the health promotion strategy, without which the general programme will not have a health impact. However, this policy emphasis is not yet transformed into widespread activities in the programme.

UNICEF focuses on the production and distribution of different printed communication materials. Previously less attention was paid to interpersonal health communication. However, the new role of the TWM as PHP and the priority given to health promotion in the training of caretaker families signals a shift in priority. But as with other dissemination channels for health education little documentation exists about how health messages are actually being communicated by the TWM and caretakers. It appears that the TWMs are yet to attain the envisaged role and status as PHPs. As hinted by UNICEF, constraints like lack of credibility in the village community and lack of educational qualifications may constrain the health promotion activities of the TWM/PHD.

MOHFP is a member of the Upazila Water Supply Sanitation Committee but otherwise there is no contact at present between DPHE and the upazila-level officials of MOHFP in the IA upazilas. HAS from MOHFP and DPHE Health Educators have not yet been involved in the programme, but it is planned to involve the HAS in the IA upazilas.

The NGO working in the two IA upazilas have demonstrated very promising results in health and hygiene education, primarily through interpersonal communication facilitated by an already established dialogue with villagers on various development issues. By relating improved hygiene and sanitation to a reduction in people's medical expenditures the NGO has created an entry point for further dissemination of health promotion activities.

## 5. Project Analysis

### 5.1. Project Impact

Despite the impressive improvement in coverage particularly with clean water sources UNICEF reported there has been no measurable decline in waterborne diseases.

Recent studies suggest three main reasons for the lack of health impact. First, although most people use tubewell water, they only use it for 25% of their needs and continue to use traditional polluted sources for the remaining 75%; secondly, the practice of sanitary excreta disposal is still very low (2-4%); thirdly, there has been very little improvement in personal hygiene practices. It is now understood that 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. Studies have shown that the most significant practices relating to diarrhoeal diseases in children are indiscriminate defecation by young children around the bari in which they play and the handwashing practices of the mother particularly before food preparation and serving.

These observations call for an intensifying of efforts to improve the utilization of existing clean water sources and for intensifying of health and hygiene information and education.

### 5.2. Economic Issues

Government allocations to rural water and sanitation have been reduced drastically over the past few years. For the second five year plan period (1980-85) the water and sanitation sector was allocated 2,1% of governmentspending. For the third five year plan (1985-90) the sector allocation has been reduced to 1,2%. During 1980-85 the urban : rural ratio was 64% : 36%. In 1985-90 the ratio is 74% : 26%.

The real decline in budget allocation as well as change in rural/urban distribution reflects a shift in priorities which may be attributed to the fact that rural Bangladesh is comparatively well covered with clean water sources. In 1971 rural Bangladesh had including private wells one well per 215 persons, in 1985 there was one well per 70. Excluding private wells there was in 1985 one public well per 134 persons. However this nationwide coverage conceals a wide difference in coverage - from 100 per shallow well to 1238 per deepset well. During 1971 to 1985 there has been an increase in proportion of private wells from 32% to 47%.

Although budget allocations for 1987/88 for deepset wells have increased, allocations for coastal wells and particularly sanitation have decreased while allocations for

shallow wells have increased slightly. The decline in sanitation allocations may partly be offset by the new policy of revenue recycling (see para 5.6).

Table 5.2.1

Government Budget Allocation for Rural Water Supply and Sanitation Projects

	1985-86		1986-87		1987-88	
	1000 Taka	%	1000 Taka	%	1000 Taka	%
Shallow wells	11,500	43	32,800	38	27,000	40
Coastal wells	5,000	19	15,500	18	10,500	15
Deepset wells	2,000	7	4,500	5	9,000	13
Resinking	1,500	5	7,200	8	5,000	8
Sanitation	7,000	26	26,500	31	17,500	24
	27,000	100	86,500	100	69,000	100

It is discouraging to note that the positive development from 85-86 to 86-87 has been reversed in 87-88.

The mission strongly recommends that all efforts are made to reallocate funds from shallow wells to coastal and particularly deepset wells and village sanitation as expressed in the 5 year programme.

5.3 Organizational Issues

5.3.1. Executing Government Agencies

In August 1985, as part of the general decentralization, responsibility for the installation of shallow tube wells was transferred from DPHE to the upazila administration. The DPHE Sub Assistant Engineer who had previously reported to DPHE only, was now reporting to the LGEB Upazila Engineer on shallow tube wells and to DPHE subdivisional Engineer on all other programme activities. As of FY 1987/88 also the responsibility for production of materials for sanitary latrines is transferred to the Upazila Engineer. This "dual boss" system combined with shifting responsibilities for payment of salary and allowance to the SAE have caused considerable problems for programme implementation particularly in qualitative terms. Apart from the immediate problems at upazila level inter-departmental conflicts between DPHE and LGEB have caused some problems.

It is almost inevitable that such a large scale restructuring towards decentralization causes upheavals within the organizations concerned. It appears that the waves are subsiding, partly as a natural organisational adjustment process partly due to UNICEF intervention at upazila level through joint briefings of Upazila Chairmen, Upazila Engineers and DPHE SAEs.

*man & eval.*

Even though the need for further joint briefings may be subsiding they should be held annually in order to keep the officers informed of new programme initiatives and developments and as a forum for solving problems.

### 5.3.2 UNICEF

In UNICEF responsibility for programme implementation rests with the Water and Environmental Section. Field monitoring is performed by UNICEF zonal officers through 16 Field Assistants. Although the Field Assistants primarily are occupied with water and sanitation programmes their responsibilities include other programmes. By necessity their function vis-a-vis the water and sanitation programme is mainly monitoring and less interactive. As the programme moves more and more into software activities professional interaction with Engineer and Upazila/Purashara Water and Sanitation Committees becomes more and more necessary. UNICEF field staff should be strengthened accordingly - possibly by provision of project funded field assistants.

Until 1985 programme planning, budgetting and purchase by the UNICEF Dhaka office were causing amongst others overstocking of materials and underutilization of funds. This has improved significantly since 1985 and programme management is now efficient.

### 5.4 Balance Between Service to Well-Served and Underserved Areas

The shallow area, where sinking of shallow wells and installation of suction pumps is possible, has always been given the highest priority in the national programme as compared to the coastal belt and the low water table area. This development is primarily attributed to the relative low input in terms of funds and manpower required for implementation in the shallow area.

The regional imbalance in level of service has always been a special Danida concern:

Appraisal, 1982: There is little evidence for the need of a general increase in coverage while there is known to be needs to cover in underserved areas

Review, 1985: The shallow tubewell programme shall be given a lower poriority than hitherto

Review, 1986: The mission strongly recommends that DPHE gives higher priority than hitherto to the underserved areas.

The present service level can be reflected by the following coverage figures:

shallow area	100 user/handpump
low water table area	1,200 user/handpump
coastal belt	900 user/handpump

These figures do not take into consideration the approx. 600,000 private tubewells, so the actual coverage especially in the shallow area is higher.

For the periods 1982-85 and 1985-87 the increase in number of tubewell installations amounted to:

	<u>1982-85</u>	<u>1985-87</u>
Shallow Tubewells	21%	14%
Deepset Tubewells	18%	25%
Deep Tubewells	13%	16%

If the number of SST and VSST is added to the number of deep tubewells the 1985-87 increase would be 20%.

The trend with increasing imbalance between the well served shallow area and the underserved coastal area/low water table area has within the last years been substituted by a trend of decreasing imbalance. However this trend is not reflected in the budget allocation for 1987-88. The main reasons for this positive development are:

- the introduction of the Tara pump has enabled a substantial upgrading of the activities in the low water table area
- the introduction of SST and VSST in the coastal belt has reduced the average cost of a tubewell in this area
- UNICEF matching of GOB's expenditure on tubewell sinking in underserved areas has made activities in these areas more attractive from GOB's financial point of view

As all above mentioned factors will prevail in the coming years there is a certain likelyhood, that this development will continue, provided it is not counterbalanced by policy decisions at government level.

## 5.5 Community Participation and Women's Involvement

### Targets and Achievements

Involvement of the users/beneficiaries in the project is taking place systematically in connection with a number of key activities as per prescribed and written guidelines. These guidelines are available whether as forms (e.g.

tubewell application formats) or on printed tubewell information pamphlets. The key activities include:

- tubewell application
- site selection
- tubewell installation (the "self-help" system)
- latrine construction.

Attempts are made to reach the poorer groups better through criteria for tubewell application excluding the bigger landowners. However, there is still a tendency for tubewell applicant groups to be represented by a better off family (usually the future caretaker), which is then also influential in site selection, although officially more than one family was involved in site selection in 72% of tubewells inspected by UNICEF. According to the report from one UNICEF zonal office only 83% of the tubewell sites were correctly selected during 1986/87 as compared with 95% in the previous year.

The number of families contributing towards the cost of installation within the "self-help" system has been recorded by UNICEF as follows:

Single Family	49%
2-5 Families	11%
6-10 Families	19%
Over 10 Families	21%

*UNICEF  
administered  
handpumps*

In handpump maintenance the newly introduced family caretaker system has paved the way for the involvement of women. In the sanitation programme transportation costs of materials and all manual labour in connection with construction of latrines are contributed by the beneficiaries.

#### Assessment of Performance

UNICEF recognizes the difficulties involved in reaching the poorer groups in the villages. The introduction of new forms and guidelines should be seen as part of a package of mutually reinforcing steps to encourage better participation of the poor, thus trying to avoid the dominance of single better off families.

The role of the UWSS in ensuring distribution of tubewells to poorer beneficiary applicant groups is at times being restricted by the individual preferences of the Upazila Chairman. Likewise, tubewell application forms are primarily administered by the Union Council Chairmen which tend to limit the range of distributing forms through other channels (e.g. SAEs, TWMs) whereby applications from poorer groups may be encouraged. Distribution of forms through other channels does not appear to have been implemented.

One of the ways to assess the involvement of the community is to hold post-installation meetings in which acceptability and quality of sites and installations are evaluated by the SAE and the user group. Such meetings do not appear to take place, but there is a completion report system, and UNICEF carries out random inspections.

In spite of the above mentioned weaknesses in a community participation programme favouring the poorer sections the mission finds that user involvement is high and taking place in a satisfactory manner, in particular with regard to the "self-help" system.

When it comes to the involvement of women the performance is less encouraging when matched with the high priority given to women's issues at the policy level.

Besides being the primary drawers and users of water women are only involved in the programme to a very limited extent. Women's participation in the family caretaker training arrangements appears to be related to the daily allowances given rather than to motivation for the caretaker activities. It is usually the men who talk their wives into accompanying them during the training. But in many cases women are reported not to be turning up.

The mission would like to point out that the rather patchy involvement of women should not be surprising to anyone familiar with Bangladesh rural society. Further involvement of women is curtailed by prevailing socio-cultural norms restricting women's behaviour in public and their participation in decision making processes. The modest achievements within women's participation may also be related to a 100% male environment within DPHE (SAEs, TWMs) and within the UNICEF Zonal Offices, which is not the most conducive atmosphere for a dialogue with village women.

## 5.6 Monitoring and Evaluation

### Targets and Achievements

A system for the monitoring of physical progress of activities incl. feedback of information to project management through progress reports is developed and in operation. The system is based on the supervision and quality control provided by the DPHE territorial staff and the periodical field visits by the staff of the UNICEF Zonal Offices who checks up to 5% (in 1986/87 average was 2%) of all installations. In addition periodical reviews take place at the different implementing levels. At the apex management level biannual progress reviews are made and revised workplans prepared.



Assessment of Performance

UNICEF does not treat monitoring as a separate project component. This may be because the physical progress monitoring only requires DPHE to register and document outputs from implementation activities. However, UNICEF's own more critical checking of installations constitute a qualitative contribution to the monitoring of physical activities.

Monitoring of socio-economic and qualitative impact related aspects is less systematic and based on ad hoc observations by staff of the UNICEF Zonal Offices and field visits to the Dhaka-based staff. [ Nothing systematic is for example known by UNICEF about women's involvement, quality and effects of the family caretaker training programme, quality and use of latrines and the various mechanisms constraining the active participation of the poorer villagers. The result is limited flow of more comprehensive and qualitative information to the central management concerning important programme effects/impacts which may require policy revisions and subsequent renewed planning of field level activities.

## 6. PROJECT APPRAISAL

Chapters 6.1 - 6.5 are extracted from UNICEF Project Document. The mission's comments to various elements are given in chapter 6.6.

### 6.1. Project Description

The Rural Water Supply and Sanitation programme 1988 - 1993 Comprises 6 projects: (Project Proposal contained in Annex III).

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

The six projects constitute one balanced programme to be implemented simultaneously and integrated.

UNICEF will provide an estimated US\$ 29,482,000 from supplementary funds for the Water and Environmental Sanitation programme in the July 1988 to June 1993 period. In addition it will provide an estimated US\$ 1,300,000 from general resources for the same period.

All six projects will be implemented by the Department of Public Health Engineering under the Sponsorship of the Ministry of Local Government, Rural Development, and Cooperatives.

The Government of Bangladesh will contribute TAKA 300 mill. (opp. US\$ 10 mill.) Beneficiary contribution is estimated at TAKA 767 mill. (US\$ 25 mill.).

### 6.2 Project Objectives

The general objectives of this water supply and environmental sanitation programme are:

1. To reduce the incidence of diarrhoeal diseases and parasitic infections particularly in children by providing clean water facilities integrated with improved sanitation and promotion of personal hygiene.

2. To strengthen the national capacity to provide water supply 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 under-served coastal and low water table areas.

### 6.3 Target Group

The target group comprises app. 40 mill. people distributed among the subproject as follows:

Project Name	No. of beneficiaries (millions)	Coverage (Per - sons per operating tubewell)	
		1985	1993
1. RURAL WATER SUPPLY AND SANITATION IN COASTAL BELT	5,0	880	350
2. RURAL WATER SUPPLY AND SANITATION IN LOW WATER TABLE AREA	12,1	1240	225
3. RURAL WATER SUPPLY AND SANITATION IN SHALLOW WATER TABLE AREA	7,5	100	70
4. RURAL WATER SUPPLY MAINTENANCE REHABILITATION AND UPGRADING	9,2	-	-
5. VILLAGE SANITATION	3,7	2-3%	5-6% water seal 5-6% hygienic 10-12% of rural populatio
6. WATER SUPPLY AND SANITATION IN URBAN SLUMS AND FRIENGES	1,6	?	?
TOTAL	39,15	143 2-3%	120 10-12% water sanitatio

#### 6.4. Project Output

The overall physical output of the project is shown below. Details for each project are contained in Annex III.

<u>Project Name</u>	<u>No. of Water Systems</u>	<u>No. of Latrines</u>
1. RURAL WATER SUPPLY AND SANITATION IN COASTAL BELT	20,000	100,000 <sup>1)</sup>
2. RURAL WATER SUPPLY AND SANITATION IN LOW WATER TABLE AREA	60,500	302,500 <sup>1)</sup>
3. RURAL WATER SUPPLY AND SANITATION IN SHALLOW WATER TABLE AREA	75,000	375,000 <sup>1)</sup>
4. RURAL WATER SUPPLY MAINTENANCE REHABILITATION AND UPGRADING	85,535	-
5. VILLAGE SANITATION (WATER SEAL LATRINES)	-	625,000
6. WATER SUPPLY AND SANITATION IN URBAN SLUMS AND FRINGES	14,175	46,000 <sup>1)</sup>
TOTAL	255,210	1,448,500

1) Low coast hygienic pit latrines

#### 6.5 Programme Strategy

Based on an analysis of the situation, and successive discussions between UNICEF and Government the programme will focus on two main issues:

1. Achieving Health Impact
2. Giving Priority to Underserved Areas

Achieving Health Impact: To maximize the health impact, tubewell installations will gradually adopt an integrated approach, combining improved water supply, sanitation and hygienic practices in the same beneficiary group. The programme will further improve beneficiary participation, develop a major communications component, take special measures to reach and involve women more fully and develop interlinkages with other UNICEF-assisted programmes.

The Integrated Approach: It is recognized that the minimum conditions necessary to achieve health impact are:

1. Maximum use of tubewell water by all beneficiaries.
2. Maximum practice of hygienic excreta disposal by the same beneficiaries, especially young children.
3. Maximum practice of improved personal and domestic hygiene by the same beneficiaries, especially mothers.

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

1. 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.
2. In order to increase sanitary excreta disposal practices in the same beneficiary group, vigorous promotion of latrine construction by beneficiary households is necessary. To encourage this process, a demonstration latrine made entirely of local materials needs to be built in each prospective tubewell beneficiary group, those who can afford to purchase water-seal latrines should be encouraged to do so; and the eventual provision of the tubewell should be linked to the number of latrines constructed and in use in the prospective tubewell beneficiary group.
3. In order to improve personal and domestic hygiene, hygiene promotion activities should be undertaken, for which promotional materials should be made available; Health promotion and awareness raising activities should be conducted through public meetings and house-to-house visits among the prospective tubewell user group.

Beneficiary Participation: In addition to the improved beneficiary participation inherent in the integrated approach, beneficiaries will continue to participate in tubewell site selection, installation through self help or cash contribution, operation and maintenance as before. Beneficiaries will be fully responsible for the operation and maintenance of their tubewells.

Communications: UNICEF will provide assistance to the 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.

Involvement of Women: Women are not only the main drawers and users of water, they can significantly reduce the incidence of diarrhoeal diseases and parasitic infections in their children by adopting improved practices of personal and domestic hygiene and by instilling 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 details of these measures are specified in the Project Plans of Action.

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. The details are specified in the Project Plan of Action.

Priority to Underserved Areas: This programme will accord top priority to the underserved areas. The main categories of underserved areas are the coastal belt, the low water table area, the urban slums and fringes, and underserved pockets within the better served shallow water table area. In terms of financial allocations, approximately one third of the total of UNICEF and Government resources is allocated to a project specifically for the coastal belt, and another third to a project specifically for the low water table area. A new project specifically 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 NGO's will be encouraged to install tubewells in underserved pockets and among the poorest groups, as per guidelines set by government in agreement with UNICEF.

#### Government Counterpart Funding

In the past, lack of government funding for sinking costs of deepset tubewells was a major constraint to implementation. The actual annual allocation has often been less than indicated in the Annual Development Plan (ADP) or under the Project Proforma (PP). To encourage government to allocate resources commensurate to the priority of the coastal belt and low water table areas, UNICEF will match government expenditure on sinking costs by an additional 100% or 200% effectively doubling the budget available. The government's budget allocation must be spent first.

For example, if the government provides budget for the sinking costs of 2,500 TARA deepset tubewells, DPHE will install the first 2,500 tubewells using government funds and may install up to a further 2,500 using UNICEF funds under RPA, making a total achievement of 5,000.

In the coastal belt the following system will be applied for which an appropriate mechanism will be developed:

- a) For total annual implementation up to 1999 deep tubewells UNICEF will match government expenditure by an additional 100% effectively doubling the budget available. The government's budget allocation must be fully spent before UNICEF's matching funds may be spent. For example, if government provides budget (exclusive of carriage and establishment cost) for sinking 750 tubewells, DPHE will install 750 tubewells using Government funds and may install up to a further 750 in the same year using UNICEF funds under RPA, making a total achievement of 1500. However, if the total achievement is only 1250, 750 will be charged to Government budget and the balance (500) to UNICEF.
- b) For total annual implementation of 2000 deep tubewells and over, UNICEF will match government expenditure by an additional 200% effective trebling the budget available. The government's budget allocation must be fully spent before UNICEF's matching funds may be spent. For example, if government provides budget (exclusive of carriage and establishment cost) for sinking 1000 tubewells, DPHE will install 1000 tubewells using government funds and may install up to a further 2000 in the same year using UNICEF funds under RPA, making a total achievement of 3000. However, if the total achievement is only 1750, 1000 will be charged to government budget and the balance (750) to UNICEF.

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. There will also be coordination with the UNDP/World Bank Low Cost Sanitation Demonstration Project. 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 bilateral donors (Danida and SDC) providing supplementary funding to UNICEF.

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. 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 government department 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 organisa-

tions. The quantity of materials available for release to NGOs will be up to 5% of the quantity provided under the following projects. However, in the event of shortage of materials, the regular projects implemented by the Directorate of Public Health Engineering will have majority.

Under the policy of decentralization, upazilas have authority and budget outside the national programme to implement activities in the water and sanitation sector. In addition to the national programme a guideline will be prepared by DPHE to permit the effective utilization of the upazila budget for water supply and sanitation utilizing UNICEF supplied materials. Overall supervision, monitoring, and evaluation will be maintained by DPHE.

## 6.6. Project Components

### 6.6.1 Rural Water Supply

#### Target

##### Coastal Belt

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The main target for the coastal belt is to increase the coverage from the present 900 users/installation to 350 users/installation by installing 20,000 new handpump systems with the following tentative distribution:

- Deep tubewells	16,000
- Shallow shrouded tubewells	3,250
- Very shallow shrouded tubewells	500
- Pond sand filters	750
- Iron removal plants	100

The most appropriate and least costly technology will be applied. The selection of water source will be based on a hydrogeological mapping of each upazila. The mapping will be undertaken by DPHE who will reorganize and strengthen its hydrogeological set up supported by a Danida adviser.

No. 6 handpump will be used irrespective of water source. Iron removal plants will be constructed for new handpump systems on the basis of the demand of the beneficiaries.

Implementation will be carried out through the contractor system.

##### Low Water Table Areas

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The main target for the low water table area is to increase the coverage from the present 1200 users/installation to 225 users/installation by installing:

- tubewells with Tara pumps	60,000
- tubewells with very deepset pumps	500
- iron removal plants	1,200



The delineation of areas where deepset and very deepset handpumps are required will continue through the monitoring of the depth to the lowest watertable. This monitoring will be undertaken by DPHE who will reorganize and strengthen its hydrogeological set up supported by a Danida adviser.

Iron removal plants will be constructed for new handpump systems on the basis of the demand of the beneficiaries.

Implementation will be carried out through the contractor system.

#### Shallow Water Table Area

The main target for the shallow water table area is to increase the coverage from the present 100 users/installation to 70 users/installation by installing:

- |                       |        |
|-----------------------|--------|
| - shallow tubewells   | 75,000 |
| - iron removal plants | 12,000 |

The tubewells will be sunk under the self-help system. Iron removal plants will be constructed for new handpump systems on the basis of the demand of the beneficiaries.

#### Areas With Drilling Problems

No specific target has been given for new installations in areas with drilling problems. In spite of the fact that approx. 5 million people are living in these areas.

#### Collaboration with Other Implementing Agencies

A number of other government agencies and Non-Government Organizations implement programmes with a water supply component. As such programmes normally are working with the underserved and poorer sections of the society, materials will be supplied to these programmes through DPHE.

#### Analysis

A UNICEF analysis implies that there has been no measureable decline in the incidence of diarrhoeal diseases and parasitic infections in children within the last decade. Recent studies suggest three main reasons for the lack of health impact, ref. chapter 5.1. One of these reasons is related to the water supply:

- although most people use tubewell water they only use it for 25% of their needs and continue to use traditional polluted sources for the remaining 75%.

Based on this finding UNICEF concludes that:

- 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.

The mission takes note of this finding and agrees entirely with the conclusion. Consequently increasing of the tubewell coverage and platform rehabilitation must play crucial roles in the water supply programme.

The proposed targets for the coastal belt, the low and the shallow water table areas are fully supported by the mission, as they reflect a substantial reduction in the present imbalance between the well-served and the underserved areas.

	<u>1985</u>	<u>1993</u>
Shallow water table area	100 users/hp	70 users/hp
Low water table area	1240 -	225 -
Coastal belt	880 -	350 -

The mission is convinced that the target for the shallow water table area can be achieved without difficulty. The coverage targets do not take into consideration the 5-600,000 private tubewells, that each supply 1-2 families. If it is presumed that families with private tubewells do not apply for a public tubewell, the coverage in 1993 will correspond to 50-60 user/handpump or approx. 8 families/handpump. As 10 families have to apply jointly for a handpump, the 1993 target either represent an oversaturation or contain an inbuilt violation of the site selection criteria. For the low water table area and the coastal belt the targets appear optimistic but not unrealistic, provided the necessary government funding will be made available, and provided the delays caused by late publishing of Annual Development Programme, transferring of funds, and submitting of materials can be alleviated.

The observed trend with an apparent reduction of the quality of site selection and technical installations must be stopped. This is even more important in the future, where a greater emphasis is given to the low water table area and the coastal belt, where the quality of the work is more crucial than in the shallow zone. The role of the Upazila Engineer/DPHE Sub Divisional Engineer as supervisors must be strengthened and the site checking of the UNICEF zonal officers must be intensified, especially in upazilas where the hydrogeological conditions and/or the past programme

performance necessitate this. As described in chapter 6.6.6 the introduction of iron removal units and pond sand filters as regular implementation components will require intensified supervision and support, which must be reflected in the staff allocation for these purposes.

For the coastal belt the hydrogeological mapping must be revitalized immediately. As the conducted mapping has not achieved its final shape, it is recommended to complete the mapping of 2-3 upazilas located in different hydrogeological environments initially. After completion of these mappings a mapping of all upazilas within the coastal belt must be carried out within a 2 years period. This is proposed to be done by:

- employing the proposed staff without delay including the already agreed Danida hydrogeologist
- immediate recruitment of a short term hydrogeological adviser for further elaboration on the mapping technique through mapping of the above mentioned 2-3 upazilas, for planning of the future mapping and by initiating the collection of existing data and maps
- recruiting of a local consulting company, who can assist DPHE's Ground Water Division in the mapping, as this is deemed necessary for meeting the time target stated above. This large scale mapping is envisaged to be started after the completion of the mapping of the first batch of 2-3 upazilas. The local consultant may be supported by an expatriate consultant/short term adviser. The mission recognizes that at present there is hardly any alternative to the proposed No. 6 handpump, but foresees maintenance problems as this pump is not designed to the relative heavy population loads prevailing in the coastal belt. The performance of the pumps in the coastal belt should therefore be closely monitored and the pump maintenance should be given special attention.

For the low water table area hydrogeological model calculations have been made in order to delineate the future low water table areas. The calculations imply that the percentage of the rural population living in the low water table areas will rise from 8% in 1985 to 45% in 1995. The main cause for the lowering of the water table is the heavy and steadily increasing groundwater abstraction for irrigation. It appears, that the calculations have overestimated the implementation rate of the groundwater based irrigation. Consequently the development of the low water table areas may not take place as rapidly as previously anticipated. The uncertainty in the delineation of the future low water table area makes the ground water level monitoring a vital component, the importance of which cannot be overestimated.

If shallow tubewells are installed in an area, that turns into a low water table area the investments in the tubewells are lost. Similarly if Tara pumps are installed in an area that is wrongly anticipated to become a low water table area, then an unnecessary amount has been spend on these installations. In the DPHE/UNICEF Master Plan of Operation 1988-93 it is recommended to assign two DPHE hydrogeologists, five technical assistants and 50% of the expatriate hydrogeologist to the ground water monitoring. The mission strongly supports this proposal. The ground water monitoring activities of DPHE should be coordinated with similar activities of other water related agencies such as Bangladesh Water Development Bord and Master Plan Organization.

In order to ensure sucessfull introduction of the Tara pump, intensified support, supervision and control shall be exercised as long as deemed necessary. Once all introduction problems have been overcome, and the revision of the Depth Book has reduced the average depth, the price of a tubewell fitted with a Tara pump is expected to decrease. At that time the feasibility of converting this programme from the contractor system to the self-help system should be investigated. The very low water table area shall be given particular high priority, as soon as a suitable pump has been identified and introduced.

In the shallow water table area the main concern is to ensure adherence to site selection guidelines and prevent a deterioration of the quality of the installations. As already described, intensified supervision and spotchecks are prerequisites to achieve this.

In the areas with drilling problems a coverage of the same order of magnitude as in the coastal belt and the low water table area must be ensured. An inventory of the existing installations must be prepared as the basis for the planning of the activities in these areas.

Whenever applicable the hand drilling technique must be improved e.g. by substituting the sludging method by the more powerfull water jet method and by improving the drill bits etc. The experiences from similar projects in the Region shall be applied to the greatest possible extent. The feasibility of introducing light mechanized rigs shall be investigated.

In areas where even improved drilling technique is inadequate, the necessary steps must be taken to increase the coverage by constructing and rehabilitating alternative water supply installations.

## 6.6.2 Rural sanitation

### Targets

UNICEF's targets for the village sanitation programme are the following:

1. to construct 400 additional latrine production centres, to be increased to 540 centres if resources are made available, whereby the government production of water seal latrine components will be approximately 175,000 units per year as compared with the present 100,000 units.
2. to produce 625,000 water-seal latrine slabs and any number of rings up to a maximum of five per slab, depending on demand.
3. to increase the users of water-seal latrines in the rural areas from the present 3% to approximately 6% as a result of the project activities.
4. to gradually reduce the subsidy on government produced latrines in order to encourage the private sector to produce latrine components to satisfy the demand for water-seal latrines of the richest 50% (estimated) of the rural population can be met.
5. to promote cheaper "home made" latrines, made entirely from locally available materials, to cater for the remaining 50% (estimated) of the rural population who are expected not to be able to pay for the water-seal latrines even at the current subsidized rate of Tk. 250/- (without superstructure).
6. to undertake experiments to determine the practicability of employing one mobile latrine production centre to each VSC and if found successful to extend mobile centres to all VSCs.
7. to establish a revolving fund at the upazila level for the deposit of financial proceeds from the sale of latrines and to be used for the purchase of local materials for production of more latrines.
8. to provide material assistance to other UNICEF assisted projects, Upazila Parishads, NGOs and the private sector to set up latrine production centres. NGOs will be given additional provisions of non-local materials for the initial production of 50 latrines.
9. to undertake R&D activities including the development of cheaper solutions for very low cost latrines using local materials and other appropriate technology latrines.

10. to conduct training and retraining of 700 mistris from the government and non-government sector.
11. to implement procedures which will give priority to selling latrine components to families who are members of a tubewell applicant group in accordance with the IA.

### Analysis

The proposal to more than double the number of VSCs during the 5-year project period may not be necessary if the production capacity of the existing underutilized VSCs is increased by supplying more materials. At present only approx. 50% of the production capacity of the VSCs is utilized. However, new centres are needed to serve areas where present centres cannot serve due to transportation costs. New centres also serve to stimulate local demand. While constructing new VSCs, supply of the necessary materials for achieving optimum production according to capacity should be ensured.

The mission finds that the production and beneficiary coverage targets set by UNICEF are realistic but does not favour the idea of slowly withdrawing subsidy on the water-seal latrine at this point in time. At unsubsidized rates the richer 50% would easily be reduced to less than 25% of the population being able to pay. Although the mission agrees with UNICEF that health impact cannot be achieved unless all villagers construct latrines of one type or the other, it may not be realistic to expect that this could be achieved through a reduction in subsidy. The mission expects a somewhat longer time horizon whereby the adoption of sanitary or hygienic latrines are being gradually accepted by the people themselves based on their own felt needs. In order that sanitary habits may spread the supply of water-seal latrines at subsidized rates have to be readily available to meet as much of the demand as possible. Based on the few experiences gained in the IA upazilas the mission envisages that DPHE/UNICEF will run into severe motivational problems in convincing the less well-off villagers to construct low cost pit latrines because they cannot afford the unsubsidized, but previously subsidized, water-seal latrine. Moreover, since water supply continues to be given on a very high subsidy basis, there is little justification that sanitation should be unsubsidized; especially not since the relative contribution to improved health is expected to be primarily related to improved sanitary conditions.

However, while critically raising this issue the mission finds that the questions of subsidy in general and the consequences of a reduction in subsidy in particular need to be further looked into. Studies on the economic and social implication of various subsidy/non-subsidy sanitation models and delivery systems (at the macro as well as community/household level) could be carried out during the first years of the 5 year programme.

check  
special  
study?

The mission supports UNICEF's high priority given to the promotion of very cheap latrines constructed from local materials. This is also in line with previous recommendations made by Danida. Experience shows that it is specific kinds of latrine technologies which may initially invite people's interest (based on e.g. status, convenience) and not concepts (in villagers' minds) of health advantages derived from safe excreta disposal. Latrines will therefore to a large extent have to be promoted by their own demonstration effects incl. cost aspects. The mission observes that there are many technology options for cheap and hygienic excreta disposal available in Bangladesh. The challenge is therefore not so much new ideas on cheap latrine designs but rather promotion through appropriate communication channels and villagers acceptability of very low cost latrines.

However, the mission supports a sanitation promotion strategy according to which high priority should be accorded to the promotion of cheap and simple technology solutions for excreta disposal only in cases where people cannot possibly afford the water latrine. ?????? The long term expenditures involved in constructing and monitoring low cost latrines may become higher than initially anticipated because they are less durable (e.g. may easily collapse during floods). Initial investment costs of a latrine made from local materials will be around Tk. 150/-. The mission recommends that UNICEF carries out comparative monitoring of costs incurred in monitoring the very cheap latrines and the water seal latrine.

The mission supports UNICEF's proposal to establish mobile latrine construction units on an experimental basis as a supplement to the VSCs. The objective should be to test such units with regard to cost-efficiency, service delivery and reduction of transportation costs from the VSC to the beneficiary's village. Initially the experiment could be implemented in a few upazilas (say 4).

In order to increase the government's capacity to produce water-seal latrine components, while simultaneously encouraging the private sector, the water-seal latrine unit consisting of one slab and only one pit ring shall be promoted on an experimental basis as the project's very cheap latrine type in a few upazilas. The private sector shall be encouraged to produce and supply the additional pit rings. These rings are presently sold from the VSCs at unsubsidized rates anyway.

In this way not only will the production capacity increase, but it will also be possible to reach a larger target group of beneficiaries. After spending Tk. 70/- the beneficiary's financial capability will decide whether he/she will be able to buy the additional 4 rings from local manufacturers at an approx. cost of Tk. 180/- or he/she will construct a cheaper additional pit lining made from local materials, e.g. bamboo mats.

The mission is very much in favour of UNICEF's proposal to provide material assistance to NGO's to set up latrine production centres. The experience gained so far from collaborating with NGO's is so promising that increased support to new and qualified NGOs shall be given high priority.

### 6.6.3 The Integrated Approach

#### Targets and Objectivis

UNICEF's objectives behind the IA and the principles based on which its implementation procedures are based are presented in chapter 6.5. The main element in the IA is the interlinkage between sanitation, water supply and hygiene education according to which a tubewell applicant group has to construct a number of latrines (presently five) before a tubewell is given by DPHE and the applicant groups are exposed to some health and hygiene education.

In UNICEF's draft master Plan of Operation for July 1988 - June 1993 a summary of the stepwise procedures for implementation of the IA has been worked out. The procedures emphasize sanitation and hygiene promotion campaigns as part of the strategy. This includes the construction of a demonstration "home-made" latrine by the tube-well applicant groups themselves. They are then expected to construct their own personal "home made" latrines. Households capable of paying for a water-seal latrine may buy one from DPHE at a subsidized price. After some time DPHE will assess the tubewell applicant groups according to the number of household latrines in operation. The best performing will then receive final sanction for a tubewell. As a follow-up measure the field staff of the MOHFP is supposed to visit each household.

UNICEF will finalize the detailed procedures for the IA during the first years of the new 5-years programme to be spread nationwide by 1993. No specific physical or coverage targets have been set for the expansion of the IA during the new programme, but UNICEF plans to add a few more IA upazilas during 1988/89.

#### Analysis

The mission is of the considered opinion that the implementation of the IA is absolutely essential for fulfilling the longer term objective of substantially improving the health status of people. However, in order that a positive integration of health and sanitation activities can take place, VSC's must be able supply the required number of water seal latrine units in an upazila, i.e. required as per the demand within the tubewell applicant groups. This necessitates a minimum yearly production capacity of 5 latrines per tubewell allocated according to ADP targets.



Furthermore, in order to make the term "integrated approach" meaningful compared with the ordinary programme activities health and hygiene education must be included as an activity on par with water supply and sanitation. This will require a strengthening of the IA through a realization of all suggested components in the proposal for an integrated water supply and sanitation approach put forward in the Danida consultancy report "Framework for Implementing the Strategy for Health Promotion", December 1985. Attention shall in particular be given to the following activities:

- involvement of HAS and FWs from the MOHFP in health and hygiene education through motivation and training.
- make further attempts in transforming the TWMs into PHPs through motivation and training. It may be advisable for UNICEF to allocate one project officer in each IA upazila to be responsible for the motivation, training (on-the-job) and coordination of the activities of the TWMs, at least during the first year of the IA in one upazila.
- promotion of low cost latrines made from local materials to members of tubewell application groups who cannot possibly afford the water seal latrine component.

*unif...*  
For the further development of the IA the missions finds it essential to expand the present coverage from 2 upazilas in the country to 2 upazilas within each UNICEF zonal area by the beginning of the fiscal year 1988/89. Considering that the IA is presently being implemented in rather well off rural areas close to a big urban centre, the real testing ground for the approach will be in poorer, more interior and less developed areas of the country.

*Shel*  
In order to ensure the optimum success in the expansion of the IA it is recommended that UNICEF increases its local staff with one ass. project officer and one field assistant at each zonal office as the IA expands to two upazilas in each UNICEF zone. *What about staff DDE?*

When the country-wide expansion of the IA sets in the UNICEF project officer presently located in Chittagong should be located at the Dhaka office.

The promising experiences from the involvement of NGOs shall be taken into account. In each new IA upazilla local or national level NGOs shall be contacted and invited to participate according to the arrangement with the NGO Proshika-Comilla in one of the IA upazillas (Rowzan).

#### 6.6.4. Training and Orientation

##### Targets and Objectives

Training and orientation is dealt with as a separate component under each of the six sub-projects in UNICEF's draft master Plan of Operation for the next five years. The targets for training and orientation activities over the five year project period is envisaged as presented in the implementation schedules for each sub-project in section 6.7.2. The personnel which will receive training and orientation include:

- caretaker families
- public health promoters (previously tubewell mechanics)
- upazila officials
- masons (for the village sanitation programme)
- sub-assistant engineers
- pourashava officials

Training of caretaker families will be undertaken in accordance with the present two-phased arrangement. The caretaker family is trained and instructed initially at the time of collection of materials for the tubewell and again later after the installation of the handpump. DPHE will conduct annual refresher training for DPHE implementing staff of sub-divisional engineer level and below. Annual orientation on project strategy and implementation is scheduled to be given to all other upazila-level field staff, upazila officials, local leaders, and NGO's involved.

##### Analysis

The mission supports the planned training and orientation programme presented by UNICEF in the draft master Plan of Operation. However, judging from the present considerable backlog in training and orientation activities, in particular the training of caretakers, the set targets may be difficult to achieve in a qualitative manner unless more attention and manpower resources are allocated.

So far there is an insufficient feed-back and documentation from the field with regard to quality and impact of the training activities. The mission therefore recommends that strong emphasis is put on monitoring and documentation of training activities with particular attention to performance, quality and impact.

Judging from the reported very positive results from the training and orientation of DPHE staff and upazila officials (section 4.4) it is recommended to repeat such sessions with regular intervals. With the introduction of new strategy of integrating water supply and sanitation closely there is a need to communicate frequently and directly with all DPHE and upazila level officials. In the training of all field-

level staff categories it is important among other topics to stress improvement of communication techniques and the need for community participation in site selection and tubewell installation.

In the IA upazilas it is recommended to give high priority to the training of TWMs as PHPs. Likewise the HAS and FWWs should be trained according to the strategy for health promotion in the integrated approach to water supply and sanitation if and once an agreement for their participation in the IA has been made with the MOHFP.

#### 6.6.5 Rehabilitation and Maintenance

##### Target

The target for this programme component is:

1. to reduce the proportion of handpumps out of order to 3% by training caretaker families, providing free tools, and selling spare parts and by further transferring the responsibility for maintenance to the beneficiaries,
2. to reduce the proportion of choked up tubewells to 7% by
  - . desanding 80,000 ST
  - . desanding 1,330 DST
  - . desanding 1,330 DT
  - . resinking 60,000 ST
  - . rehabilitating 1,000 DST
  - . rehabilitating 1,000 DT
3. to construct or repair 2,500 platforms on existing deep and deep set tubewells,
4. to upgrade 375 existing unprotected water supplies where tubewells are not feasible,
5. to gradually replace old No. 4 and No. 6 handpumps of which approx. 200,000 are in operation at present,
6. to construct 3,750 iron removal plants on existing tubewells on the basis of the demand of the beneficiaries,
7. to repair and rehabilitate the constructed iron removal units and pond sand filters as and when the need arises.

##### Analysis

The DPE/UNICEF proposal to rehabilitate a total of 2,500 platforms in the coastal belt and in the low water table area and none in the shallow water table area is considered to be inadequate and inconsistent to UNICEF's own analysis

of the importance of proper platforms, chapter 6.6.1. The necessity in upgrading the platform rehabilitation compared to sinking of new tubewells is supported by cost-efficiency arguments as a new shallow tubewell costs more than 10 times as much as a platform rehabilitation.

However, in spite of the past experience with platform rehabilitation, the mission recommends that platform rehabilitation is reintroduced in a few upazilas in the shallow water table area. UNICEF's zonal officers will give this important activity the necessary back up in order to ensure a whole hearted support from the DPHE field staff including a proper motivation campaign. After e.g. two years the experiences are reviewed and the feasibility in upscaling the programme is considered.

The target for resinking of choked tubewells appears to be underestimated (12,000 tubewells/year). The number of tubewells drilled each year was in the early 1970's increased from approx. 15,000 tubewells/year to an average of 30,000 tubewells/year. The average lifetime of a tubewell is presumed to be in the order of 15 years, which corresponds to resinking (or desanding) of 30,000 tubewells/year. As 25% of the tubewells can be desanded, the demand for resinking will amount to 20-25,000 tubewells per year just to cope with the rate of choking. As the target is to reduce the proportion of choked tubewells from 10-13% to 7%, the annual requirement is to resink 25-30,000 tubewells. The resinking programme must therefore be upgraded accordingly and this upgrading must be reflected in the budget and in the manpower allocations.

The mission supports UNICEF's plans of continuing the study of the choking problem and the reasons for choking of tubewells as such a study may lead to improvement of the drilling/tubewell development technology which eventually may increase the lifetime of the tubewells and hereby reduce the magnitude of the choking problem.

The rate of upgrading existing unprotected water supplies, where tubewells are not feasible, should be reviewed after implementation of the survey recommended in chapter 6.6.1.

The mission supports the concept of constructing iron removal units on existing tubewells provided the necessary manpower is allocated to the task ref. chapter 6.6.6.

To achieve the target for the day to day maintenance of handpumps upgrading of caretaker training must be given high priority and the backlog must be alleviated within a few years. The quality of the training must be ensured, and the further introduction of the important family caretaker concept must be given the necessary support.

#### 6.6.6 Research and Development

The successful implementation of the rural water supply and sanitation programme in Bangladesh is greatly attributed to the close interlinkage between research and development and regular implementation. The bridging period 1982-87 highlighted this interlinkage and resulted in development, field testing and gradual introduction of new concepts and components. A main scope of work within the coming planning period 1988-93 is to support this gradual introduction. The support will include:

- training of those, who shall implement
- motivation of the beneficiaries to accept and maintain
- monitoring the performance and acceptability
- ensuring the necessary technical back up as and when the need arises including testing of minor modifications made necessary by the field experience.

Major new research and development activities are not foreseen at present, but further research in existing designs and implementation procedures may improve the programme in terms of e.g. higher success rate, longer lifetime, and more cost efficient solutions. In special areas the present practice may be inadequate or inappropriate. Due to the limited extent of such areas research and development within the frame of the programme may not be feasible and the main emphasis will be on introducing components and methods properly tested outside Bangladesh.

The mission is convinced that UNICEF and DPHE are aware of these tasks and agree in the approach outlined above, but this awareness is apparently not fully reflected in the manpower allocation. The mission therefore recommends recruitment of a fulltime technical R & D adviser to ensure the necessary follow up on the past research and development programme. The adviser is expected to be local and may, if necessary, be supported by expatriate short term advisers.

In addition to the general outline above the contents of the different research and development activities are appraised as follows: The integrated approach, linkage of water supply, sanitation and health promotion is appraised in chapter 6.6.3.

The monitoring of the Tara pump performance and acceptance is continued as described in chapter 4.8. If necessary UNICEF and the proposed adviser will initiate modifications of components creating problems in collaboration with the manufacturer and the remaining staff in the World Bank hand pump testing programme. It may be considered to continue the testing beyond the envisaged two year period.

The selection of a very deep set hand pump shall, as envisaged by UNICEF, be based on the findings in the World Bank global hand pump testing programme. The Afrider pump is considered, provided the ongoing testing of the pump is successful.

The introduction of iron removal plants and pond sand filters will undoubtedly require a substantial support not the least from the proposed adviser. The introduction is likely to reveal a number of minor design aspects, that will require considerable attention, if the plants shall be introduced successfully. The drilling technology in areas with hard/stoney layers shall be improved by transferring already known technology to these areas, ref. chapter 4.1. The experience gained in similar projects within the region may be applied.

The various types of drilling technology and tubewell design shall be reviewed including assessment of failure rates and lifeline considerations. Proposed modifications shall be field tested.

Platform rehabilitation shall be introduced in the shallow water table area on pilot basis as described in chapter 4.6.

Alternative water supply technology may be considered in patches of the coastal belt where fresh water is not available throughout the year. The feasibility of different types of technology may be investigated based on experiences from projects outside Bangladesh with similar hydrogeological conditions.

#### 6.6.7. Health and Hygiene Education

As it is UNICEF's target for the next five years' programme to improve personal hygiene practices of 25 mill. beneficiaries there is a need to substantially strengthen the health and hygiene education activities. The mission, however, finds that this overall target may be too ambitious within the given time frame considering that the health and hygiene education primarily will be limited to the health promotion activities inherent in the integrated approach.

Outside the integrated approach areas UNICEF/DPHE's strategy is to provide promotional materials (pamphlets, leaflets, folders etc.) for raising public awareness of personal and domestic health and hygiene practices. Such material includes health and hygiene messages printed on tube-well application forms, general information folders on water related health and hygiene, and latrine construction. It is also envisaged to develop a mass media (radio) campaign to promote healthy and hygienic practices. The mission supports the development of this communication strategy and the material in question. But to achieve continued impact in

terms of changed behaviour/practices and subsequently improved health conditions it is the experience that media campaigns and printed communication material are not sufficient. UNICEF's strategy to train and reorient TWMs to become Public Health Promoters (PHP) equipped to disseminate health and hygiene messages along with sanitation promotion should therefore be given high priority within the integrated approach. A similar orientation of caretaker families should also be given continued emphasis.

The health and hygiene education strategy to be followed by all personnel involved in the integrated approach should consequently be based on interpersonal communication (e.g. through house-to-house visits, women's groups, and public meetings) to be reinforced by communication aids like printed material and mass media. This priority in the strategy should be reflected in the development of training curricula for PHPs, Health Assistants (HA), and caretaker families in which particular emphasis should be given to interpersonal communication methodologies. The possibility of involving NGOs in conducting training courses in interpersonal health communication should be looked into. In upazilas where NGOs will be implementing the integrated approach such training should be a natural responsibility of the NGO.

Considering that all TWMs are male raises concern as to their capability to communicate with and influence women, who constitute the main target group when it comes to changing personal and household hygiene practices. In this connection the mission strongly supports UNICEF's recommendations that DPHE should recruit female PHPs into existing vacancies aiming at one per upazila by 1993. The mission, however, finds that the possibility that at least two PHPs are female (out of the existing four) in each upazila by the end of the five year project period should be explored.

The mission is aware of the difficulties involved in incorporating DPHE Health Educators, Health Assistants (HA), and Family Welfare Assistants (FWA) of the MOHFP, in particular the latter category. It is, however, important to continue working for the mobilization of HAs particularly within the integrated approach according to the proposals presented in the Danida consultancy report "Framework for Implementing the Strategy for Health Promotion" of December 1985. It is also recommended to look into ways of further strengthening health and hygiene education in government schools, e.g. through training of teachers in connection with distribution of communication materials.

As a final, general recommendation the mission would like to see a health and hygiene education strategy materialize into well defined communication activities carried out by appropriately trained personnel. The aim should be that health and hygiene education eventually becomes a priority component on par with water supply and sanitation within the integrated approach not only policy-wise but also activity- and impact-wise.

#### 6.6.8. Urban Slums and Fringes

This programme aims at providing 1.6 mill. beneficiaries with improved water supply and sanitation and healthy and hygienic practices through the installation of 14,175 hand-pumps, establishment of 85 latrine production centres, and the production of 46,000 water seal latrine units.

The mission supports UNICEF's proposal to implement the programme in the fringe and slum areas of all 87 municipalities in the country of which 62 are defined as district towns. There is sufficient justification for the proposed programme considering that neither the urban nor the rural water supply programmes extend to the areas in question. Moreover, the poverty and congested living conditions of the slum areas qualify the people in these areas to become beneficiaries. The strategy to first start up slowly (in ten municipalities) appears appropriate considering experience has to be gained before expanding to full country coverage.

According to the proposed action plan the programme in urban slums and fringes will be implemented according to the principles, strategies, and guidelines in the UNICEF plan of action for rural water supply and sanitation. The key principles of the integrated approach of linking water supply to the compulsory construction of latrines combined with promotion of healthy and hygienic practices should be adhered to initially in the first ten and subsequently in all remaining municipalities. The element of compulsion and persuasion in latrine construction is expected to be negligible compared to the rural areas considering the very high demand for close, convenient, and sanitary excreta disposal in the congested slum areas.

However, the production target for water seal latrines set by UNICEF allows only an average of approx. 540 latrine units to be installed in each slum/fringe area. To meet the demand the remaining latrine units to be constructed will have to be made from local and cheaper materials. Considering the very high demand for sanitary and more permanent disposal systems for excreta in congested slum areas the mission recommends that all efforts are made to increase the production capacity of the 85 latrine production centres. In addition it is strongly recommended to invite local or other NGOs to set up their own latrine production centres supported by UNICEF and according to the conditions already in operation.

It is recommended that UNICEF/DPHE establishes well defined criteria according to which the areas to receive assistance will be identified and mapped out based on a survey of slum and fringe areas in each municipality. It will be the task of UNICEF/DPHE to ensure that all but only needy areas are selected. The mission supports UNICEF's proposal to invite local NGOs identified during the initial surveys to assume



responsibility of implementing the entire programme according to the integrated approach in certain defined geographical areas. In addition to local NGOs the larger national NGOs could also be asked to take up the entire selected beneficiary area of some municipalities.

To avoid duplication and confusion regarding different implementation policies the project shall consider not to provide water supply and/or sanitation to municipality areas which have already received or are presently receiving adequate donor assistance to these sectors. A particular effort should be made to coordinate the programme with the LGEB low cost sanitation programme in 84 municipalities (with World Bank/UNDP/Danida assistance). In this connection it is important not to overlap in the geographical coverage of the programmes. Similarly, too big disparity in subsidy and cost recovery policies should be avoided.

## 6.7 Plan of Operation

### 6.7.1 Organization and Administration

#### Responsible Ministry and Department

The project will be the responsibility of the Local Government Division of the Ministry of Local Government, Rural Development & Co-operatives (MLGRDC) and will be implemented by the Department of Public Health Engineering (DPHE). DPHE has been implementing the national rural water supply and sanitation (RWSS) activities since 1948. Its organization has been extended to the upazila level and the programme is now implemented by DPHE in partnership with the elected Upazila Parishad.

#### Upazila Level Organization

DPHE has deputed one Sub-Assistant Engineer (SAE) and four field staff, Public Health Promoters (hitherto known as tubewell mechanics) to each upazila for implementation of RWSS activities. This staff is supported by DPHE in respect of implementation, operation, maintenance, logistics and training.

A Sub-Committee of the Upazila Parishad, known as the Upazila Water Supply and Sanitation Committee (UWSSC), is responsible for coordination and implementation of all RWSS activities at upazila level. The formation of the UWSSC is currently as follows:

Chairman, Upazila Parishad	Chairman
Upazila Engineer	Member
Upazila Health and Family Planning Officer	Member
Upazila Education Officer	Member
Chairman of concerned Union Parishad	Member
Sub-Assistant Engineer, DPHE	Member-Secretary

### Pourashava Level Organization

The Pourashava level organization has yet to be defined. DPHE and UNICEF will agree on a suitable organization set up. It is proposed that a Sub-Committee of the Pourashava to be known as the Pourashava Water Supply and Sanitation Committee (PWSSC), should be responsible for coordination and implementation of all project activities at the Pourashava level. The formation of the PWSSC is yet to be decided.

The mission recommends that the PWSSC is formed similarly to the UWSSC and has the same functions. It is further recommended that the DPHE functions and relations to PWSSC be similar to the functions and relations to UWSSC.

### Supervision

Supervision will be provided by the territorial staff of the DPHE. The Executive Engineer (EE) will be responsible for all activities in his Division, assisted by a Sub-Divisional Engineer (SDE) in each district and a Sub-Assistant Engineer (SAE), and 4 PHPs in each upazila.

DPHE as the principal implementing agency will carry out routine monitoring of both physical progress as well as qualitative aspects of the project. DPHE will conduct field visits as follows:

#### Public Health Promoters (formerly Tubewell Mechanics): 100% of all sites

- a) One visit to check sites of all applications received.
- b) One visit to form applicant groups at selected sites and to inform groups of procedures, promote sanitation and convey health messages.
- c) At least three intervening visits to each applicant group before installation of the tubewell to promote and inspect latrine construction and promote awareness and practice of improved personal hygiene.
- d) One visit during installation of the tubewell.
- e) One final visit for inspection and preparation of completion report.

#### Sub-Assistant Engineer: 100% of all sites

- a) One visit to approve site selection.
- b) One final visit for inspection and preparation of completion report.

Sub-Divisional Engineer

Bimonthly visits to each upazila. At least 20% of all ADP work.

Executive Engineer

Visits to each upazila once every 6 months. At least 5% of all ADP work.

Superintending Engineer

As necessary to ensure supervision and support of subordinate staff and strengthen relations with upazilas.

WHO Field Sanitation Officers (FSO)

Will also check sites and periodically inspect both ongoing and completed work.

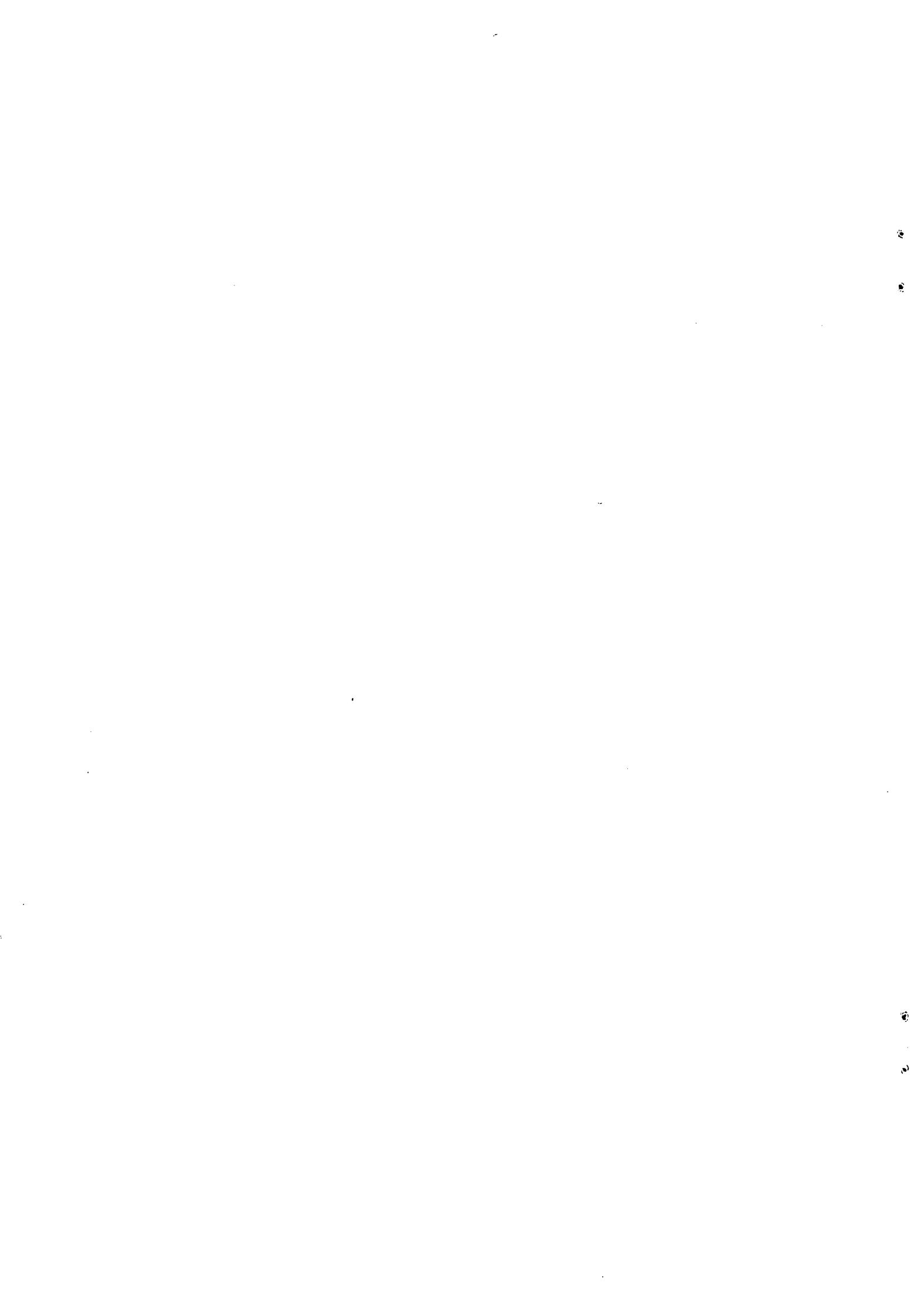
UNICEF Zonal Office

The staff of UNICEF Zonal Offices will check 3-5% of the sites and periodically inspect both ongoing and completed work (ref. chapter 4.1.3).

UNICEF field staff has primarily been monitoring the project with emphasis on physical activities. As the new programme puts more emphasis on education and communication the field staff should be augmented with the purpose of monitoring, supporting, and interacting with implementing government staff, particularly in connection with the integrated approach (see chapter 6.8.2).

6.7.2. Implementation Schedule

Detailed implementation schedules for each component of the sub projects is given in the Plans of Operation. Below tables provide an overview of Major Annual Targets of each sub project



1. Coastal Belt

Implementation Targets

	1988	1989	1990	1991	1992	1993	Total
<b>MAJOR TARGETS</b>							
1. Deep Tubewells*	2,200	2,700	3,200	3,700	4,200	-	16,000
2. Very Shallow Shrouded Tubewells	400	500	600	750	1,000	-	3,250
3. Shallow Shrouded Tubewells	50	75	100	125	150	-	500
4. Pond Sand Filters	75	100	150	200	225	-	750
5. Iron Removal Plants	20	20	20	20	20	-	100
6. Installation of Latrines by beneficiaries	13,625	16,875	20,250	23,675	27,875	-	102,500
7. Training of Caretaker Families	2,745	3,395	4,070	4,795	5,595	-	20,600
8. Refresher Training of Public Health Promoters	348	348	348	348	348	-	1,740
9. Orientation of Upazila Officials	435	435	435	435	435	-	2,175

\*The budget for the sinking of deep tubewells is based on the assumption that over 2,000 tubewells are achieved each year and the first third are paid by Government and the other two thirds are paid by UNICEF.

The technologies selected may be interchanged as required in ratio to total costs. For example, if a deep tubewell costs ten times as much as a VSST, then 10 VSSTs may be added for every deep tubewell reduced in the target.

2. Low Water Table

Implementation Targets

	1988	1989	1990	1991	1992	1993	Total
<b>MAJOR TARGETS</b>							
1. Tara Tubewells*	5,000	8,000	12,000	15,000	20,000	-	60,000
2. Other Deepset Tubewells	50	75	100	125	150	-	500
3. Iron Removal Plants	100	160	240	300	400	-	1,200
4. Installation of Latrines by beneficiaries	25,000	40,000	60,000	75,000	100,000	-	300,000
5. Training of Caretaker Families	5,150	8,235	12,340	15,425	20,550	-	61,700
6. Refresher Training of Public Health Promoters	492	492	492	492	492	-	2,460
7. Orientation of Upazila Officials	615	615	615	615	615	-	3,075

\*The budget for sinking of Tara Tubewells is based on the assumption that the first half of the annual installation target is paid by Government and the second half is paid by UNICEF.

3. Shallow Water Table

Implementation Targets

	1988	1989	1990	1991	1992	1993	Total
<b>MAJOR TARGETS</b>							
1. Shallow Tubewells *	15,000	15,000	15,000	15,000	15,000	-	75,000
2. Iron Removal Plants	500	1,000	2,000	3,500	5,000	-	12,000
3. Installation of Latrines by beneficiaries	75,000	75,000	75,000	75,000	75,000	-	375,000
4. Training of Caretaker Families	15,000	15,000	15,000	15,000	15,000	-	75,000
5. Refresher Training of Public Health Promoters	1,000	1,000	1,000	1,000	1,000	-	5,000
6. Orientation of Upazila Officials	1,250	1,250	1,250	1,250	1,250	-	6,250

\*Excluding the value of stocks in hand

4. Maintenance, Rehabilitation and Upgrading  
Implementation Targets

	1988	1989	1990	1991	1992	1993	Total
<u>MAJOR TARGETS</u>							
1. Provision of Spare Parts				As required			
2. Desanding: Shallow Tubewells	16,000	16,000	16,000	16,000	16,000	-	80,000
3. Desanding: Deepset Tubewells	130	200	270	330	400	-	1,330
4. Desanding: Deep Tubewells	130	200	270	330	400	-	1,330
5. Resinking: Shallow Tubewells	12,000	12,000	12,000	12,000	12,000	-	60,000
6. Rehabilitating: Deepset TWs	100	150	200	250	300	-	1,000
7. Rehabilitating: Deep TWs	100	150	200	250	300	-	1,000
8. Construction of Platform	500	500	500	500	500	-	2,500
9. Construction of IRFs	250	500	750	1,000	1,250	-	3,750
10. Upgrading Water Supplies	25	50	75	100	125	-	375
11. Training of Caretaker Families	12,475	12,840	13,225	13,600	13,975	-	66,125

5. Village Sanitation  
Implementation Targets

	1988	1989	1990	1991	1992	1993	Total
<u>MAJOR TARGETS</u>							
1. Construction of Latrine Production Centres	80	80	80	80	80	-	400
2. Production of Latrines	175,000	100,000	125,000	150,000	175,000	-	625,000
3. Construction of Non-Government Production Centres	15	25	40	60	80	-	220
4. Training of Masons	100	100	100	200	200	-	700
5. Training of SAEs	100	100	100	100	60	-	460

6. Urban Slums and Fringes

Implementation Targets

	1988	1989	1990	1991	1992	1993	Total
<b>MAJOR TARGETS</b>							
1. New Pourashavas Implementing Project	10	15	20	20	20	-	85
2. Cumulative Total Pourashavas	10	25	45	65	85	-	
3. Shallow Tubewells	520	1,300	2,420	3,500	4,500	-	12,240
4. Deepset Tubewells	40	100	175	250	330	-	895
5. Deep Tubewells	20	55	95	140	180	-	490
6. Very Shallow Shrouded TUs	15	35	65	90	120	-	325
7. Shallow Shrouded TUs	10	15	30	45	60	-	160
8. Pond Sand Filters	5	10	20	30	40	-	105
9. Iron Removal Plants	20	45	80	115	150	-	410
10. Resinking	50	125	225	325	425	-	1,150
11. Construction of Latrine Production Centres	10	15	20	20	20	-	85
12. Production of Latrines	2,000	5,000	9,000	13,000	17,000	-	46,000
13. Training of Caretaker-Families	660	1,685	3,090	4,495	5,805	-	15,735
14. Training of Pourashava Staff	50	125	225	325	425	-	1,150
15. Training of Masons	20	30	40	40	40	-	170
16. Orientation of Pourashava Officials	50	125	225	325	425	-	1,150



### 6.7.3. Budget

Project cost estimates for each component of the sub projects by the Bangladesh fiscal years (1.7. - 30.6.) is given in Annex VI.

The budget table below provides an overview of UNICEF financial resource requirements by calendar year with proposed finance sources.

UNICEF has designed this programme with special emphasis on the underserved areas - these areas are underserved because technical and budgetary constraints have resulted in slow implementation. The new programme calls for a substantial acceleration of implementation in these hitherto slow-moving components. Special efforts will be made to overcome the constraints, but 100% achievement of targets cannot be guaranteed.

The physical targets and financial allocations indicated in the new programme are designed to attract government attention to these underserved areas; UNICEF is hoping to influence the preparation of the fourth Five Year Plan to ensure allocation of more resources to the sector in general, and the underserved areas in particular.

The achievement of physical targets is significantly dependent on government counterpart funding. While the Planning Commission has indicated broad agreement with the proposed level of government counterpart funding, it remains to be seen what allocations will actually be made in each year of the plan. The annual government allocations are made at the beginning of each year and history has shown that they do not necessarily reflect the annual commitment of government funding made earlier in the project document or the Five Year Plan.

The unit costs of tubewells in the new Country Programme are greater than before because UNICEF is concentrating on the underserved areas where the technology is more expensive. In addition, UNICEF is bearing a greater proportion of the unit costs than before, because it is paying a significant proportion of the sinking costs of deep and deepset tubewells. This means that the under-expenditure per unit of under-implementation will be greater than before.

It should be stressed that the physical targets and government allocation targets are feasible. It is only that their achievement is heavily dependent on actual budget allocations by Government, which cannot be guaranteed at this stage. The programme has a history of under utilization of UNICEF resources, partly caused by a decline in government allocations. It is hoped that the "advocacy" character of the new programme will reverse this decline. But it is only prudent to point out that actual expenditures by UNICEF may turn out less than the figures given in the programme documentation.

It is thus that financial requirements may well be less than shown. It is therefore recommended that Danida commits itself to funding approx. 50% of project cost up to US\$ 15,162,500 under the provision that the programme is reviewed in the latter part of 1989 with the purpose of adjusting budgets to actual implementation and to Government of Bangladesh sector allocation for the 4th 5-year plan (1990-95) which will then be under preparation.

The proposed funding is based on the assumption that the UNCDF pledged contribution of US\$ 2,501,000 will be committed and the balance distributed between SDC (40%) and Danida (60%). It is understood that if annual financial requirements vary from the above SDC and Danida will fund the actual requirement proportionately (40/60) within the limits of total commitment.

Total Budget

Project Cost	1988	1989	1990	1991	1992	1993	Total
	1/7-31/12					1/1-30/6	
	US\$: 1000						
a) Coastal Belt RWSS	604.0	1,342.0	1,622.0	1,904.0	2,187.0	1,435.0	9,094.0
b) Low Water Table RWSS	699.0	1,178.0	1,770.0	2,292.0	2,998.0	861.0	9,798.0
c) Shallow Water Table RWSS	795.0	777.0	804.0	848.0	888.0	78.0	4,190.0
d) Maintenance and Rehabilitation	326.0	285.0	305.0	324.0	344.0	45.0	1,629.0
e) Village Sanitation	472.0	548.0	673.0	795.0	919.0	53.0	3,460.0
f) Urban Slums/Fringes RWSS	17.0	155.0	237.0	350.0	457.0	95.0	1,311.0
<b>Total Programme</b>	<b>2,913.0</b>	<b>4,285.0</b>	<b>5,411.0</b>	<b>6,513.0</b>	<b>7,793.0</b>	<b>2,567.0</b>	<b>29,482.0</b>

Project Funding

Already funded incl. carried over stocks	1,710.5						1,710.5
UNCDF	500.0	800.0	1,201.0				2,501.0
Swiss Development Corp.	281.0	1,394.0	1,684.0	2,605.0	3,117.0	1,027.0	10,108.0
Danida	421.5	2,091.0	2,526.0	3,908.0	4,676.0	1,540.0	15,162.5
<b>Total Funding</b>	<b>2,913.0</b>	<b>4,285.0</b>	<b>5,411.0</b>	<b>6,513.0</b>	<b>7,793.0</b>	<b>2,567.0</b>	<b>29,482.5</b>

## 6.8. Reporting, Monitoring and Evaluation

### 6.8.1. Reporting

Supervision will be provided by the territorial staff of DPHE as outlined in chapter 6.7.1.

To ensure the visits are carried out, and to feed back the information gained, the reporting system will be as follows:

- a) The SAE will submit a monthly report of all visits to the SDE, with a copy to the upazila engineer.
- b) The SDE will submit a monthly report to the EE with a copy to the upazila chairmen concerned covering all visits carried out by himself with a summary of visits reported by his SAEs.
- c) The EE will submit a monthly report to the SE with a copy to the upazila chairmen concerned covering all visits carried out by himself with a summary of reports received from his SDEs.
- d) The SE will submit a monthly report to the Additional Chief Engineer and to those officers where action is to be taken covering all visits carried out by himself with a summary of reports received from his EEs.
- e) UNICEF staff and WHO FSOs will share their field reports with DPHE staff concerned for follow-up action.

### 6.8.2. Monitoring

Monthly physical progress reports (Government and NGO) will be submitted by the SAEs to the SDE, by the SDEs to the EE, by the EEs to the SE (Zonal) and the EE (P&C), with a copy to UNICEF.

The Upazila Water Supply and Sanitation Committee will review progress every two months.

There will be a quarterly review of progress by the Zonal Review Committee (ZRC) of DPHE, attended by UNICEF staff.

The Ministry of LGRD, DPHE, UNICEF, and WHO will review progress and prepare a revised workplan every six months.

The semi-annual progress report will be provided to the donors and form the basis for a review meeting.

UNICEF will prepare the annual Programme Review and report to donors in September of each year.

Joint reviews should be carried out every two years, the first at the end of 1989.

In addition to the physical progress monitoring exercises UNICEF plans to assist the government in carrying out sample surveys to assess health impact. Likewise, DPHE plans to evaluate the village sanitation programme by the end of the project period, assisted by UNICEF and WHO.

### Analysis

Considering the many innovative activities in the new programme, primarily being qualitative and socio-economic in nature, there is a need to systematically monitoring these activities. In order to fully understand the development of these activities the project will require feedback of information to its central management concerning the quality of specific activities and their effect/impact; e.g. women's involvement and quality and effects of the family caretaker training programme.

It is therefore important that UNICEF establishes systems for monitoring of socio-economic and qualitative aspects of the programme. The main focus shall be on activities within the IA but also activities of a more general nature outside the IA, shall be monitored. These activities include:

- participation of users in the tubewell programme: tubewell application, site selection, maintenance and use.
- role of UWSSC's in tubewell allocation and users' involvement
- women's involvement in the process of tubewell application, site selection, health education and in the caretaker programme and elsewhere
- quality and effect of training activities
- use, maintenance and duration of water seal and homemade latrines
- quality of health and hygiene education carried out by TNMs (PHPs), HAs and caretakers.

As already suggested by Danida and UNICEF in previous reports (1985 - 86) the monitoring system shall be process evaluation oriented. The most appropriate methodology to apply is therefore to carry out smaller sample studies rather than more superficial surveys based on a few recorded data. For the monitoring (and future evaluation) of activities within the IA the monitoring package recommended by Danida in the "Framework for Implementing the Strategy for Health Promotion of December, 1985 shall be implemented in the IA upazilas (ref. chapter 8.6.8., pp. 32-34). This has also been pointed out by UNICEF in a working guideline/manual on the IA prepared in November 1986.

For all monitoring and evaluation carried out in the programme it is important that data and analyses are made directly available to project management for operational use in the steering of project activities. Such steering may very well include revisions of specific policies and priorities with a subsequent change in the activities being implemented.

In order to make the suggested monitoring/process evaluation activities possible for UNICEF additional staff will be required. The mission therefore recommends that a local Bangladeshi UNICEF programme officer responsible for the monitoring of socio-economic and qualitative aspects shall be engaged by the start of the next 5 year programme. The post shall be funded by Danida in addition to the budget. During the initial development of the monitoring system the programme monitoring officer should be assisted by a short term Danida consultant. He/she will engage the existing staff at the UNICEF zonal offices in the monitoring activities to the extent possible. For certain specific in-depth studies assistance from local research institutions will be taken. Proposed terms of reference for his/her assignment are presented in Annex VII.

#### 6.8.3. Evaluation

The programme was evaluated in 1979 and has been reviewed in 1982, 1985 and 1987. The next in-depth evaluation should take place in 1990 - 91 when the planned monitoring system has been developed and implemented. The evaluation should focus on social balance, women's involvement, training and health and hygiene promotion.

As suggested in para 6.7.3 the programme should be reviewed in the latter part of 1989 with the purpose of reviewing plans and budget to actual implementation and to GOB sector allocations for the fourth 5 year plan (1990-95). The review should also identify areas of special concern for the above evaluation and possibly design special studies to be conducted prior to the evaluation.