

822

PK.BA 89

**RURAL WATER SUPPLY HEALTH
AND SANITATION PROJECT
FOR BALOCHISTAN**

**PROJECT PREPARATION DOCUMENT
FOR WORLD BANK APPRAISAL MISSION**

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WORLD BANK ASSISTANCE FOR RURAL WATER SUPPLY IN BALUCHISTAN

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1. **BACKGROUND**

Refer to Strategic Investment Plan Report

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2. THE PROJECT

2.1 Objectives

The general objective is to improve the implementation of rural drinking water supply schemes and related water source development. These schemes should be cost-effective and sustainable.

Specific objectives include institutional strengthening for PHED, technical assistance for line department staff, and limited financial assistance for new and rehabilitated water supply schemes.

The goal is to assist the Government of Balochistan to increase rural water supply coverage in a cost-effective manner, given the existing funding levels available from the Provincial Annual Development Programme. The PHED has limited capacity to implement the aggressive programme for new water supply schemes, particularly the development of new sources. The improper development of water sources can create problems in the future which decrease service levels and require costly mitigative actions by PHED. Institutional aid and technical assistance will enable PHED to cope with the large task at hand and will improve the sustainability of schemes. Greater involvement of communities in planning, implementation and operation of schemes will enhance the quality of service and cost recovery.

2.2 Rationale for IDA Involvement

The Government of Balochistan has given highest priority to investment in water supply schemes and development funding from the ADP has increased dramatically to meet these demands.

The primary responsibility of this programme rests with PHED, which was created in 1987, having been bifurcated from the Irrigation Department. PHED was been allocated capable technical staff to meet the needs for implementing new schemes, but they have weak institutional support facilities which reduces their efficiency and adversely affects the quality of their work. The first priority is to improve the capabilities of existing technical staff and employ some professional staff in key positions, particularly the Electrical and Mechanical Division, which is responsible for water source development, and the Design and Planning Cell.

The World Bank, through the International Development Agency (IDA), can assist the Government of Balochistan by providing institutional aid for PHED. The Government has given PHED the mandate and development funds to construct new water supply schemes but PHED does not have adequate equipment and facilities to properly complete their tasks. Such funding is difficult to obtain given the financial limitations and the political desire to see evidence that funding has gone into new water supply schemes. Consequently, plans for institutional strengthening have been repeatedly postponed.

PHED has been doing a commendable job regarding the completion of water supply schemes that are technically sound, although they tend to be somewhat costly. One common problem that was identified related to the development of new water sources (which are inevitably tubewells). Several concerns were identified:

- the efficiency of developing tubewells is very low (eight to ten production wells per rotary rig);

- . as a result PHED can only develop 60 tubewells each year, which is less than one-third of requirements for 1989/90 (other departments have been given the responsibility to develop another 100 tubewells but at higher cost and less control/supervision by PHED);
- . technical limitations have resulted in improper siting and/or development of the tubewells, particularly in areas with more complex aquifer characteristics; and
- . the inability to make quick repairs to machinery and equipment increases down-time and inefficiency.

The solution to these problems requires technical training and assistance in addition to new equipment and facilities. Technical assistance for drilling deep tubewells in the complex hydrogeological environment throughout Balochistan is not readily available in Pakistan and the cost of developing technical expertise is too costly for the Government of Balochistan. It should be noted that PHED does not require sophisticated expertise for groundwater investigation because this is justifiably the mandate of WAPDA Hydrogeology. What PHED requires is the capability to assess groundwater potential at selected sites, properly analyze data, and properly design and install tubewells.

Despite the rapid increase in development funds, PHED faces another constraint in terms of its recurring budget. Although the long term solution is greater cost recovery, there is an immediate need for funding to repair and improve existing schemes. These needs are occasionally met out of the development budget in the case of larger rehabilitation or extension projects, but smaller improvements that would give immediate and economical benefits are denied for lack of funds

in the recurring budget. This need could be met by the World Bank. Similarly, there may be demands for higher service levels that have not been met; these could offer good opportunities to promote new cost recovery mechanisms.

2.3 Project Description

The Rural Water Supply and Sanitation Project can be divided into 9 components:

- . Procurement of Equipment;
- . Office Construction;
- . Consulting Services;
- . Training and HRD;
- . District Water Supply Plans;
- . Source Development (TW);
- . Rehabilitation of Water Supply Schemes;
- . Water Resource Management;
- . Water Supply and Drainage for Larger Rural Communities;
and
- . Low cost Sanitation for Larger Rural Communities.

2.3.1 Procurement of Equipment

PHED requires new equipment to improve the institutional capability to implement planned schemes and to upgrade the quality standards. The major items include the purchase of vehicles for field staff; drilling equipment and spares (including one new rotary rig plus equipment and spares to maintain existing drilling rigs over 3 years.); five mobile workshops for repairing machinery and equipment; a water laboratory and office equipment (see component 2).

It has been proposed that the World Bank provide credit to purchase vehicles for LGRDD field staff, since LGRDD is responsible for sector needs at the village level. Also, the Planning & Development Department is responsible for formulating investment plans and approving annual development schemes. Their ability to perform long term sector planning is limited by insufficient staffing and lack of good data-bases on water supply schemes and needs. The Bureau of Statistics, within P&D handles data management. The project proposes to expand their capabilities by financing a mini computer system that can be used by the various Sections in P&D.

2.3.2 Office Construction

PHED is a newly created Department that grew out of Irrigation and Power. Their annual development budget is now the largest of all departments, yet the staff are working out of temporary facilities (old Irrigation buildings or rental facilities). The long term needs of PHED have been identified in Annex A and now is an appropriate time to provide good office accommodations for the central and decentralized staff. A main office is proposed for the Chief Engineer and his staff, including new office space for an expanded Technical and Planning Cell and Laboratory.

Offices for 6 Superintending Engineers offices will be provided in the six divisions/circles. Each will accommodate an Executive Engineer and Sub-Divisional Officer plus their normal complement of staff. These offices will have garages and warehouse facilities to support operating requirements and provide a base for one mobile workshop. Offices for other Executive Engineers will accommodate an S.D.O. and will have adequate space for stores required for servicing water supply

schemes. In the more isolated areas, separate S.D.O. offices are required.

The project will manage the design, contractor selection and construction of the office buildings. Provision has been made to properly furnish the new offices (utilizing existing assets where available) and providing new office equipment, including drafting equipment, computers, and reproduction equipment.

2.3.3 Consulting Services

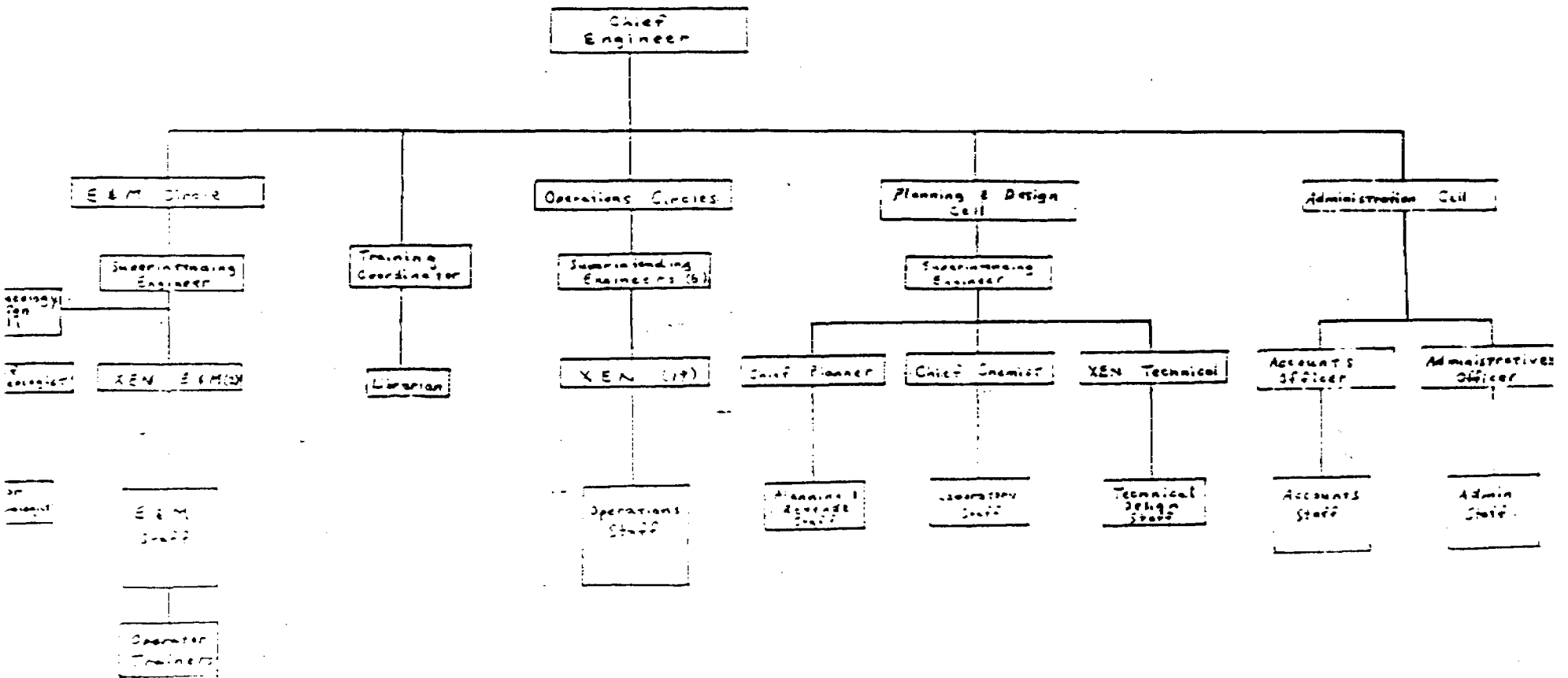
The initial focus of the project involves institutional strengthening and technical assistance for PHED. Consulting services are required to formulate training programmes for PHED staff, including a detailed assessment of human resource capabilities and training requirements.

A second aspect includes institutional restructuring for PHED, including setting up the Design and Planning Cell and providing assistance for organizing and operationalizing the cell. Similarly, the Electrical and Mechanical Division is being expanded to include increased drilling capability, design expertise, and an operator training cell for maintenance of schemes. The proposed organizational structure of PHED is shown in Figure 2.1.

2.3.4 Training and Human Resource Development

PHED has no formal training programme and many of their staff lack the opportunity to expand their knowledge to keep pace with changing needs of the department. Promotions are on the basis of education and seniority but in-programme training is not normally a consideration for faster promotion.

Figure 2.1
PROPOSED ORGANIZATIONAL STRUCTURE FOR PHED



Training is an integral part of the project and involves the following 8 sub-components. More detail is provided in Annex A.

1) Electrical and Mechanical Professional Staff

This includes advanced training for mechanical engineers, hydrogeologists, geologists and supervisors. Foreign fellowships are proposed for the four hydrogeologists. Courses will focus on tubewell design, proper investigation and development, tubewell monitoring and evaluation, and tubewell rehabilitation.

2) Drilling Crews

On-the-job training is proposed for each of the drilling crews on a rotating basis. The objective is to improve quality, increase efficiency and ensure proper use of new equipment.

3) Technical Design Staff

For the technical design engineers, the training will focus on cost effective water supply schemes, new technologies (low cost options), and sanitation/drainage. A key area of concern is the sizing of pumps for tubewell schemes (this requires coordination with the Design Hydrogeologists). The alternatives for distribution and levels of service are an important issue. Also, PHED requires more expertise for water treatment facilities for surface water supplies. This will be important for increasing rural coverage in Kachhi and Nasirabad.

4) Planning and Community Relations Staff

The Planning branch is a new addition which will administer the role of scheme investigation, selection, and PC-I, PC-II preparation. This cell will be responsible for monitoring implementation and will require and assess PC-IIIs and PC-IVs for each project. Technical scrutiny of schemes will be provided by the Technical Design branch. The Planning branch will have Community Relations Officers to prepare feasibility reports on new schemes, liaise with Community officials, and negotiate operating and maintenance responsibilities of schemes. This will be an integral component of cost recovery measures (eg. tariffs for house connections or direct community operation/financing of schemes).

On-the-job training will be essential to assess the viability of new procedures and make modifications where necessary (trial process).

5) Operator Training

No formal training is provided for operators of new schemes. The proposal is to develop a "train the trainer" programme for new staff (mechanical and electrical sub-engineers) who have the responsibility of training new operators and upgrading skills of existing operators.

A second component involves training courses for SDOs and sub-engineers for monitoring water supply systems. They will collect data on the operating performance of schemes at regular intervals. They will inspect schemes for preventative maintenance and identify problems before they result in major breakdowns.

6) Laboratory Staff

The new laboratory should be functional by the end of year 2. The laboratory staff will require some on-the-job training to learn specific requirements for water quality testing. This training will be coordinated with water sample procedures and collection for PHED field staff.

7) Administrative Staff

PHED's administrative staffing capabilities are weak and not well suited for revenue collection and cost recovery measures. The proposed training programme would focus on the accounts, auditing and general administration duties.

8) Human Resource Development

The above mentioned training components are designed to meet specific short term requirements of PHED to provide the most effective benefits for sectoral development. Long term training requirements are equally important and therefore providing in-house training capabilities to PHED is essential. An expatriate training specialist will work with a PHED training coordinator to assess human resource capabilities, determine requirements, and develop training programmes. A library will also be established.

2.3.5 District Water Supply Plans

One of the first priorities for the sector is to improve long term planning capabilities. This will require some additional staffing, a comprehensive inventory of existing water supply, estimates of demand, and improved coordination between the various implementing agencies. This responsibility resides

with the Planning and Development Department. Recommendations have been made to bifurcate the Water Section into two parts

- Water Supply and Sanitation; and
- Irrigation and Power.

Under each of the Sections, new staff will be required to provide full complements. This will enable increased manpower for sectoral planning, coordination and monitoring.

The first task of the new Water Supply Section will be to develop a comprehensive data base of existing systems implemented and/or operated by various agencies and the private sector. This inventory will be compiled on a district wise basis with the assistance of the consultant's team. PHED has a good database that needs to be expanded and verified in the field. LGRDD has a list of completed projects but with very little information on each scheme; subsequent verification will be a difficult and time consuming task, particularly for the smallest schemes (e.g relining of open wells, water tanks, etc). Other agencies like BIAD and Pak-German can readily provide details for their specific schemes. The private sector has provided traditional schemes such as karezes and open wells. Field verification is essential to determine the conditions of these schemes.

The consultant will coordinate the collection of information (primarily from PHED) and will provide a junior engineer full time for field verification. This task will take 24 months. The data will be assembled by PHED (and other relevant agencies) and provided to the Bureau of Statistics within the Planning and Development Department for data entry on the new computer system.

Information will also be gathered on the demands for water supply in each district by enumerating villages with unsuitable or insufficient water supply. A suggested list of data to be collected is shown in Table 2.1. A sample of a proforma already used by PHED is attached.

This information will be tabulated by the Bureau of Statistics computer staff and analysed by the Research and Planning Officers within the Water Supply and Sanitation Section. This will form the basis for long term district water supply plans. The P & D staff will liaise with the line departments (PHED Planning Staff and Executive Engineers and LGRDD R.W.S.S. cell and District Planners) and local officials to develop plans for each district. This process will take 24 months and these plans would be used as guidelines for future development. These plans should be reassessed and updated annually.

Table 2.1 DATA REQUIREMENTS FOR EXISTING SCHEMES

Name of Scheme:
Location:
Implementing Agency:
Year of Construction:
Year (s) of Augmentation/Improvement (if applicable)
Operating Agency:

Type of Scheme:
Water Source:
Design Capacity:
Present Capacity (Daily supply):
Present Population Served:
. House connections;
. Stand posts; and
. other.

Storage Capacity:
Original Capital Cost:
Cost of Augmentation/Improvement:
Cost per Capita:
Monthly O & M Cost:
Unit Cost per thousand gallons of water:
Present Status/Problems:
Proposed Plans:
Quality of Water:
Revenue Collection:

EXISTING PROFORMA USED BY PHED.

1. S.No. 1
2. NAME OF SCHEME. MANDAN WATER SUPPLY SCHEME
(DISTT: PISHIN)
3. COST

i.	CAPITAL COST	Rs. 2.449 million
ii.	AUGMENTATION COST	
	Year	Rs. ___
	Year	Rs. ___
iii.	EXTENSION & IMPROVEMENT	
	Year	Rs. ___
	Year	Rs. ___
<hr/>		
G.Total		Rs. 2.449 million
<hr/>		
4. DATE/YEAR OF COMPLETION. 1985
5. POPULATION SERVED (ACCORDING TO 1981 CENSUS-SOULS). 6000

6. COMPONENTS OF SCHEME.

1. Tube well.
2. Pump House with pumping machinery.
3. Chowkidar quarter.
4. Storage tank 5000 gallons - 2 Nos.
5. Storage tank 50,000 gallons capacity.
6. Public stand posts.

7. SOURCE.

- I. SPRING.
- II. OPEN SURFACE WELLS (WITH NOS). 1 NO.
- III. TUBE WELLS (WITH NOS).
- IV. CANAL WATER.

8. <u>MONTHLY RUNNING AND MAINTENANCE COST.</u>	Rs. 4000/-
9. <u>UNIT COST PER THOUSAND GALLONS OF WATER.</u>	Rs. 2.72
10. <u>COST PER CAPITA</u>	Rs. 408.16
11. <u>BRIEF DESCRIPTION</u>	

The scheme was completed in 1985. The discharge of the Tubewell is too measure to meet with the demand of the population of the area. Another tubewell was drilled adjacent to old tubewell, but this too failed. At present the scheme is not functioning. An other tubewell is necessary to be drilled to bring the scheme into operation.

12. DAILY SUPPLY IN GALLONS. 30,000 gallons.
13. PUMPING EQUIPMENT (WITH TYPE).
Submersible pump (KSB) 20 H.P.

14. DETAILS OF MAIN AND DISTRIBUTION SYSTEM.

<u>MAIN</u>	<u>DISTRIBUTION</u>
1. Type. "B" Class PVC pipe	1. Type. "B" class PVC pipe.
2. Dia. 4" dia	2. Dia. 3" dia
3. Length. 9800 Rft.	3. Length 25250 Rft.

15. CHLORINATION

Bleaching powder.

2.3.6 Source Development (Tubewells)

The development of water sources for new schemes has become a constraint for PHED because the demand (and funding) for new schemes has increased dramatically (150 new schemes started in 1989/90) while PHED's capability for developing new sources (primarily deep tubewells) has only increased modestly. Also, the development of new sources has been a difficult task because it involves: the coordination of equipment amongst various agencies; difficult accessibility to sites; political interference in selection and prioritization of new sites; lack of technical expertise for investigation and development; and lack of equipment, spares and repair facilities to maintain drilling rigs. For these reasons, each rotary rig only completes an average of eight development wells each year.

The proposed technical assistance would assist the Electrical and Mechanical Division to enhance their capability to develop new sources. The project would finance the cost of new source development as follows:

<u>Fiscal Year</u>	<u># of Tubewells</u>	<u>Total Cost (Rs. million)</u>
1990-91	0	0.0
1991-92	20	5.7
1992-93	20	6.1
1993-94	20	6.5
<u>Sub-total</u>	<u>60</u>	<u>18.3</u>

The Project team would coordinate this programme with related components, including:

- 1) procurement of drilling equipment and spares establishment of mobile workshops;
- 2) reorganization of the E & M Division into a separate Circle;
- 3) training of professional staff, drilling crews and operators; and
- 4) a programme for monitoring and evaluating groundwater sources and water supply systems.

The new central workshop will be completed by 1990 and the consultants would assist PHED staff in operationalizing the workshop with an aim to reducing downtime of drilling rigs, thereby increasing their efficiency. They would assist in operationalizing the proposed mobile workshops.

2.3.7 Rehabilitation of Water Supply Schemes

At present, the needs for rehabilitating PHED water supply schemes exist but the situation is not critical and new

schemes are clearly higher priority. Nonetheless, when schemes require rehabilitation, quick action is required to maintain service levels to customers. The main causes of problems relate to failure of the tubewell or failure of the pumps and motors. The latter problem requires immediate attention to repair or replace the equipment to make the scheme functional again. This problem can be quickly and effectively resolved, provided skilled technicians and spare parts are available. These conditions should be satisfied with the proposed institutional strengthening.

The failure of the tubewell can occur gradually which requires investigations by qualified staff and solutions may take several weeks to rectify, particularly if a new tubewell is required. Annex A describes the principals of hydrogeology for rehabilitation of tubewells. The objective is to follow a least cost approach that is technically viable for the local conditions and compatible with future demands. This investigation and rehabilitation will be supervised by the project team. Technical assistance will be provided for testing, evaluation and design of solutions. The World Bank will finance part of the equipment and civil works required for rehabilitation. This will typically include some extensions to existing systems and possibly upgrading service levels. One option is to provide house connections in large communities, provided the beneficiaries are willing to contribute to the installation cost and are committed to pay water charges.

2.3.B Water Resource Management

Water resource investigation and management (including groundwater protection/replenishment) is the responsibility of WAPDA, the Irrigation Department and to a lesser extent,

the Forestry Department. However, PHED should monitor and evaluate their existing tubewells and operating characteristics, from the view point of system operation and groundwater management. This information will be used directly by PHED but should also be provided to the Irrigation and Power Section of P & D to enable coordination between all agencies using groundwater resources. The Project team would assist PHED (E & M Circle) to set up a monitoring and evaluation system. The SDOs and sub-engineers would have to be trained to collect data at regular intervals (three times a year) for each water supply system.

The Project team would also provide technical assistance to set-up, operationalize the water quality laboratory and train laboratory staff. The laboratory can only provide a useful service provided that water quality data is properly collected for the water supply schemes and potential new sources. This information should be collected by SDOs and sub-engineers new water sources can be tested by the sub-engineers with in E&M. Finally, water quality testing is not an end in itself but rather provides information that has to be acted upon. In the case of tubewell schemes, some water purification may be required to maintain quality of the distribution system and storage tanks. Testing would also identify any increases in salinity to aquifer depletion. Such information would be used to determine appropriate mitigative actions.

The water quality laboratory will obviously be instrumental for the assessment of water treatment requirements for surface water supplies. These systems will be more prevalent in the future to provide coverage to areas like Kachhi and Nasirabad, which are more densely populated but rely upon untreated surface water.

2.3.9 Water Supply and Drainage for Larger Rural Communities.

This component is being prepared by NESPAK for a selected number of the township schemes that are presently under investigation.

2.3.10 Low Cost Sanitation for Larger Rural Communities

It is proposed that LGRDD take the lead role in the provision of low cost sanitation in larger rural communities (i.e. townships). The approach should be based on WASA's programme being implemented in Guetta. (See attachment in Annex K). The costing for this programme will be prepared by NESPAK.

2.4 Cost Estimates

Refer to Cost Tables and detailed costing in Annex A.

2.5 Impact on Current Sector Resources

2.5.1 Development Expenditures

PHED has a development budget of Rs.270 million for 1989/90, of which Rs.233 million is for rural schemes. The allocations for water supply schemes have increased as follows:

	<u>Current Prices</u>	<u>Constant Prices</u>
- 1984/85	Rs. 50 million	Rs. 81 million
- 1985/86	Rs. 65 million	Rs. 96 million
- 1986/87	Rs. 80 million	Rs.106 million
- 1987/88	Rs.163 million	Rs.195 million
- 1988/89	Rs.196 million	Rs.215 million
- 1989/90	Rs.270 million	Rs.270 million

Of the Rs.233 million allocated this year, Rs.192 million (82%) is for new or ongoing (and uncompleted schemes); Rs.22 million (9.5%) is for extension and improvement of existing schemes; and Rs.19 million (8.5%) is solely for water source development. Note that many new schemes also include source development in the cost, therefore the total amount of expenditures on water source development is roughly Rs.60 million this year.

The proposed assistance from the World Bank would range from Rs.90 to 100 million each year, of which roughly 25% would be for institutional strengthening, 20% for rural water development and 55% for township schemes. Since the majority of the World Bank assistance is for institutional aid, this impact is very significant (Rs.10 to 20 million in each of the first 5 years). This year Rs. 5 million was allocated to complete the E&M workshop and last year Rs.16 million was allocated to purchase vehicles, spare parts and equipment for drilling rigs. Prior to these, the only large investment involved the purchase of 6 rotary rigs (through a grant from the Japanese in 1985).

Roughly Rs.15 million will be allocated annually to rural water supply schemes, representing 4% of the present ADP allocation. Much of the proposed World Bank financing includes technical assistance for water development and rehabilitation of schemes. The impact on PHED's annual development plan would be minor and would not place a burden on the implementation capability of PHED. However, these investments would generate greater than average benefits because the technical assistance will enhance PHED's implementation capability for all schemes. Also, for the rehabilitation component, small expenditures on repairs and improvements can restore benefits to existing schemes. Maintaining service levels with cost-

effective measures will be an increasingly important prerequisite for PHED in future years. Project benefits are described in Section 5.1.

2.5.2 Recurring Expenditures

The rural component proposed World Bank project will have a negligible impact on recurring expenditures because the development aspects are minor. The impact of institutional strengthening will be much greater owing to increased staffing (administrative and professional), operating costs of vehicles, and fuel and maintenance costs of offices and workshops. The impact of the townships component will be much greater but cost recovery is expected to offset these incremental costs. Estimated costs are shown in Annex F and summarized in Table 2.2.

Table 2.2

ESTIMATES OF RECURRING COSTS - PHED

Rs ('000) - in current prices

<u>Component</u>	<u>1989/90</u>	<u>90/91</u>	<u>91/92</u>	<u>92/93</u>	<u>93/94</u>
1. <u>Administration</u>					
Officers	3168	4114	4402	4688	5725
Other Staff	27068	34545	38498	41281	44173
Allowances	18802	24250	20328	30355	32895
Operating Expenses	4322	7196	7065	6379	7697
Sub-Total	53360	70105	78293	82703	90490
2. <u>Running and Maintenance of Water Supply Schemes</u>					
Fuel Cost	18,500	25,000	32,000	40,000	49,000
Machinery & Equipment	20,000	15,000	16,200	17,300	18,500
Sub-Total	38,500	40,000	48,200	57,300	67,500
3. <u>Other Maintenance Costs</u>					
Buildings	9000	6320	5622	6923	7743
E&M Equipment	6400	8350	9018	9650	10275
Sub- Total	15400	14670	14640	16573	18,018
Total	107,260	124,775	141,133	156,576	176,008
- Constant Prices	107,260	113,432	118,799	123,176	130,012

2.6 Financing

2.6.1 Source of Funding

The total assistance to be provided by the World Bank would be Rs. 777 million (US\$ 37 million) during the 8 year project period. This would be entirely financed through IDA. In addition, the Government of Balochistan would provide Rs. ___ million from the Special Development Programme (financed by the Government of Pakistan). These local funds would offset the cost of project related items that are not covered by the World Bank loan. These would include:

- . local taxes and tariffs on new equipment purchases (estimated to be Rs. ___ million);
- . 20% of the cost for civil works contracted locally (estimated to be Rs. ___ million); and
- . 20% of goods and equipment procured by local contract bidding (estimated to be Rs ___ million).

2.6.2 Allocation of Funds

The majority of the project funding will be allocated through PHED. This will include the institutional aid, and the equipment and civil works expenditures for water source development and water supply schemes. Several contracts will be prepared which can be executed by PHED since they involve local bidding. Only the special equipment for drilling rigs and possibly the procurement of vehicles would be open to international bidding.

The technical assistance would be provided through international bidding, involving a combination of foreign and local consultants.

2.6.3 Disbursement Schedule

Refer to Table 2.3.

3. **PROJECT MANAGEMENT AND IMPLEMENTATION**

3.1 **Project Management**

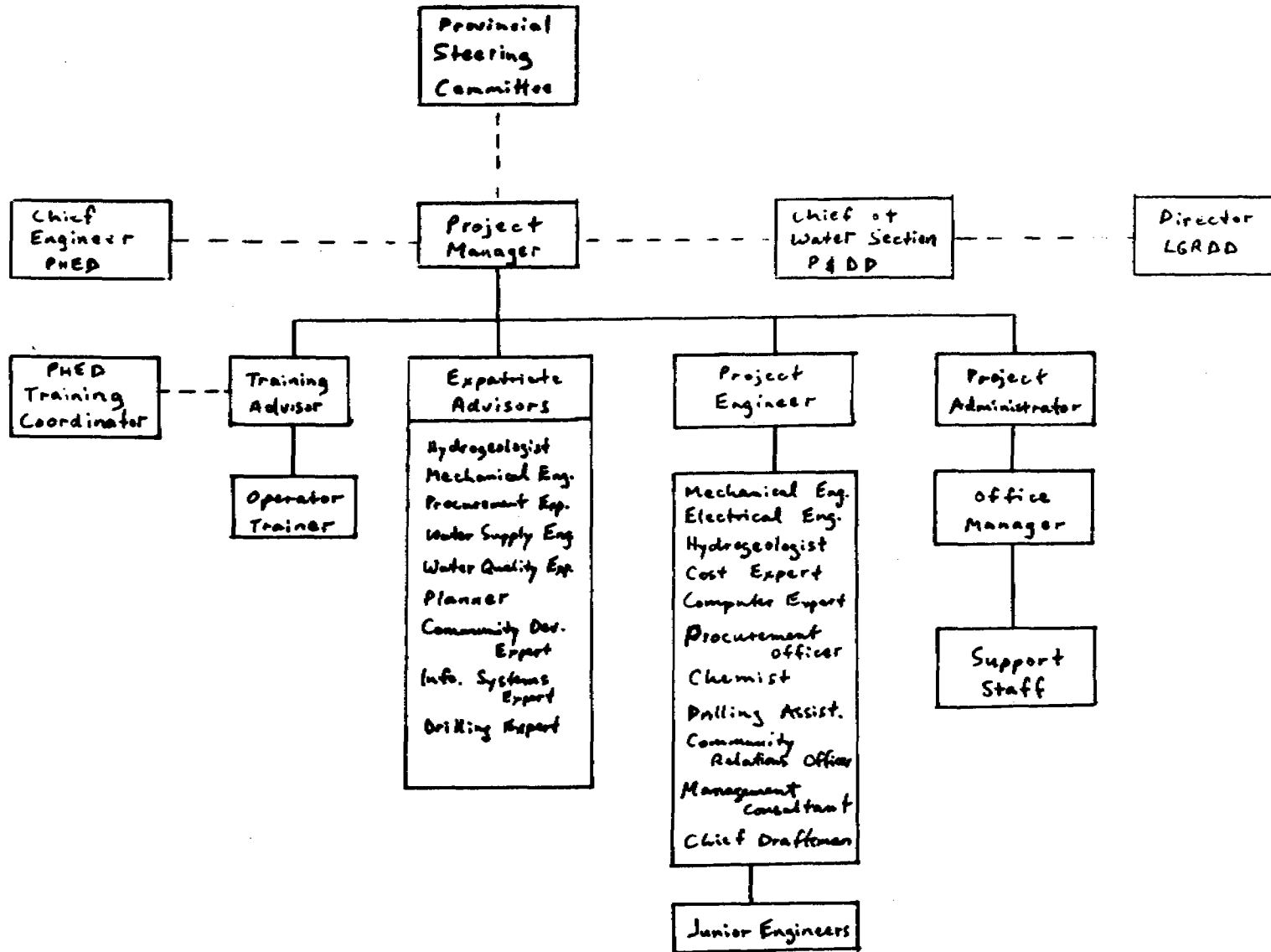
The project would be managed by a foreign consultant who is primarily responsible for the technical assistance. The project manager would deal directly with the Chief Engineer PHED for the implementation of schemes and local contracting. Foreign specialists would be brought in on a short term basis for technical training, supervision of implementation and evaluation of the project. The training and human resource development would be managed by a foreign training consultant, whose counterpart would be the new PHED training coordinator. The water source development, rehabilitation of schemes and related on-the-job training components would be handled primarily by local consultants under the direction of a project engineer. These staff would be supported by the expatriate consultants at various stages.

Staff within PHED would be available on secondment to the team (assistant engineers). Local staff would be hired for support including drafting, secretarial staff, office manager, clerk, drivers, etc.

The project staffing and responsibilities are shown in Table 3.1. The schedule for staffing requirements and man-month effort are shown in Figure 3.1, Table 3.2 displays to various manpower inputs by component. A project organization chart is provided in Figure 3.2.

Figure 3.2

PROJECT TEAM ORGANIZATION CHART



3.2 Operational Plan of Action (see Figure 3.3)

	<u>Timing (mo.)</u>
1. Mobilization of Project Office	01 - 02
- setting up office and facilities	
- staffing (consultants and support staff)	
- procurement of project vehicles	
2. Establishment of PHED counterparts	01 - 02
3. Preparation of tender documents for PHED office accommodations	02 - 05
4. International bidding for vehicles (I)	02 - 04
5. Preparation of contracts for field equipment	03 - 05
6. Technical assistance for E&M Division	03 - 20
7. Selection of sites for source development	08 - 12
8. Training with new equipment	16 - 20
9. Preparation of tender documents for other offices and workshops	03 - 06
10. Groundwater testing & development - PHED (including on the job training)	12 - 46
11. Investigation and selection of schemes for rehabilitation (primarily tubewells)	06 - 24
12. Design of rehabilitation schemes including technical training	08 - 12
13. Preparation of contracts for rehabilitation (civil works and equipment - local bidding)	12 - 30
14. Rehabilitation of schemes	16 - 46

3.3 Implementation Schedule

Figure 3.1 provides the proposed timing for the project components. This schedule is conditional upon completion of certain pre-project activities, as indicated.

3.4 Procurement

3.4.1 Civil Works

There are four components which involve civil works -- 1) office construction, 2) rehabilitation and extension of water supply schemes, 3) water supply and drainage schemes for townships, and 4) low cost sanitation for townships. Each of these will form a separate contract. The first two components will be open to Local contract bidding while the larger schemes for the township would likely involve international contract bidding.

3.4.2 Equipment

There are various equipment procurement packages:

- . equipment for institutional strengthening:
 - . drilling equipment;
 - . mobile workshops;
 - . laboratory equipment; and
 - . computers (P&D).
- . equipment for new officers;
- . equipment for rural water supply;
 - . rehabilitation and extension;
 - . tubewell development; and
 - . monitoring and evaluation of tubewells.
- . equipment for townships water supply and drainage; and
- . equipment for low cost sanitation.

There would international contract bidding for the drilling equipment, mobile workshops, laboratory equipment and computer system. The procurement of mobile workshops, tools and laboratory equipment can be locally since equipment is available in Pakistan.

The equipment for new offices would be procured locally and open to domestic bidders.

The equipment for rural water supply schemes falls into district categories. For tubewell development, no direct procurement is necessary because this involves on in-house expenditure for PHED. For the rehabilitation and extension of water supply schemes, equipment can be procured domestically. Since this is a relatively small component with various small equipment requirements, it is recommended that local contract bidding be used. For monitoring and evaluation of tubewells, special equipment is required that is not available in Pakistan; this procurement package would be open to international bidding. For the township schemes, the equipment packages are much larger and would be open to international contract bidding, with the exception of low cost sanitation.

3.4.3 Vehicles

Vehicles are required for PHED and for LGRDD, costing roughly \$1 million. The proposed types of vehicles are available locally but involves large foreign cost component. The procurement of vehicles would be open to international bidding. It is recommended that the procurement be split into two packages to meet the scheduling requirements of PHED and LGRDD (e.g. 1990/91 and 1993/94).

3.4.4 Training and Technical Assistance

Two packages for consultancy are proposed:

- 1) for the institutional strengthening and training components, including on-the-job training for tubewell development, rehabilitation and monitoring and evaluation; and
- 2) for the townships water supply and sanitation schemes.

It may be desirable to contract the low cost sanitation component separately.

3.5 Operations and Maintenance

3.5.1 Rural Water Supply

The programme for rural water supply focuses on institutional strengthening and technical assistance. Many of the components are in fact proposed to resolve operations and maintenance problems, including cost recovery. In this respect, the burden of operations and maintenance should be eased as a result of the project. More detail is provided in Section 4.

3.5.2 Township Water Supply and Drainage Schemes (NESPAK to provide)

3.5.3 Low Cost Sanitation

The beneficiaries will be responsible for the operation and maintenance of latrines. This is consistent with LGRDD present development policies.

3.6 Monitoring and Evaluation

A Provincial Steering Committee has been established for the rural water supply, health and sanitation sector. Chief Secretary (Dev. of P&D and includes the Secretaries of PHED, LGRDD, P&D and Health. The proposed projects (World Bank and Dutch) will report to this Steering Committee to receive direction on project components, to agree on policy decisions and to report on progress made. The Steering Committee should meet every two or three months and other relevant agencies will be invited as appropriate.

The Project Teams will liaise directly with the Chief of Section (water) for P&D, the Chief Engineer of PHED and the Director of LGRDD for day-to-day requirements.

Quarterly progress reports will be submitted to the Steering Committee. The World Bank will send missions to evaluate progress every six months for the initial four years.

4. FUTURE FINANCING AND COST RECOVERY

4.1 Proposed Sector Financing

The majority of financing for development of water supply schemes will continue to come from the Annual Development Programme, primarily through PHED and to a lesser extent LGRDD. During the remaining three years of the 7th Five Year Plan, Rs 900 million is anticipated for water supply schemes, of which 90% would be channelled through PHED (this includes the projected ADPs for PHED, LGRDD and Special Programmes within the ADP). This level of annual investment from the ADP is expected to increase slightly during the 8th Five Year Plan, amounting to Rs 1650 million in total.

The World Bank is expected to provide credit of approximately Rs 300 million for institutional strengthening (PHED and P&D) during the next four years. The World Bank would provide an additional Rs 400 million credit for water supply and sanitation in larger communities.

The Government of Netherlands have proposed grants for LGRDD (and the related health components) in the order of Rs 100 million during the next 4 years and possibly a similar commitment for the subsequent 4 year period.

The European Economic Commission (EEC) has decided to allocate approximately Rs 150 million to complete phase II of BIAD within a 2 to 3 year period.

The German Government through GTZ has decided to extend their programme in Balochistan but with greater emphasis on income generating schemes rather than infrastructure such as water supply schemes. Their programme will have very minor

financial impact on the rural water supply sector.

The British Overseas Development Agency has committed funds for the sector but have not as yet made any specific proposals in Balochistan. Numerous potential projects have been identified by other donors for water resource development, working primarily with Irrigation and WAPDA. These include the Dutch, the Italians, UNDP and the Japanese, all of which could involve investment in the order of Rs 500 million. USAID has also committed funding for infrastructural improvements in Makran Division. All of these projects could have an indirect on the rural water supply sector.

4.2 Affordability

Field investigations were performed by the World Bank consultants during the months of April and May in order to assess villager's ability and willingness to pay for water supply and sanitation (refer to Annex C). Fifty-five villages were visited in 11 of 20 districts in Balochistan. The results revealed that affordability was not a major constraint on people's willingness to pay, although it does influence the amount of money people are willing to pay for water supply. It was found that willingness to pay was good when the felt needs were greater, regardless of income levels. However, the majority of people demanded piped water supply schemes that were well beyond their ability to pay in terms of capital cost and, in many cases, operating and maintenance costs.

It is felt that people were willing to make some contributions to construction costs in terms of land and labour, but they are unable and unwilling to make sizeable financial contributions. With respect to operating and maintenance

costs, many people were willing to contribute Rs 20-30 per household per month. With a 100% recovery rate, these charges would typically cover the cost of operating and minor maintenance for piped water schemes with tubewell sources. However, the villagers could not afford to pay for major maintenance and repairs that are required periodically.

The willingness to pay for water supply is less when house connections are not offered. Since the cost of operating schemes with community tanks is only marginally less (10 to 15 percent) than the same scheme with house connections, full recovery of operating costs only appears feasible when house connections are used. There is also a question of equity since urban rates for water connections range from Rs 10 to 20 per month. In Balochistan, it would not be politically feasible to have higher rates in rural areas and if lower levels of service are offered (eg. community tanks, or daily periods with no water supply), even lower charges would have to be made. Further evidence of cost recovery experience is provided in Annex C.

Table 4.1 shows an assessment of affordability based on household incomes in rural Balochistan. The income information was based on Government surveys done in 1984-85. The income ranges were inflated to 1990 currency values but the household distribution within each income range was assumed to remain constant. The rationale for this assumption was that income distribution changes very slowly as evidenced by comparable figures for the rest of Pakistan. What this implies is that almost half of the households in rural Balochistan are below the poverty line (roughly Rs 1400 per month).

For water supply schemes, operating and maintenance costs would have to be recovered from the better-off households (50%). Table 4.1 shows that for households above the poverty line, monthly water tariffs of Rs 30 per household would require only 2% or less of total income, which is an acceptable charge. At Rs 40 per household, 27% of households would be paying 2-3% of total incomes which may be excessive. Therefore, more revenue would possibly be collected with a tariff of Rs 30, due to greater ability and willingness to pay at this level.

Table 4.1

ESTIMATED INCOME DISTRIBUTION IN RURAL BALUCHISTAN - 1990
(Based on Household income and Expenditure Survey, 1984-85 and inflated factor of 1.4; same income distribution)

<u>Household Income</u> (Rs per month)	<u>% of</u> <u>Households</u>	<u>% of Income for Water Supply Charge</u>		
		<u>Rs 20/H/m</u>	<u>Rs 30/H/m</u>	<u>Rs 40/H/m</u>
Less than 840	13%	> 2.4%	> 3.6%	> 4.8%
841 - 1400	34%	1.4-2.4%	2.1-3.6%	2.9-4.8%
----- Poverty line-----				
1401 - 2100	27%	1.0-1.4%	1.4-2.1%	1.9-2.9%
2101 - 2800	12%	0.7-1.0%	1.1-1.4%	1.4-1.9%
2801 - 4200	8%	0.5-0.7%	0.7-1.1%	1.0-1.4%
4201 - 6300	3%	0.3-0.5%	0.5-0.7%	0.6-1.0%
More than 6300	3%	< 0.3%	< 0.5%	< 0.6%
Average Income = 1970		1.0%	1.5%	2.0%

4.3 Cost Recovery

The Government of Balochistan recognizes that cost recovery is a pressing issue and the time has come for policy changes. Cost recovery mechanisms need to be worked out before any meaningful progress can be made. This will require changes for both the rural and urban water supply schemes.

4.3.1 Present Situation

For PHED schemes, customers with house connections are required to pay a Rs 500 connection fee and a monthly tariff of Rs 20 per household. PHED supplies roughly 20,000 rural customers with house connections. The total revenue collected (urban and rural) amounted to Rs 564,000 in 1987/88, representing a recovery rate of less than 10 percent. Recovery rates in rural areas are low due to difficulty in collecting charges in smaller remote villages. In total, the revenues only offset 1.4% of PHED operating and maintenance costs (excluding administration). In some urban areas, town councils are collecting water charges for house connections. Their recovery rate is similarly poor and the revenues are generally used to offset other local government expenditures. No transfer of funds are made to PHED, yet PHED is expected to meet the cost of operation and maintenance.

4.3.2 Policy Changes

The following policy changes are required:

- beneficiaries should contribute to the operating and maintenance costs of all PHED water supply schemes;

- . in rural areas, PHED will retain responsibility for major repairs, rehabilitation and extension;
- . any revenues to be collected by PHED should be credited to PHEDs future operating budgets;
- . PHED will only provide basic service levels unless communities are willing to finance higher levels (refer to Table 4.2 in Investment Plan Report - p. 193);
- . LGRDD will continue to only provide financial and technical assistance for schemes; villagers will be fully responsible for operation and maintenance;
- . legal contracts must be signed between the funding/implementing agency and the beneficiaries;
- . village water supply committees must be formed and take responsibility on behalf of the community;
- . in urban areas, the funding/implementing agency will deal with the elected councils or committees; and
- . PHED should implement a freeze on the hiring of new operating staff in order to reduce the labour requirements for schemes and to shift some of the manpower burden to villagers.

4.3.3 Cost Recovery for Rural Water Supply Schemes

Very little revenue is presently collected from beneficiaries of PHED rural water supply schemes. The objective is to implement a collection mechanism relatively quickly despite the absence of an effective revenue collection authority and

despite people's general lack of willingness to pay for government services. The proposed solution depends upon the new policies recommended above and focuses on the formulation of a village water supply committee and the signing of a legal agreement between PHED and the village committee.

In general, the responsibilities would be divided as follows:

Ownership of Scheme	-	Village Committee and PHED
Capital Cost		
Basic System	-	PHED
House Connections	-	Households (Rs 500 each for Connections plus materials and installation)
Operation and Maintenance		
Operating Staff	-	PHED (1 operator, 1 valveman)
	-	Village Committee (1 helper, chowkidar)
Fuel Costs (calculated on basis gallons/per capita/day)	-	Village Committee (up to a maximum that is of equivalent to Rs 30 per household at the time of implementation)
	-	PHED would subsidize any surplus amounts *
Minor Maintenance & Repair	-	PHED (supply of stores)
Monitoring	-	PHED
Major Repair	-	PHED
Rehabilitation, Extension and Improvement	-	PHED for basic service levels

* PHED calculates the O & M cost per 1000 gallons (based on 10 gallons per capita per day). Since the average household consumption is 2400 gallons per month (8x30x10), the maximum cost per scheme should be $Rs\ 30/2.4 = Rs\ 12.5$ per 1000 gallons. Any scheme costing less will have fuel costs fully paid by villagers. The schemes that cost more would have to receive some subsidy for fuel.

Implementation Steps for New Schemes

1. Request

Initial contact with the community would be through the Sub-engineer (trained in communication and the new implementation procedures). The Secretary of the Union Council should attend a village meeting at this time. Sub-sequently, a request for water supply would be made to the District Executive Engineer of PHED. The needs assessment would be conducted by a field research officer (within the Planning & Community Relations Cell) at the same time as the technical feasibility study is carried out by the SDO and the Sub-engineer. Care would have to be taken in assessing the community's needs and willingness to participate and contribute.

PHED would appoint a Community Relations Officer to handle future negotiations with the village(s).

2. Formation of Water Supply Committee

After technical assessments confirm pre-feasibility, the PHED Community Relation Officer would liaise with the villagers and assist them to form a Water Supply Committee. Villagers may also request assistance from LGRDD, since the Secretary of the Union Council has access to similar information through the Rural Development Academy. The Village Committee should be elected/appointed by a majority of the households in the village(s). Separate villagers may choose to form more than one committee.

The committee would have one chairman, one administrator (and one treasurer).

3. Feasibility Study

PHED engineers would prepare a feasibility study or PC-I for the scheme with cooperation from villagers. This would be scrutinized by the Technical Design Cell and by the Planning and Community Relations Cell to assess whether the scheme satisfies selection criteria and whether low cost alternatives have been considered. This assessment will determine the basic level of service to which the village is entitled for funding.

4. Negotiation

PHED will discuss the technical options and financial responsibilities of the scheme with the Village Committee. This will be conducted by the Community Relations Officer and supported by technical expertise when necessary. The options will clearly state the capital cost, the staffing requirements, fuel cost estimates, and other specifications. PHED would then describe the responsibilities of the Village Committee, particularly monthly fuel charges and local staff charges.

5. Agreement

The village committee will decide which, if any of options is suitable and will sign a legal agreement with PHED if the decision to proceed is agreed by the majority of members. The agreement will be binding upon approval of funding in the ADP and a deposit of money equal to four months fuel costs in an account set up by the Village Committee for monthly fuel payments.

6. Design and Construction

PHED will follow standard procedures for implementation of the scheme. The Village Committee will appoint a counterpart to monitor and report on the construction progress.

7. Training

PHED and local staff would receive training prior to completion of construction. The Helper hired by the village may also be responsible for collecting tariffs from households. As an incentive, this person could be paid a certain percentage of the collection fees.

8. Hand-Over

Upon satisfactory completion of the scheme, PHED would hand-over the scheme to the villagers and the contractual agreements would be fully binding. There would be joint ownership and operation of the scheme in most cases.

9. Revenue Collection

The Village Committee would be directly responsible for paying the salaries of the Helper/Tax Collector and the Chowkidar, and paying the monthly fuel charges as stipulated in the contract agreement. The Village Committee would be responsible for collecting tariffs on a formula agreed to by the members. (This would have been discussed at the negotiation stage). The bank account set up by the Village Committee would be used for depositing revenues and payment of accounts to WAPDA or the local diesel supplier. Monthly collection should be equalized and any surplus/deficit made up at the year end from the original deposit. Any adjustments

for the next year, including inflation, should be made based on the current years actual expenditures. Any default by the Village Committee would ultimately result in non-payment of fuel charges and the possibility of energy being cut-off to the scheme. This dispute would be settled by the Village Committee and the supplier.

10. Operation and Maintenance

The PHED Operator and/or Valveman would be responsible for running and maintenance of the scheme. They should be locally employed where possible. They would be permanent staff of PHED. PHED would provide regular parts and service for the schemes from their regional stores. Major repairs and maintenance would be financed by the Government subject to approval by PHED for repairs costing less than Rs 200,000 (financed from a lump sum provision for rehabilitation in the ADP/Recurring Budget); or approval in the ADP for repairs in excess of Rs 200,000.

Implementation Steps for Existing Schemes

The steps will be similar as those for new schemes, but the process will begin in a different manner. Initially, it may be difficult to convince people to pay charges for existing schemes until there is widespread evidence that the cost recovery policy is effective. However, many existing schemes could use some rehabilitation and improvement/ extension. This provides PHED with the opportunity to negotiate and enforce a contractual agreement for water supply. Schemes in dire need of rehabilitation would be the most logical place to start the new cost recovery procedures. Once cost recovery is widespread and functioning well, it would be possible to dictate that all schemes must negotiate agreements.

Regarding staffing, PHED would only retain the Operator and one Valveman on staff. Other staff would be redeployed on new schemes nearby or could choose to be employed by the Village Committee in their present job, if agreed to by all parties.

The proposed schedule for implementation is as follows:

- . Policy Changes by G.O.B. July 1990
- . Creation of P & CR cell in PHED July 1990
- . Trial Implementation with Schemes
Needing Rehabilitation July 1991
- . Full Scale Implementation for
New /Rehabilitation Schemes Jan. 1993
- . Implementation for all Existing
Schemes(at which time 50% of schemes
are achieving cost recovery) July 1996

Advantages of the Proposed Cost Recovery Mechanism

- . responsibility for payment resides with the beneficiaries, thereby creating a strong incentive for payment (penalty for non-payment);
- . no funds are transferred between the beneficiaries and PHED, thus PHED has no burden of revenue collection including:
 - . staffing (revenue collectors); and
 - . administration of accounts.
- . revenues are used specifically for each individual scheme (strong incentive to pay);

- . no legislation is required to redirect revenues from the central "pool" of funds;
- . PHED staffing levels are reduced with a direct saving on administration expenditures;
- . collection by PHED was deemed to be inefficient and costly for rural schemes;
- . villagers may utilize water more efficiently to reduce their fuel charges;
- . areas with low cost water supply can pay less, which is compatible with lower willingness to pay in areas where such options exist;
- . in high cost areas, an upper limit is set wherefore the Government would subsidize fuel costs (the objective is to reduce the number of these schemes in the future);
- . this system can be implemented for all schemes, thereby reducing inequities that arose with other experiments such as BIAD;
- . this will encourage adherence to selection criteria/ guidelines for new schemes by forcing beneficiaries to pay for higher service levels; and
- . compatibility with existing BIAD schemes that were successful with cost recovery.

Disadvantages

- . it does not permit one standard water tariff for all beneficiaries;
- . it requires a contract agreement and associated negotiations between PHED and villagers; and
- . it will require some additional staff in PHED as Community Relations Officers.

Justification en lieu of Disadvantages

- . no standard water tariff exists now and collection is so ineffective that it is inconsequential to change the basis for revenue collection;
- . more community involvement is required and this can only be viewed as positive; and
- . a new cell in PHED is recommended and training for all staff is required to implement the desired changes.

4.3.4 Urban Areas

Option A - PHED operates the schemes and collects all revenues, thus requiring:

- . continued employment of system operators;
- . employment of revenue collectors and administrators

. changes to legislation governing revenue collection and disbursement to ensure revenues are used to offset operating costs;

- PHED would have a set tariff for all house connections, but no collection would be made for standposts;
- PHED would require the power to cut-off supply to customers that do not pay water tariffs
- PHED would require the authority to increase tariffs to keep pace with expenditures (i.e. inflation); and
- the tariff should include depreciation to enable PHED to maintain and upgrade the system, otherwise PHED would continue to finance major repairs and upgrading out of the ADP, for which funding is presently inadequate.

Option B - PHED hands schemes over to urban councils/committees, which are to be fully responsible for operation and maintenance;

- in the short term, PHED could continue to supply operating staff for urban schemes until municipalities have set up an effective revenue collection system and engineering branch;

- PHED staff would ultimately be redeployed or would have the option to join the municipal engineering branch;
- water tariffs would be set and revised by the municipal committees;
- subsidies if any, would have to be applied for through Local Government Grants in-Aid;
- PHED would continue to provide technical assistance and monitoring at no cost;
- minor repairs would be the responsibility of the municipal engineering branch; and
- major repairs, improvements would have to receive approval from P & D in the ADP for execution by PHED.

4.4 Implications of Cost Recovery

Refer to Recurring Cost Estimates - Annex F See also Cost Recovery spreadsheet.

5. PROJECT JUSTIFICATION AND RISKS

5.1 Benefits of the Project

Project Activities

Direct Benefits

- | | | |
|--|---|--|
| 1. Inventory of water supply status and development of district plans based on this data base. | . | better assessment of needs |
| | . | long term planning possible |
| | . | better coordinated development |
| | . | permits monitoring and evaluation of progress |
| | . | Can implement scheme selection guidelines in the planning procedure |
| 2. Procurement of vehicles (PHED) | . | increased mobility |
| | . | improves effectiveness for planning, implementation, O&M and monitoring of schemes |
| | . | A/Cs can improve efficiency of staff in hot desert regions |
| | . | heavier vehicles provide greater capacity to make equipment repairs |
| | . | trucks for moving equipment & parts will make rigs more efficient (increased utilization; less down time). |
| 3. Procurement of vehicles (LGRDD) | . | increased mobility facilitates community contact |
| | . | improved accessibility to schemes |
| | . | RDA bus will enhance training programmes |

4. Office Accommodations

- . consolidation of PHED activities (Planning & Design, Administration)
- . necessary expansion to accommodate proposed staff
- . alleviation of rental charges
- . more efficient operations due to better facilities and consolidation
- . facilities are modernized (computers, filing, library, accounting, laboratory, drafting)
- . decentralized divisional offices can provide stores for scheme implementation
- . garages at each circle (division) provide bases for mobile workshops.

5. Mobile Workshops (in circle locations)

- . closer access to schemes (rigs)
- . improved efficiency of drilling rigs (less down time)
- . faster repairs to WSS thus improving level of service
- . more efficient distribution of parts and equipment

6. Workshop Equipment

- . enhance capacity for repairs.
- . enhanced capacity for repairs (more repairs and more complex jobs)
- . fast repairs (less down time for rigs and machinery)
- . enhanced in-house capability.

- 7. **Rehabilitation of Schemes**
 - . restoration of water supply
 - . augmentation of water supply
 - . improved service levels (timing, water pressure, reliability)
 - . improved cost recovery (O&M cost)
 - . extension of service to more beneficiaries
 - . extended life of scheme.

- 8. **Development of Tubewells**
 - . increased number of water sources (financed by World Bank Credits)
 - . improved water supply availability and quality)
 - . better developed tubewells will function longer
 - . increased efficiency of rigs resulting in:
 - expanded number of new tubewells each year;
 - defer requirement for new drilling rigs (within PHED and other agencies);
 - PHED has greater control over their drilling programme (70-80% rather than 33%).

- 9. **Technical Assistance**
 - . strengthening of PHED
 - . improved capability to/for:
 - develop tubewells (better operation, fewer repairs)

- rehabilitation(sustainability)
- operate schemes (more efficient, fewer repairs and community inputs)
- design of low cost schemes
- implementation of appropriate technologies (willingness to pay)
- . enhanced planning capabilities
- . more efficient organization
- . in-house training capabilities
- . Implements of E&M will increase effectiveness of source development
 - . increase # of TW per rig
 - . permit expended programme for WSS
 - . defer requirement for new rigs (both in PHED, WAPDA, BDA)
 - . PHED will have greater control of their drilling programme, increasing from 33% at present to 75.80% by 1994/95 (see Table 5.1).

Table 3.1 PHED Drilling Programmes (Source Development TW)

	<u># of Rigs</u>	<u>Tubewells Developed by PHED</u>	<u>TW per Rig</u>	<u>Tubewells Developed by other Agencies</u>	<u>% PHED</u>	<u>Developed Tubewells</u>
1986-87			8			
1987-88	6+1	50	0	50	50%	100
1988-89	6+1	50	8	100	33%	150
1989-90	8+1	65	8	115	36%	180
1990-91	9+1	90	10	60	60%	150
1991-92	9	110	12	40	73%	150
1992-93	9	110	12	40	73%	150
1993-94	9	140	15	40	73%	180
1994-95	9	140	15	40	78%	180
1995-96	9	140	15	40	78%	180
1996-97	9	140	15	40	78%	180
1997-98	9	140	15	40	78%	180

10. Laboratory

- . capability to assess water quality of new and existing schemes
- . improved monitoring of quality
- . potential for primary treatment (to improve health).

11. Drilling Rig

- . enhanced capability to develop water sources (in-house)
- . improved skills through on-the-job training.

5.2 Socio-Economic Impacts

The improvement of water supply coverage can have an impact on the nomadic habits of people in Balochistan. Availability of water, temperature and tradition are three main factors that cause seasonal migration of pastoral peoples.

For some, the availability of water may be the critical reason for moving. If supplies of water are readily available from tubewells, a greater share of the migrating population may choose to remain sedentary.

This may have positive and negative impacts.

Positive

- . higher living standards;
- . better opportunity to benefit from other community & social services;
- . diversification of occupations; and
- . greater income potential.

Negative

- . alteration of cultural traditions;
- . disruption of labour supply;
- . conflicts with settled population; and
- . greater dependence on water supply scheme.

5.3 Project Outputs

- . District Inventories of Water Supply Schemes;
- . District Water Supply Plans;
- . Improved Physical Facilities at PHED
 - . Offices
 - . Workshops
 - . Vehicles
 - . Laboratory
- . Improved Equipment at PHED
 - . Drilling Rig
 - . Equipment to maintain drilling programme
 - . Mobile Workshops
 - . Repair Equipment
 - . Testing Equipment
 - Tubewells
 - Water Quality
 - . Data Base Management
 - . Drafting/Reproduction Equipment
- . Rehabilitation of 40 (Approx) Water Supply Schemes
- . Development of 60 new Tubewells (Sources)
- . Monitoring and Evaluation System for Tubewells/Water Supply Schemes
- . Well Equipped and Trained staff for the Electrical & Mechanical Circle.

- . **Qualified and capable Design Cell experienced with community involvement, selection criteria, and cost recovery**
- . **An Operator Trainer programme to enhance local sustainability**
- . **A structured in-house training programme**
- . **Better Implementation of Tubewells**
 - . **increased sustainability**
 - . **improved cost recovery for O & M**

5.3.1 Direct Beneficiaries

(Low, Middle income Households)

- 1) **New Water Sources for approximately 120,000 people
(N.B. cost excludes water distribution)**
- 2) **Rehabilitated water supply schemes
For approximately 120,000 people (40x3000)**
- 3) **Improved service for an additional
60,000 people (1/2 x 3000 x 40)**

5.3.2 Indirect Beneficiaries

- 4) **Existing people served by house Connections (400,000)**
- 5) **Existing people with stand posts/C.T. (800,000)**
- 6) **Proposed people to be served during project (2,000,000)
by PHED from ADP funding**

5.3.3 Economic Benefits

Economic benefits by 1997/98 (Based on market rates)
 - Constant 1989

Type	# of People 1000	Existing Tariff Rs/yr/ capita	Existing Recovery Rate	Existing Revenues Rs 1000/ year	Proposed Tariff or charge Rs/yr/ capita	Est. Rvy. Rate	Estimated Revenues Rs '000/yr
1	120	0	N.A.	0	45	50%	2,700
2	120	30	5%	180	45	50%	2,700
3	60	0	N.A.	0	45	50%	1,350
4	400	30	5%	450	45	50%	6,750
5	900	0	N.A.	0	30	30%	8,100
6	2000	-	N.A.	-	30	30%	18,000
Tot. 3,500		-	-	630			39,600

5.4 Environmental Impacts

For the rural water supply component, the project will have minor direct environmental impacts because the scale of physical projects is small and the focus is on institutional strengthening and technical assistance. Indirectly, the project should have a positive impact on water resource development that has already been committed for the 7th Five Year Plan.

The development of groundwater resources normally has a profound impact on the environment, particularly in Balochistan. Changes include the expansion of agricultural crops and related population growth. Settlements with a good supply of potable water have higher growth rates. The availability of water influences man's exploitation of their

environment (e.g. changing from pastoral to more intensive agricultural patterns).

The proposed project will not climate these environmental changes, many of which are considered/procedures, increased community involvement, improved implementation technologies will lead to better development and minimize negative impacts.

In the past, some negative impacts have included:

- . over development of groundwater resources, with the result that older systems (e.g. karezes) and economic are adversely effected;
- . in-adequate disposal of sullage water, causing health hazards; and
- . population growth and increase density of housing creates problems for sanitation and human waste disposal.

The townships projects will focus on resolving these problems in the larger settlements.

5.5 Risks

For the rural water supply components, the following risks are evident:

- . price contingencies
- . availability of local financing
- . availability of staff and cooperation from all agencies
- . implementation of policy changes.

5.5.1 Price Contingencies

In Pakistan, the rate of inflation has been higher than international rates and the PK rupee have also lost some value to other currencies.

There is some risk of instability in this regard. The implications for the project could be less severe because a large share of the project cost is for foreign equipment or consultancy, which are not subject to drastic price changes.

5.5.2 Availability of Local Financing

The lack or delay of approval for local financing (government) could hold up various components of the project. The local share of government financing would be in the order of Rs 20 million per year, which is equivalent to 7-8% of the ADP for the sector. It is anticipated that if the project is approved, local financing would come from the provincial Special Development Programme. The allocation in SDP for development projects was Rs 650 million from the federal government; therefore, the required funding only represents 3% of this fund. Historically, these funds have not been fully utilized due to delays or problems with SDP projects. If for some unknown reason the SDP funding was not approved, the Government of Balochistan has looked favourably on increasing the ADP in this sector if required.

Consequently, the availability of local financing does not appear to be a concerning factor for the rural water supply component.

5.5.3 Availability of Staff and Cooperation From All Agencies

The proposed project will create major changes in PHED and the Water Section of P&D. It is essential that the required counterparts be available, capable and cooperative. Given the degree to which key staff are currently over-extended, new offices will have to be posted and some shift of personnel will be necessary. Without this, the project will risk delay possibly failure to complete certain components. It is felt that the senior officials of relevant departments are committed to the project, as evidence by the cooperation extended to the consultants to date. It is recommended that the identification of key staff and hiring of new officers be accomplished before commencement of the project.

5.5.4 Implementation of Policy Changes

The proposed project does not require many policy changes because no major shift in mandates is necessary and the Government of Balochistan has shown their financial commitment in the sector. The one major exception is cost recovery. The concerned agencies agree with cost recovery and have shown a willingness to implement policy changes. However, there is no evidence of specific policy changes relating to tariffs and community financing, owing to the political sensitivity of the issue. Firm commitments are required to reduce this risk but flexibility is necessary to ensure that proposals are feasible.

6. AGREEMENTS REQUIRED FROM GOVERNMENT OF BALOCHISTAN

The following agreements are required before commencement of the rural water supply project:

- . approval of local financing;
- . sanctioning of new posts and provision of capable staff to work as counterparts to the Project Team;
- . approval of cost recovery mechanism(s) and implementation of policy changes as necessary (e.g. tariffs, payment of fuel charges, legislation for revenue collection and allocation);
- . adherence to service level and selection criteria formulated in the Strategic Investment Plan;
- . settlement of land acquisition issues; and
- . continued functioning of the Steering Committee.