Balochistan

Strategic Provincial Investment Plan
and Project Preparation for
Rural Water Supply,
Sanitation and Health.

Final Strategic Investment Plan

VOL. I

September, 1989

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STRATEGIC PROVINCIAL INVESTMENT PLAN

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EXECUTIVE SUMMARY

1. Introduction

In accordance with the objective of the Government of Pakistan to expand coverage of water supply and sanitation/drainage facilities to people living in rural communities, a National Policy Conference on Rural Water Supply and Sanitation was held in Islamabad in April, 1988. The outcome of this Conference was the development of a strategy for future investments in the Sector.

This Project was established through an agreement between the Government of Pakistan, the World Bank and CIDA, to prepare Provincial Strategic Investment Plans for the Sector, including the enhancement of existing institutions and mechanisms. The strategy is to cover the balance of the 7th Five Year Plan (commencing July 1990), with recommendations for the 8th Five Year Plan period which reflect the objectives of the study and will maximize the benefits of the investment being made. The following strategy has been developed by a team of Government staff and Pakistani and international consultants.

2. Objectives of the Study

In an effort to bring about improvement in the living environment of the rural population of Balochistan, this study was initiated to develop a strategy for maximizing the health and sanitation benefits of water supply, drainage, human waste disposal and improved hygiene practices. The general objectives are contained in the following five points:

- efficiently utilize available resources (financial, human and physical) to provide a basic level of service to all of the rural population;

- provide appropriate and affordable technologies, that are acceptable to the beneficiaries, in order to enhance the long term sustainability of systems;

- minimize Government liability of operation and maintenance costs over the long term by improving cost recovery through increased community participation and ownership of water supply schemes;

- improve the hygiene practices of the rural people through widespread hygiene education and promotion of latrines; and

- improve the livelihoods of women and encourage a more active role in decisions by the community for development of the Sector.

3. Study Programme

For the past nine months the study team has carried out investigations, field surveys and evaluations of the social, cultural, economic, environmental, institutional, hydrogeological and technological aspects of water supply, sanitation/drainage and hygiene conditions in rural Balochistan.

The focus of investigations has been to define present conditions in the Sector, determine the effectiveness of the implementing agencies, and identify the constraints and opportunities for achieving objectives in the Sector. Having gathered and analyzed all the relevant data, a strategy has been formulated to overcome the constraints and provide a viable plan of action for future development.

4. Current Sector Constraints

The following provides a summary of the key constraints identified that impact most strongly on strategy decisions for the Sector.

Planning Procedures:

- absence of long term water supply plans for Districts;
- lack of community involvement in planning and implementation;
- insufficient feasibility studies; and
- lack of criteria or guidelines for scheme selection and approval.

Water Resources:

- good groundwater resources exist but with limited capacity; and
- lack of coordinated planning, development and monitoring of water sources.

Technology Choice and Cost:

- insufficient evaluation of technology options for new schemes; and
- lack of knowledge or time to explore viable low cost technologies.

Institutional Limitations:

- PHED lacks designated staff for planning, need's assessment and community involvement;
- PHED has physical limitations in terms of offices, equipment and vehicles to properly implement their development plan;
- LGRDD staff lack appropriate implementation skills and mobility;
- LGRDD does not have adequate technical expertise; and
- neither department employs female field staff.

Financial Resource Limitations:

- PHED has adequate resources allocated for new schemes, but recurring budget allocations must also increase rapidly;
- LGRDD has a smaller allocation for new schemes which are spread too widely, making investments less effective; and
- few Government resources have been allocated for sanitation/ drainage, human waste disposal or hygiene education.

Community Participation:

- PHED implementation procedures do not encourage active community involvement in planning, design, construction or operation;
- LGRDD staff are more active at the village level but they have been less effective in implementing community based schemes; and
- hygiene education has not reached rural villagers on a wide scale.

Cost Recovery:

- recovery of capital costs for water supply schemes is not feasible based on the present technologies used; and
- recovery of operating and maintenance costs are possible but no effective collection mechanisms have been established.

Hygiene Education:

- existing low health conditions, strong cultural beliefs and low education levels present an enormous and difficult task; and
- for the delivery of preventive health care, institutional weaknesses persist, particularly in rural Balochistan.

Lack of Appropriate Government Policy:

- no operative policy for cost recovery;
- no policy or guidelines for scheme selection and approval; and
- no policy to give some priority to sanitation/drainage, human waste disposal or hygiene education.

Human Resource Limitations:

- lack of sufficient qualified personnel to administer new policies and procedures; and
- inadequately trained field staff to implement new strategies.

5. **Strategy for Water Supply**

The following principles form the basis of the strategy:

- the Government should be responsible for providing a basic level of service to the rural population;

- the basic level of service should include convenient and adequate supply of safe drinking water, the system must be appropriate and affordable according to village size, availability of potable water and cost of supplying water;

- enhancement of the basic level of service should only be made if the recipient community desires it and is willing to bear the additional capital cost;

- the recipient communities should finance the majority of the operation and maintenance cost (subject to affordability) for all water supply schemes installed by PHED, including payment for direct costs such as energy, staffing and routine maintenance and repair;

- PHED should continue to supervise the operation of schemes and to finance the cost of major repairs;

- since communities will be given greater responsibility for water supply, they must be more actively involved in planning, decision-making and implementation processes; and

- LGRDD should provide a more substantial role in the provision of technical and planning support for small water supply and sanitation/drainage schemes; the community should contribute to capital cost through material and labour inputs and the community should be fully responsible for the ownership, operation and maintenance of the schemes.

To implement this strategy the following recommendations have been made: –

- strengthening the planning and implementation procedures which in turn necessitate greater community involvement, including:

  - creation of a Planning and Community Relations Cell within PHED;
  - creation of posts for District Planners within LGRDD;
  - new procedures for scheme selection and approval; and
  - contractual agreements between PHED and the community (water committee) detailing future responsibilities.

- maintaining financial allocations to PHED for new schemes at the present level and giving increased priority to rehabilitation, in the short term, and extension/upgrading of schemes, in the long term;

- gradually increasing financial allocations to LGRDD as their capacity to implement low cost technologies increases;

- providing material support to PHED in terms of:

  - office accommodations and equipment;
  - workshop/warehouse facilities to improve the implementation and maintenance of water supply schemes;
  - equipment, spares and tools for the Electrical & Mechanical Division, to enhance the investigation, development, monitoring and rehabilitation of tubewells; and
  - provision of jeeps to give adequate mobility to existing and proposed new staff.

providing material support to LGRDD in terms of:

  - office equipment for District level staff;

- properly equipping the new Rural Development Academy to facilitate a vastly expanded role in human resource development for the sector; and
- provision of vehicles to improve the mobility of field staff at the District level.

. increasing PHED staffing at key positions:

- 5 professionals for the Planning and Community Relations Cell, plus junior officers for field duty;
- 3 new professionals to strengthen the Electrical & Mechanical Division, plus additional drilling crews to increase operations to two shifts;
- 2 additional design engineers;
- 1 training coordinator; and
- adequate support staff.

. increasing LGRDD staffing at key positions:

- 3 professionals to expand LGRDD's expertise in low cost technologies, community involvement and District level planning;
- District Planners (beginning in selected Districts); and
- 1 training coordinator located at the Rural Development Academy.

. a major human resource development programme for relevant staff in PHED and LGRDD, focusing on new planning and implementation procedures, community involvement and relations for contractual agreements, low cost technologies, tubewell development and monitoring, operator training, and maintenance of schemes; and

. creation of a full-time sub-committee (3 persons) that monitors and evaluates sectoral progress, including inter-departmental coordination, and reports to the Provincial Steering Committee, under the chairmanship of the Additional Chief Secretary (Development).

6. Strategy for Sanitation/Drainage

The following points outline the recommended strategy for sanitation/drainage:

- although PHED is involved with sanitation/drainage in urban areas, they will not be able to increase their role in the rural areas during the planning period due to:

    - lack of financial resources;
    - low priority given by both government and villagers;
    - needs are not felt until water supply is satisfied; and
    - cost of sanitation/drainage in small villages is high.

- PHED will be required to provide adequate drainage facilities for new and existing water supply schemes to mitigate undesirable environmental impacts (these should be integrated with the design of waster supply systems); and

- LGRDD will take a lead role in promoting simple improvements to sanitation/drainage through community self-help methods; LGRDD will provide organizational, planning and technical support.

7. Strategy for Human Waste Disposal

The recommended strategy is as follows:

- no major public sector financial resources will be allocated to human waste disposal during the planning period, since the provision of latrines is a household concern;

- however, an effort should be made to promote proper human waste disposal to generate an increased demand and willingness to pay;

- LGRDD should be the lead agency for widespread promotion and demonstration of low cost latrines for rural areas, building upon the useful experiences of BIAD, Pak-German, UNICEF and, more recently, WASA.

- promotion will have to focus on women and children; and

- opportunities for the private sector's role should be encouraged.

8. Strategy for Hygiene Education

The strategy for a hygiene education programme is to:

- mobilize relevant government staff that have proper training and time to impart knowledge to others;

- inform villagers through various approaches and media;

- create awareness in government departments of links between adequate water supply, proper sanitation and health conditions; and

- promote hygiene education from within the community, focusing heavily on information transfer through women and children.

The key elements of the proposed hygiene education strategy are:

- strengthening the capacity of the Health Education Unit to take a genuine lead role in hygiene promotion;

- recruitment of female Community Hygiene Promoters within LGRDD to identify women's concerns and promote hygiene education in an integrated manner with other sector development schemes;

- improve the curriculum of primary school education and upgrade the knowledge of teachers to deliver hygiene education messages;

- the Health Education Unit would be responsible for promotional materials, methods and training;

- commence community level hygiene promotion as part of the implementation process for new water supply schemes; and

- follow up hygiene promotion through trained Traditional Birth Attendants and primary school teachers within the village.

9. **<u>Required Government Action</u>**

<u>Service Levels</u>:

- water supply by community tanks or handpumps; and
- piped water supply to villages greater than 1000 people or village cluster greater than 1500 people.
- sanitation/drainage should be promoted in small villages through a self help approach.
- humane waste disposal will be left to the private sector with limited demonstration projects and promotion; and
- hygiene promotion should be carried out by field staff of various departments particularly during the implementation of water supply schemes.

<u>Community Responsibility</u>:

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

- PHED would retain overall responsibility for supervision and major repairs to mechanized pipe to water schemes. LGRDD schemes would be owned and operated fully by the community.

Institutional Mandates:

- P&D to monitor, evaluate and coordinate sector development;
- Education Department to promote hygiene education through primary schools;
- PHED for large villages water supply;
- LGRDD for an integrated approach to sector development in rural areas and to monitor and coordinate sector development at the district level; and
- Health Department for setting standards of staff and material used in hygiene promotions, and other preventive health care.

Targets for Water Supply Coverage:

- basic service levels for 45% by 1993 and 70% by 1998; and
- focus to be spread to all sizes of settlements but large rural settlements should have 100% coverage by 1998.

Project Selection Criteria/Guidelines:

- PHED should develop a set of project selection guidelines along the lines suggested in Section 4.3.7.

Formulation of District Plans:

- each District should prepare a five year plan for water supply indicating investment costs, technology options and coverage benefits.

10. **Proposed Strategic Investment Plan**

Given the recommended strategies presented above, the proposed strategic investment plan maintains roughly the same magnitude of capital investments in water supply and modestly increased funding for other sector components. However, a significant increase in funding is required for institutional strengthening and human resource development in order to realize the objectives of the proposed strategies. The existing line departments will continue to play their roles but over time an increasing share of development funds for water supply will be channelled through LGRDD to meet the needs of people in small villages.

Table 1 shows the levels of development funding for 1988/89 and 1989/90. Table 2 shows the proposed levels of investment for the remainder of the 7th Five Year Plan and the 8th Five Year Plan.

In 1990/91, an annual investment of Rs. 343 million is required and by 1997/98 an estimated Rs. 367 million will be needed to satisfy requirements in the sector in line with the proposed strategy.

Table 3 provides a summary of the investment plan for the two planning periods. The recommended investment in the Sector for the balance of the 7th Five Year Plan is Rs. 1021 million (or roughly Rs. 340 million annually). During this period, it is estimated that Rs. 920 to 940 million would be available to the Government through the Annual Development Programme. The remainder would be derived from sources external to the Province or possibly from existing donor programmes.

During the 8th Five Year Plan period, the recommended investment in the Sector is Rs. 1795 million (or roughly Rs. 360 million annually). The expected funding available from the ADP is Rs. 1679 million.

TABLE 1

CURRENT LEVELS OF DEVELOPMENT FUNDING IN THE SECTOR

	Budgeted 1989/90 (Rs. million)	Actual 1988/89 (Rs. million)
Water Supply Schemes		
. PHED (rural only)	233	132
- Ongoing	(84)	(3)
- New	(81)	(99)
- Extension & Improvement	(22)	(25)
- 23 Incomplete schemes	(27)	(0)
- Development of Water Sources	(19)	(5)
. Valley Development	10	10
. LGRDD/Rural Councils/GTZ	13	12
. Rapid Development Programme	30	0
. Completion of BIAD Phase II	35	3
Sanitation/Drainage and Human Waste Disposal		
. EEC/BIAD	3	1
. PHED and LGRDD	2	2
Hygiene Education		
. EEC/BIAD	2	1
. UNICEF	3	3
Institutional Strengthening		
. PHED	5	16
. Rural Development Academy	8	7
TOTAL	**344**	**187**

TABLE 2

RECOMMENDED CAPITAL INVESTMENT PLANS FOR THE SECTOR

(Rs. million at constant prices -- June 1989)

	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98
PHED Schemes								
Water Supply Schemes	175	177	179	179	182	182	184	184
Rehabilitation	25	25	25	25	20	20	20	20
Extension/Upgrade	5	5	5	9	15	15	23	23
Source Development	30	30	30	30	30	30	33	33
Sanitation/Drainage	2	2	3	3	5	5	5	5
Institutional Aid	15	19	11	11	9	8	8	3
HRD & Training	6	4	2	1	1	1	1	1
Sub-Total	**258**	**262**	**255**	**258**	**262**	**261**	**274**	**269**
LGRDD Schemes								
Water Supply	15	21	29	35	41	41	45	45
Sanitation/Drainage	1	1	1	2	2	2	3	3
Latrine/Hygiene Promotion	0	1	1	1	2	2	2	2
Institutional Aid	5	5	3	3	5	4	3	3
Rural Development Academy	13	7	1	1	2	1	1	1
HRD & Training	6	4	2	2	2	1	1	1
Sub-Total	**40**	**39**	**37**	**44**	**54**	**51**	**55**	**55**
Hygiene Education	3	2	1	1	3	1	1	1
Monitoring (P&D)	2	1	1	1	2	0	0	2
Other ADP Programmes*	40	40	40	40	40	40	40	40
TOTAL	**343**	**344**	**334**	**344**	**361**	**353**	**370**	**367**
Projected Funding**	310	311	317	323	329	336	342	349

* Rapid Development (Rs. 30 million) and Valley Development.

** Assumes 2% real growth/yr in ADP funds, existing Donor funds remain constant at Rs.8 million/yr (excludes EEC funds for BIAD water schemes) and Rs. 5 million for the RDA in 1990/91.

TABLE 3

SUMMARY OF THE RECOMMENDED STRATEGIC INVESTMENT PLAN

(Rs. million at constant prices -- June 1989)

COMPONENT	7th Five Year Plan		8th Five Year Plan	
	Rs million	Share	Rs million	Share
Water Supply	**776**	**76%**	**1464**	**82%**
- PHED	711	(92%)	1257	(86%)
- LGRDD	65	(8%)	207	(14%)
Institutional Aid & HRD & Training	**103**	**10%**	**75**	**4%**
- PHED	57	(55%)	44	(59%)
- LGRDD	46	(45%)	31	(41%)
Sanitation, HWD & Hygiene Education	**18**	**2%**	**51**	**3%**
Sector Monitoring	**4**	—	**5**	—
Special Programmes	**120**	**12%**	**200**	**11%**
TOTAL INVESTMENT	**1021**	**100%**	**1795**	**100%**

Note: There are only 3 years remaining in the 7th Five Year Plan.

The allocation of funding for the sector by agency is as follows:

- 75% for PHED in 1990/91, declining to 73% by 1997/98;
- 12% for LGRDD in 1990/91, increasing to 15% by 1997/98;
- 1% for the Departments of Health and Education, throughout; and
- 12% to 11% for Special Programmes within the ADP.

In terms of components, 73% will be allocated to water supply schemes in 1990/91 (excluding the Special Programmes); this figure will increase to 83% by 1997/98. In the first year of the plan institutional strengthening and human resource development will account for 13% of expenditures, of which 48% is for enhancing PHED's implementation of water supply schemes and 52% is to improve LGRDD's ability to provide water supply and promote better sanitation/drainage, human waste disposal and hygiene.

The proposed investment plan will require additional funding from the development budget and the recurring budget in the short term but the benefits of the proposed strategies will include more sustainable schemes, lower cost technologies, and increased cost recovery/community financing. In the longer term, this will lead to additional coverage for similar levels of investment, less need for ongoing rehabilitation by the public sector, and less burden on operation and maintenance costs for the public sector. Thus, funding may not have to be increased in the future to obtain the desired levels of development and although recurring budgets (currently in the order of Rs. 75 million annually) would increase 50% by 1993/94 (Rs. 115 million annually, of which Rs. 9 million is for new staffing and related expenses of institutional strengthening), they would only increase another 5% to 10% by 1997/98 (Rs. 125 million) given projections of increased cost recovery. The potential benefits from full cost recovery are much greater and this may be achievable in future years.

5.7 **Donor Programmes to Support the Strategic Investment Plan**

There are four reasons to involve Donors in the Investment Plan:

- external assistance could fill the financial resource gap of roughly Rs. 200 million during the 8 year planning period;

- human resource and institutional constraints that must be resolved require levels of funding that are currently not budgeted for;

- certain components may not receive the appropriate level of public sector funding (e.g. sanitation/drainage, human waste disposal and hygiene education, and low cost technologies such as handpumps) whereas Donor agencies can implement projects on a demonstration basis to determine the viability and suitable approaches for future development; and

- a Donor agency often has the ability to impel greater cooperation between line departments and thereby promote a more integrated approach to sector development.

Donor Assistance for PHED

Donor assistance to PHED could include:

- assisting PHED to set up and operationalize the Planning and Community Relations cell;

- reorient staff and develop awareness for factors affecting the sustainability of water supply systems;

- provision of technical expertise and training to improve the Electrical & Mechanical Division's capability for water resource evaluation and development, and rehabilitation of tubewells;

- provision of technical expertise and training to improve designs for water supply schemes, including handpumps and primary water treatment facilities;

- establishment of an in-house training programme and Human Resource Information System (HRIS) in cooperation with a new training coordinator within PHED; and

- financial support for demonstrating low cost technologies, rehabilitating existing schemes and upgrading service levels for existing schemes in order to increase willingness to pay.

In addition, there are various requirements for equipping PHED that the donor agencies could finance. This list includes:

- vehicles for new staff positions, particularly the proposed Planning & Community Relations cell and the E & M Division;

- proper office accommodations for existing and new staff;

- warehouse/workshops and related equipment and tools in four decentralized locations for the E & M Division;

- furnishings for new accommodations and office equipment including computers, reproduction equipment, drafting equipment, etc;

- supplies and spare parts for maintaining water supply schemes and drilling operations;

- equipment for hydrogeological investigations, testing development wells, monitoring tubewells and rehabilitating tubewells; and

- provision of spares for new low-cost systems until local suppliers are established to meet demands.

The recommended donor investment level would be in the order of Rs. 210 million over the 8 year period. Most of the assistance (80%) for PHED is in the form of material requirements which could be supplied with a minor donor agency presence for monitoring and evaluation. The human resource component does require some continuous donor presence in the form of training specialists and implementation experts.

Donor Assistance for LGRDD

Regarding LGRDD, there is a need for donor agencies to:

- develop and test procedures for the implementation of integrated low cost water supply and sanitation schemes for small villages;

- improve the training of field officers for community involvement in sector development, particularly the Development Officers;

- enhance the technical capability of LGRDD staff, both at the central level and the District level (low cost technologies for water supply, sanitation/drainage and human waste disposal);

- assist in the set up and training of staff for the new sanitation and hygiene promotion cell at the District level, particularly the female Community Hygiene Promoters;

- training a new staff of District Planners to prepare water development plans and coordinate activities in the sector;

- set up a programme for the installation of handpumps on dug wells and protection of existing water sources;

- improve the capability of the Rural Development Academy to develop training programmes for government staff and local officials; and

- assist LGRDD to establish a Human Resource Information System to identify existing capabilities and future requirements.

Over the 8 year planning period, the total input would amount to approximately Rs. 130 million, including the cost of expatriates (24% of the total cost).

Other Donor Assistance

Other donor agency assistance would be required for:

- hygiene education programmes, including support to the Department of Health, LGRDD and the Education Department (in the order of Rs. 30 to 35 million during the 8 year planning period); and

- establishing an effective provincial and district level monitoring and evaluation system for sector development (requiring Rs. 5 million during the planning period).

12. Potential Donor Packages

In Balochistan, the World Bank and the Government of the Netherlands have made preliminary commitments for the rural water supply, sanitation and health sector. For the World Bank, the indicated level of assistance is US$ 10 to 12 million during the eight year planning period. For the Government of the Netherlands, the equivalent of US$ 4 to 5 million would be available for the first 4 years with a similar level of assistance possible in the remaining 4 years.

Table 4 shows a potential scenario for donor packages based on the required levels of assistance identified, the preliminary financial commitments by donors and their expressed interest in various components of the recommended assistance.

TABLE 4

POTENTIAL DONOR PACKAGES FOR ASSISTANCE TO THE SECTOR

(Rs. million at constant prices -- June 1989)

	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98
World Bank								
Institutional Aid - PHED	15	19	12	12	9	8	7	3
Water Supply - PHED	0	8	8	9	7	4	4	4
Water Resource Development	5	10	10	10	10	5	3	3
Delay Action Dams - LGRDD	0	1	1	2	2	3	3	3
Sub-Total	20	38	31	33	28	20	17	13
Government of Netherlands								
Training - PHED	7	6	4	3	1	1	1	1
Training - LGRDD	12	10	7	6	5	5	5	5
Institutional Aid - LGRDD	7	9	2	2	7	2	1	1
Institutional Aid - P&D	2	1	1	1	2	0	0	0
Water Supply - LGRDD	0	1	2	2	2	3	3	3
Hygiene Education	7	5	4	4	6	3	3	3
Sanitation/Drainage	0	1	1	1	1	1	1	1
Sub-Total	35	33	21	19	24	15	14	14
TOTAL DONOR ASSISTANCE	**55**	**71**	**52**	**52**	**52**	**35**	**31**	**27**

The World Bank could have package amounting to Rs. 200 million over the 8 year planning period of which:

- 42% would be for institutional aid;
- 22% would be for water supply schemes;
- 28% would be for water resource development; and
- 8% would be for small delay action dams implemented by LGRDD.

The Dutch could have a package amounting to Rs. 175 million over the planning period (assuming funding would be extended for the last four years. In the first four years, the amount of funding would be Rs. 108 million. The share by component over the entire period is:

- 45% for training (14% for PHED and 31% for LGRDD);
- 22% for institutional assistance;
- 9% for water supply schemes (pilot projects);
- 4% for sanitation/drainage and latrines (demonstration); and
- 20% for hygiene promotion (integrated programme).

1. INTRODUCTION

1.1 Rationale for the Plan

The Government of Pakistan has undertaken to expand coverage of water supply, sanitation and drainage facilities to people living in small rural settlements. In the past, these have been provided by the Government through the Annual Development Programme or the Special Development Programme.

The Seventh Five Year Plan set the national target of increasing water supply coverage from 40 % of the rural populace to 75 %. Priority was to be given to areas where sweet ground water is not available at reasonable depths and to areas where people rely on untreated surface water. Piped water supplies were to be restricted to villages with populations ranging and from 3,000 to 5,000 people. Initial delivery systems were to be based on community stand posts or community tanks not house connections.

A National Policy Conference on Rural Water Supply and Sanitation was held in Islamabad in April, 1988. Delegates to the Conference proposed a strategy for future investments in the sector which would expand the role of the beneficiaries in the development of projects, including: community financing of operation and maintenance costs; integration of water supply, sanitation and hygiene education; strengthening and coordinating institutions; enhancing the role of the private sector; and using technologies which are technically appropriate, sustainable and affordable. In addition, the Government should provide service levels which beneficiaries both desire and can afford, but with the Government financing only the provision of a basic level of service.

Following agreement between the Government of Pakistan, the World Bank and CIDA, this Project was established to prepare Strategic Provincial Investment Plans for the Sector. The purpose is to present a strategy for the Government of Balochistan based on the consultant´s analyses of present needs, constraints, and priorities, and to identify where donor assistance could contribute to successful implementation of the plan. On the basis of this Strategic Investment Plan report, the government will formulate a clear policy for development in the Sector.

The Strategic Investment Plan covers the balance of the 7th Five Year Plan and the 8th Five Year Plan Period. The investment plan has been developed by a team of government staff and Pakistani and international consultants with frequent inputs by senior staff in various departments.

1.2 Structure of the Report

Section 2 provides a detailed review of the provincial sector including institutions involved in sector development, present levels and sources of sector financing, an analysis of conditions in terms of coverage technologies used, and an assessment of the current investment programmes, strategies and policies. This section presents the findings of extensive data collection and field surveys.

Section 3 reviews the rural population and settlement patterns and assess the demands and needs of the people. Service standards are proposed based on these results and the analysis of available technologies, financial resources and institutional capabilities in Section 2.

Section 4 reviews the key sector constraints and presents the strategies for each component of the sector. Required government policy decisions to implement these strategies are summarized at the end of Section 4.

Section 5 presents the proposed Strategic Investment Plan and discusses cost implications for the development and recurring budgets. Detailed requirements for each government department are described and the recommended policy changes for implementation are outlined. Finally, opportunities for donor assistance are identified.

Section 6 gives the financial implications of the plan.

2. RURAL WATER SUPPLY, SANITATION, DRAINAGE & HEALTH SECTOR

2.1 General

2.1.1 Scope

This Strategic Investment Plan has been prepared to assist the Government of Balochistan to achieve increased living standards for the rural population through the provision of water supplies, sanitation/ drainage, human waste disposal and improved hygiene practices.

The Sector is more specifically defined as follows:

- rural population considers all villages with less than 5000 people;
- water supply refers to potable uses only;
- sanitation and drainage are used synonymously to mean the proper disposal of sullage and storm water;
- human waste disposal refers to hygienic disposal of faeces to prevent adverse impacts on health conditions; and
- hygiene practices include a wide range of behaviours that are related to the sector and the acceptance of good hygiene depends upon education.

Hygiene education aims to maximise health benefits of improvements in water supply, sanitation and drainage. It promotes individual behaviours and community efforts related to:

better personal hygiene, particularly the interruption of faecal-oral transmission, most importantly through increased hand washing;

- hygienic human waste disposal, particularly the construction and correct usage of latrines;

- the preservation of water quality in the collection, storage and use of water; and

- the drainage of waste water.

2.1.2 Physiographic Zones

The Province of Balochistan covers an area of about 134,000 square miles (347,000 square Kilometres). It is an arid region characterized by mountains and valleys. Broadly, Balochistan can be divided into four distinct physiographic zones. These zones have been depicted in Fig 2.1 and are as follows:

- Upper Highlands
- Lower Highlands
- Plains
- Deserts

Upper Highlands

The upper highlands are more than 3940 ft (1200 meters) above mean sea level with relief generally varying between 1000 and 3500 ft (300 to 1060 m). This zone mainly falls in the districts of Zhob, Qilla Saifullah, Pishin, Quetta, Ziarat and Kalat. It comprises a number of ranges such as Sulaiman, Toba Kakar, Murdar, Zarghoon, Takatu, Chiltan etc. Toba Kakar Range, trending mainly east-west, lies north of Pishin and includes the Khojak pass. The Sulaiman Range trends north-south and forms a natural boundary between Punjab and Balochistan. The highest peak of the Koh-e-Sulaiman Range, is the Takht-e-Sulaiman (Soloman's Throne). It is lies in District Zhob with an elevation of 11,090 ft (3379 m) above mean sea level. The Takatu, Zarghoon, Murdar and Chiltan ranges lie in Quetta valley. Takatu and Zarghoon ranges lie north of Quetta and trend approximately east-west. The Murdar & Chiltan ranges

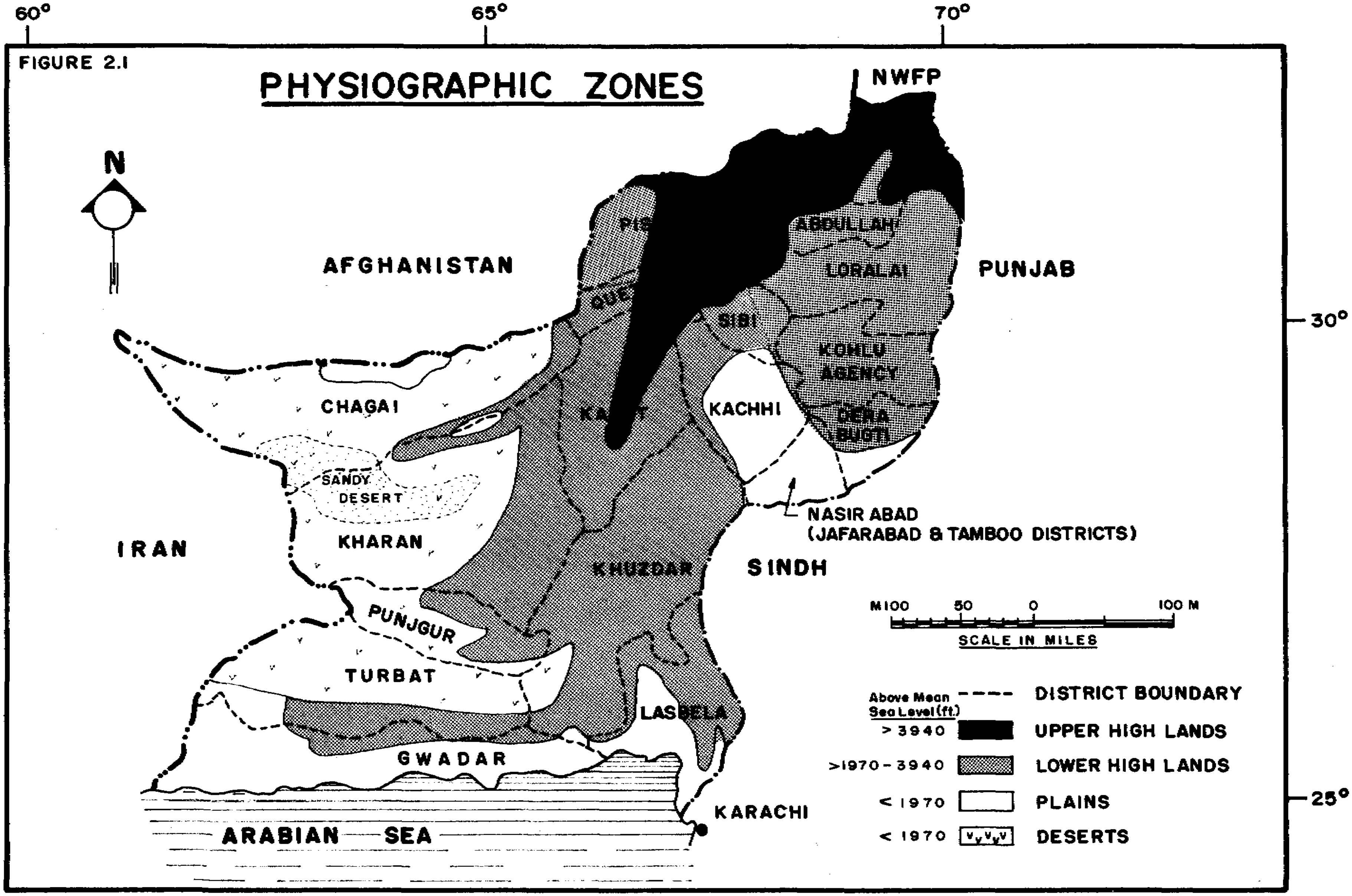


FIGURE 2.1
PHYSIOGRAPHIC ZONES
60°
65°
70°
30°
25°
N
NWFP
AFGHANISTAN
PUNJAB
IRAN
SINDH
CHAGAI
SANDY DESERT
KHARAN
PUNJGUR
TURBAT
GWADAR
KACHHI
SIBI
LORALAI
KOHLU AGENCY
DERA BUGTI
KHUZDAR
LASBELA
KARACHI
ARABIAN SEA
NASIR ABAD
(JAFARABAD & TAMBOO DISTRICTS)
M100 50 0 100 M
SCALE IN MILES
Above Mean Sea Level (ft.)
DISTRICT BOUNDARY
> 3940 UPPER HIGH LANDS
>1970 - 3940 LOWER HIGH LANDS
< 1970 PLAINS
< 1970 DESERTS

FIGURE 2.1

lie to the east and west of Quetta, respectively, with trend mainly towards north-east to south-west. The Murdar Range include improvement passes such as the Bolan and Khojak. The highest among these ranges is 11,600 ft (3530 m) above mean sea level.

Some high mountain peaks exist in other districts, for example Kalat, Kharan, Chagai and Lasbella.

Lower Highlands

The Lower highlands range in altitude from 1970 to 3940 ft (600 to 1200 m) with respect to mean sea level and their relief generally ranging from 500 to 200 ft (150 to 600 m). These are located in south-eastern Balochistan except south eastern part of Kachhi, southern end of Dera Bugti and Nasirabad districts. Some extensions of lower highlands exist at the boundaries of Gwadar, Turbat, Panjgur, Kharan and Chagai Districts.

Plains

Balochistan has relatively small areas of plains compared to its total land area. They include the Kachhi plain situated south of Sibi and extending into Nasirabad Division, the southern part of Dera Bugti District and a narrow plain area along the Makran coast stretching from Kachhi to the Iranian border. The Kachhi plain is about 500 ft (150 m) above mean sea level near Sibi and slopes to an elevation of 175 ft (50 m) in Nasirabad.

Deserts

Chagai, Kharan and the Makran coast Districts of Panjgur, Turbat and Gwadar partly consist of sandy desert areas. These Districts are all situated in western Balochistan (see Figure 2.1).

2.1.3 <u>Hydrologic Zones</u>

In order to study the water resources, the Balochistan can be divided into 12 hydrologic zones or basins. Each basin has been further divided into 68 sub-basins. The basins, exhibit four distinct landforms which are as follows:

- Mountains;
- Piedmont Plains;
- Valley Floors; and
- Deserts.

The normal set-up of these landforms in the various basins is as follows:

- Almost all the basins are bordered by mountains;

- Piedmont plains normally occur adjacent to the mountain highlands and are distinguished with remarkable change in topographic slope. In Kachhi River Basin a discontinuous zone of gravel fans, Channel and loess deposits occur along the foothill;

- Piedmont plains grade into flat valley floors comprising fine sediments. In Kachhi River Basin valley the floor is occupied by the "Pat". "Pat" is an almost level plain with average slope of about 5 to 10 feet per mile (1 to 2 m per Kilometre) The pat is characterised by moderately fine to fine textured soils and traversed by broad, shallow, depressions; and

- Sand dunes are wind blown deposits and may change their position from time to time depending upon speed and direction of wind. These may overlie piedmont plain or valley floor and exist in Hamun-e-Lora, Hamun-e-Mashkel, Rakhshan River, Porali River and Dasht River basins. The various hydrologic basins and area wise distribution of the landforms are given in Table 2.1.

Table 2.1

AREA OF VARIOUS PHYSIOGRAPHIC UNITS OF BALOCHISTAN IN SQUARE MILES

S.No	Name of Basin	Catchment	Mountain High-Land	Low Lands	
				Piedmont	Valley Floor
1	ZHOB RIVER	5348	3813	640	895
2	PISHIN LORA	6536	3496	1288	1752
3	KACHHI PLAIN	19575	15827		
4	NARI RIVER	8428	5849	2174	405
5	MULA RIVER	1617	1257	231	129
6	HAMUN -E-LORA	2967	804	294	1280
7	RAKHSHAN RIVER	4793	2531	1224	979
8	GAJ RIVER	2650	1970	380	300
9	PORALI RIVER	9950	6675	895	2380
10	HINGOL RIVER	12911	8518	2381	2012
11	DASHT RIVER (only Dasht Sub-Basin)	2850	1849	326	675
12	HAMUN-E-MASHKEL (Baddo Rud Sub-Basin only)	6378	1634	4322	422

SOURCE: HYDROGEOLOGY PROJECT, WAPDA, QUETTA

2.1.4 Drainage

The Balochistan Province is drained by a number of rivers, streams, nullahs etc.as shown in Fig 2.2. These generally form a parallel drainage system, however, locally trellis drainage systems are also found. Stream gradients are high and the rate of run off is very rapid. The Zhob River Basin drains towards the north-east into the Gomal River which ultimately joins the Indus River. Streams along the border of Punjab and Sindh Provinces flow toward the east and south-east into the Indus River. Central and western Balochistan drains towards south and south-west into the Arabian Sea. Some areas located in Districts Chagai, Kharan, Panjgur drain into playa lakes, locally called "Hamun", such as Hamun-e-Lora, Hamun-e-Mashkel etc.

2.1.5 Climate

The Climate of the upper highlands is characterised by very cold winters and warm summers. Winters of the lower highlands vary from extremely cold in the northern districts to mild conditions closer to the Makran coast, while the summers are hot and dry. The arid zones of Chagai and Kharan Districts are extremely hot in summer. The plain areas are also very hot in summer with temperatures rising as high as 120 degrees F (50 degrees C). Winters are mild on the plains with the temperature, never falling below the freezing point. The desert climate is characterised by hot and very arid conditions. Occasional strong wind storms make these areas very inhospitable.

Average annual precipitation in Balochistan varies from 2 to 20 inches(50 to 500 mm) The maximum precipitation falls in the north - eastern areas with annual average ranging from 8 to 20 inches(200 to 500 mm). It decreases in the south and the eastern parts and is minimum in Naukundi, Kharan and Dalbandin area where it ranges between 1 to 2 inches(25 to 50 mm). Mean monthly and annual rainfall recorded at various meteorological stations is given in Table 2.2. and location of these stations is shows in Fig. 2.3. Map showing average annual

FIGURE 2.2

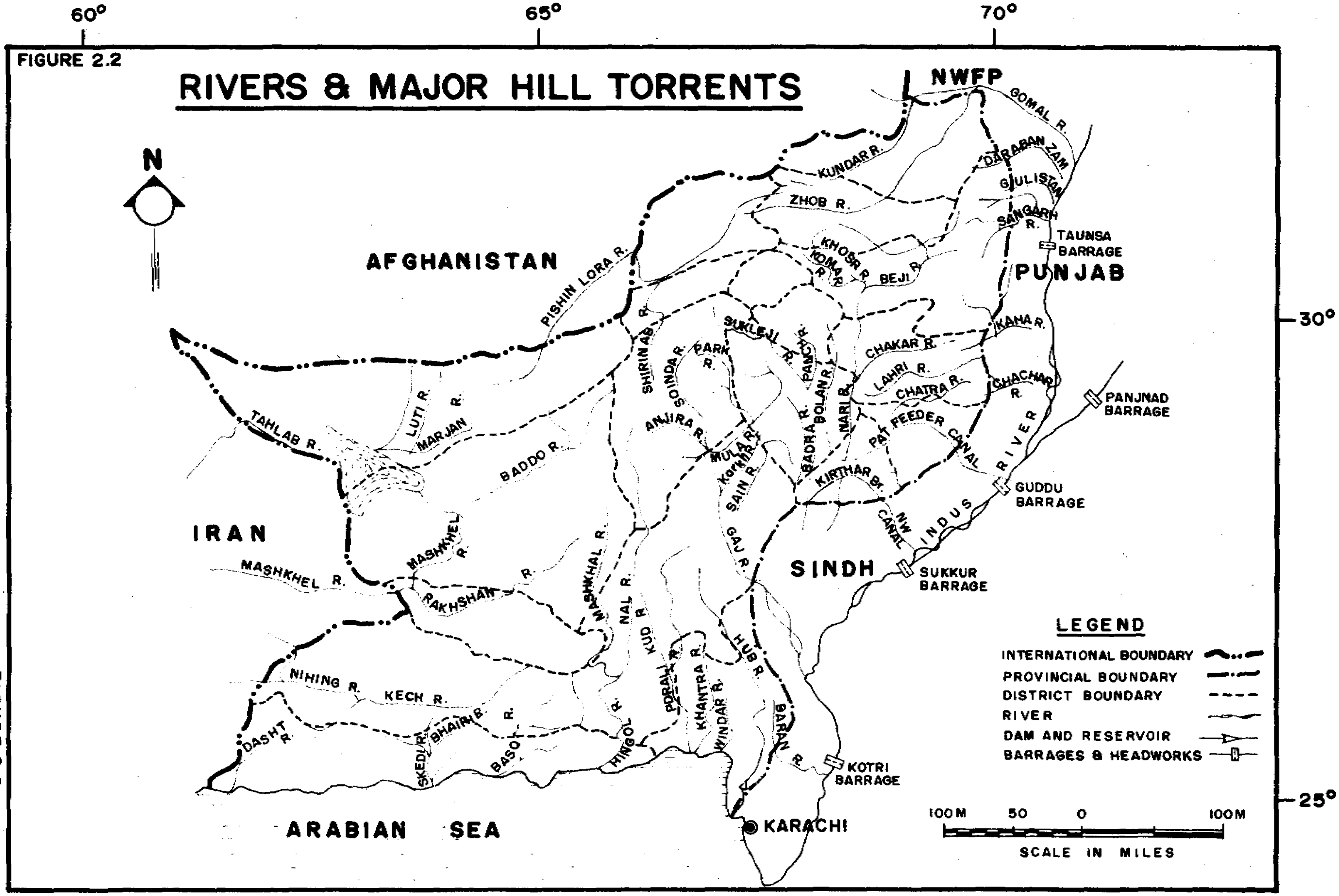
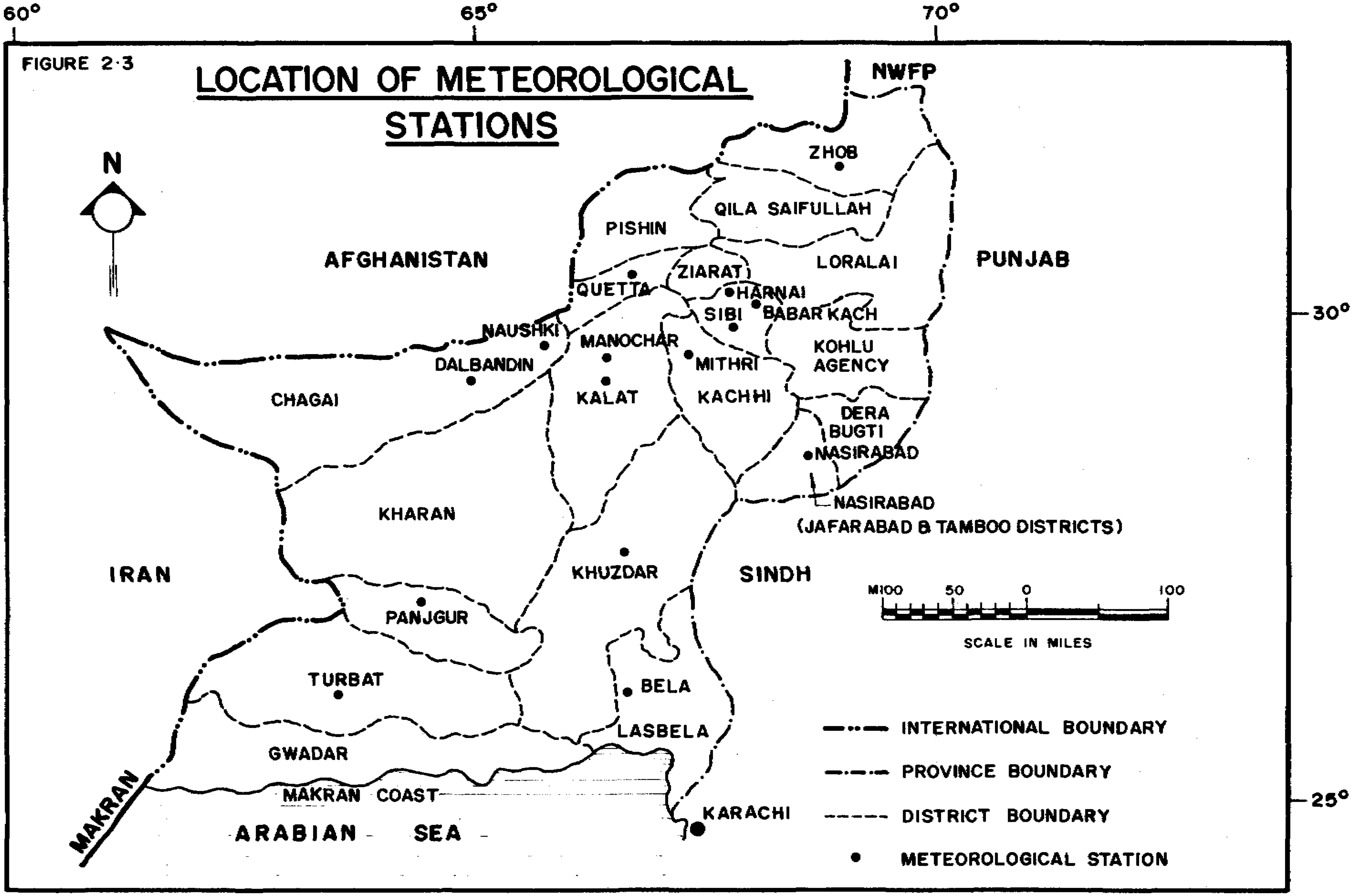


FIGURE 2.2

Table 2.2 MEAN MONTHLY AND ANNUAL PRECIPITATION RECORDED AT VARIOUS METEOROLOGICAL STATIONS IN BALOCHISTAN (Inches)

S.NO.	Name of the Basin	Name of the Station	Period	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
1	Zhob River	Zhob	1979	0.87	1.06	1.42	1.13	0.69	0.79	2.13	1.99	0.21	0.07	0.22	0.53	11.11
2	Porali River	Bela	1910-83	0.40	0.73	0.58	0.49	0.71	0.41	2.52	1.38	0.61	0.14	0.64	0.35	8.38
3	Rakhashan River	Panjgur	1940-70	0.94	0.46	0.60	0.27	0.15	0.15	1.04	0.42	0.04	0.04	0.04	0.32	4.44
4	Dasht River	Turbat	1910-70	1.39	1.05	0.52	0.49	0.23	0.18	0.66	0.19	0.05	0.04	0.05	0.55	5.41
5	Hingol River	Naushki	1910-50	0.68	0.75	0.55	0.31	0.32	0.47	1.79	1.33	0.23	0.03	0.04	0.30	6.80
6	Mula River	Kalat	1953-72	1.69	0.90	0.86	0.47	0.19	0.03	1.10	0.17	0.15	0.01	0.15	0.59	6.33
7	Hamune Lora	Naushki	1940-70	1.09	0.96	0.79	0.35	0.07	0.08	0.13	0.03	0.01	0.00	0.06	0.53	4.15
8	Gaj River	Khuzdar	1948-73	1.06	0.35	0.47	0.39	0.43	0.18	1.74	1.10	0.28	0.03	0.30	0.55	6.91
9	Kachhi	Sibi	1979	0.59	0.45	0.82	0.48	0.09	0.30	1.58	0.81	0.19	0.00	0.17	0.33	5.81
10	Kachhi	Nasirabad	1979	0.12	0.13	0.47	0.06	0.06	0.00	0.39	1.67	0.22	0.11	0.01	0.33	3.57
11	Kachhi	Mithri	1979	0.36	0.55	0.17	0.00	0.00	0.07	0.75	0.28	0.00	0.00	0.00	0.11	2.23
12	Hamune Mashkhel	Naushki	1910-68	1.41	1.35	0.90	0.49	0.07	0.07	0.18	0.05	0.02	0.06	0.10	0.85	5.55
13	Hamune Mashkhel	Dalbandin	1910-81	0.77	0.71	0.44	0.30	0.07	0.03	0.20	0.06	0.02	0.03	0.05	0.52	3.20
14	Nari River	Harnai	1979-88	1.44	1.48	1.73	0.62	0.53	1.01	3.67	2.57	0.85	0.06	0.36	0.98	15.30
15	Nari River	Babar Kach	1979-88	0.56	1.00	0.63	0.20	0.11	0.24	1.42	0.75	0.17	0.00	0.00	0.33	5.41
16	Pishin Lora	Urak	1979	1.70	2.05	2.51	1.79	0.40	0.17	0.58	0.31	0.03	0.05	0.30	0.71	10.60
17	Pishin Lora	Mangocher	1979	1.41	0.85	0.87	0.27	0.16	0.00	0.58	0.26	0.00	0.00	0.03	0.63	5.06

N.B: Information source, Hydrogeology Directorate, WAPDA.



60°
65°
70°
30°
25°
FIGURE 2·3
LOCATION OF METEOROLOGICAL STATIONS
N
NWFP
ZHOB
QILA SAIFULLAH
PISHIN
LORALAI
AFGHANISTAN
PUNJAB
ZIARAT
QUETTA
HARNAI
SIBI
BABAR KACH
NAUSHKI
MANOCHAR
KOHLU AGENCY
DALBANDIN
MITHRI
CHAGAI
KALAT
KACHHI
DERA BUGTI
NASIRABAD
NASIRABAD
(JAFARABAD & TAMBOO DISTRICTS)
KHARAN
IRAN
KHUZDAR
SINDH
M100
50
0
100
SCALE IN MILES
PANJGUR
TURBAT
BELA
LASBELA
GWADAR
MAKRAN COAST
MAKRAN
ARABIAN SEA
KARACHI
INTERNATIONAL BOUNDARY
PROVINCE BOUNDARY
DISTRICT BOUNDARY
METEOROLOGICAL STATION

FIGURE 2.3

rainfall is depicted in Fig. 2.4. Comparison of precipitation data of Nushki for the periods 1910 -1950 and 1940 - 1970 indicate decreasing trends of rainfall.

Evaporation rates are higher than the precipitation and generally vary from 72 to 76 inches (1830 1930 mm) per annum.

2.1.6 Hydrogeologic Conditions

During Early Palaeozoic Era Balochistan was occupied by an extensive depression known as Balochistan Geosyncline. Simultaneous sedimentation and subsidence of the geosyncline initiated in Permian and continued upto the Recent age with intermittent phases of Himalayan Orogeny. Sedimentary rocks of Permian to Middle Jurassic age were upwarped in Middle to Late Jurassic but were mainly folded and faulted during Himalayan Orogeny which initiated in Early Eocene and continued upto Early Pleistocene in phases. Movement along the faults continues to the present day, as evidenced by the Quetta earthquakes of 1935 and 1955. Himalayan Orogeny gave rise to a number of parallel anticlines and synclines, various types of faults, joints, fractures etc. Prevailing trends of various structures in the north and south-eastern part of Balochistan are from north to south which gradually change and attain an east-west direction in the western part of Balochistan. The sediments were consolidated to form a series of inter bedded limestones, marl, shales, sandstone and conglomerates of Permian to Pleistocene age. Igneous rocks are also exposed in eruptive zone located mainly in Chagai, Makran & Lasbella Districts.

As the sedimentary formations were uplifted by mountain building processes, materials eroded by hill torrents were transported and deposited along the foot hills and depressions. These deposits are of Recent to Sub-recent origin and are unconsolidated to semi-consolidated and consist, primarily of boulder gravel, sand, silt and clay.

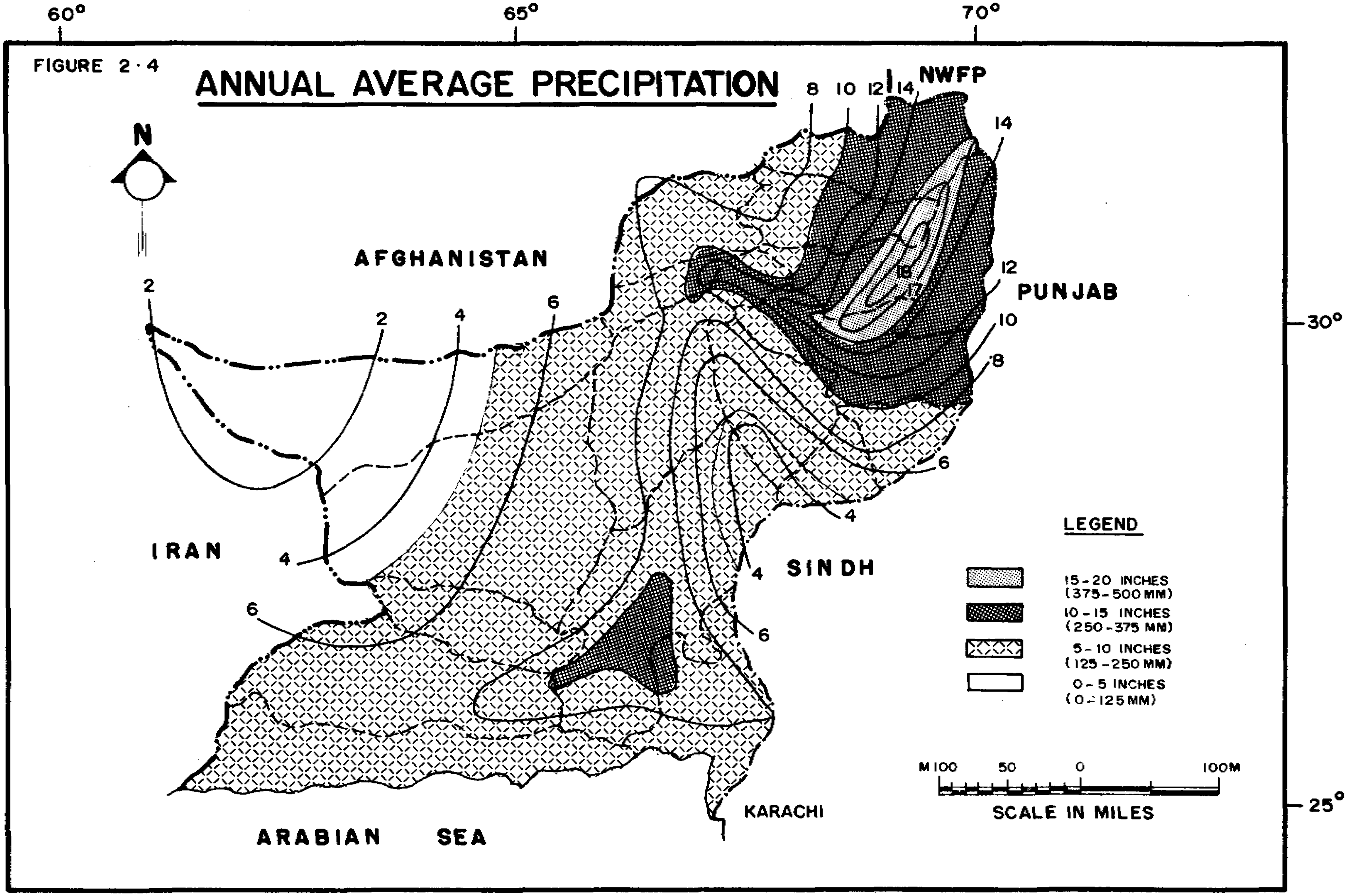


FIGURE 2·4
ANNUAL AVERAGE PRECIPITATION
60°
65°
70°
30°
25°
N
AFGHANISTAN
IRAN
NWFP
PUNJAB
SINDH
ARABIAN SEA
KARACHI
LEGEND
15-20 INCHES (375-500 MM)
10-15 INCHES (250-375 MM)
5-10 INCHES (125-250 MM)
0-5 INCHES (0-125 MM)
M 100 50 0 100M
SCALE IN MILES

FIGURE 2·4

The sedimentary rocks of Permian to Pleistocene age generally possess low primary permeability except Miocene sandstone & conglomerates for example the Urak Sandstone and the Multana Conglomerate. Tectonic deformations have created secondary permeability through joints, fissures, cracks etc i-e Chiltan Limestone of Jurassic age exposed south-west of Quetta. However, a few tubewells installed in the fractured zones of limestone rocks have indicated fairly high yield.

The unconsolidated deposits reach a thickness of up to 1000 feet. Normally, coarse sediments occur along the base of the mountains and laterally grade into fine sediments in the central part of the basin. Vertically coarse and fine formations occur alternately with a higher percentage of coarse constituents near the foot hills. The subsurface lithology encountered in various test holes may be classified into four major formations, such as:

- boulder and gravel with some silt and sand;
- gravel and clay with some sand and silt;
- clay and gravel with some sand; and
- clay and silt with minor amount of sand and gravel.

The first two formations are aquifers whereas the third formation is an aquitard and the fourth an aquiclude. The thickness and texture of the formations changes laterally. The maximum thickness of alluvium is found normally in the centre of basins. The maximum thickness more than 1000 feet was encountered in the centre of Hamune-Lora Basin, however, it generally varies from 400 to 600 feet. In general the aquifer thickness within the drilled depth is 50 to 400 feet.

2.1.7 Water Resources of Balochistan

General

Water resources investigations in Balochistan commenced in the middle of the nineteenth century. However, on a Province wide basis, detailed water resources investigations were initiated in 1973 with the creation of the Hydrogeology Project, WAPDA. Commendable investigational work has been carried out by WAPDA which comprised collection and review of available data and reports, test drilling, construction of test tubewells, performance of pumping tests, electrical resistivity surveys, chemical analyses of water sample. Details of test holes and test wells are summarised in Table 2.3. The Purpose of these investigations was to provide basis for broad economic planning. The detailed economic planning for various projects relating to water resources development will require more detailed investigations.

The project had partly completed water resources investigations in all the 12 basins of Balochistan in 1983 and produced technical reports. These investigations were of reconnaissance level and still there are many areas where investigations have not been carried out due to financial constraints. The consultants have studied all these reports for preliminary evaluation of water resources of Balochistan.

3. Surface Water

Ultimate source of all types of water resources of Balochistan is the precipitation falling over the various watersheds. Surface water resources fluctuate greatly throughout the year owing to the variation in precipitation. Rain water is stored in jointed, fractured and cavernous portions of hard rocks and feeds perennial rivers, springs and nullahs (streams) which are the most numerous in the northern and northeastern highland areas, where the precipitation is highest. Table 2.4 shows typical flows of some perennial rivers and nullahs in Balochistan.

In the southern and western parts of Balochistan where precipitation is very low, most of the streams and rivers are ephemeral, remaining dry for long periods. Nevertheless, there are many nullahs with small flows (0.5 to 5.0 cusecs i.e 0.015 to 0.15 cu.m/second) in every river basin. "Hamuns" (Shallow lakes) form during the wet season but remain dry for most of the year.

Table 2.3

TEST HOLES AND TUBEWELLS INSTALLED
BY WAPDA (1973-1983)

S.No	Name of Basin	Number of Test Holes	Number of Tubewells Installed	Installed Capacity of T/Wells (Cu.ft/sec)	Number of Tubewells Energized	Water Potential Available in 1983 (Cu.ft/sec)
1	Zhob River	45	10	5	4	125
2	Pishin Lora	89	41	20	18	145
3	Kachhi Plain	72	29	8	7	95
4	Nari River	61	27	13	11	120
5	Mula River	24	9	4	8	26
6	Hamun-e-Lora	12	6	3	3	28
7	Rakhshan River	43	20	10	6	27
8	Gaj River	39	29	15	2	38
9	Porali River	41	25	13	10	155
10	Hingol River	106	55	-	12	168
11	Dasht River	57	15	-	3	51
12	Hamun-e-Mashkel	91	43	-	12	68
13	Other Areas-(Bor Khan)	1	-	-	-	-
	Total	681	309	91	96	1046

Source : WAPDA, 1983

Table 2.4

PERENNIAL FLOWS OF SOME MAJOR RIVERS AND NULLAHS IN BALOCHISTAN

S.No	Name of River	Location	Discharge (Cusecs)
1	Nari River	Babar Kachh	115
2	Nari River	Nari Bank	50
3	Bolan River	Kundani Bridge	60
4	Zhob River	Badinzai	35-40
5	Zhob River	Brunj Well	45-50
6	Mula River	Sundh	45
7	Anamber River	Headworks	20-30
8	Anamber & Narachi	Catti Bridge	25-30
9	Sukleji River	Tangi	20
10	Nakus River	Nakus Railway Station	15-20
11	Gurmai Rud	Harnai Railway Bridge	5-20
12	Kapip Lora	Saliaza Weir	15-20
13	Thal Rud	Thedari	10-12
14	Kawas Lora	Kahan Tangi	10-12
15	Kawas Lora	Kahan Banglow	3.5-10
16	Kulachi River	D/s Ziddi Village	11
17	Khost River	Khost Railway Station	4-5
18	Shahrig River	Railway Bridge	3-6
19	Sawar Nullah	Downstream Mina Weir	3-5
20	Karak Lora	Near Quetta	5
21	Mushkaf River	Gujjor	5
22	Mashkai River	Bedi Dhat	4
23	Porali River	Sinchi Bent	5
24	Sariab Lora	Kurram Levy Post	3-4
25	Rukhshan River	Chitkan	3
26	Baleli Nullah	Baleli Road Bridge	2
27	Shora Rud	Muree Brewery Rd. Brdg.	3-4
28	Shirinab Dhora	Sheikh Wasil	2

Source: WAPDA, 1989

In the Kachhi and Nasirabad plains, some rivers are perennial in the upper reaches but disappear downstream due to infiltration, evaporation and consumption (irrigation).

Groundwater

Groundwater in Balochistan occurs both in consolidated and unconsolidated rocks. In consolidated rocks groundwater occurs in jointed, fractured, fissured and cavernous portions. In Balochistan the only known consolidated rock aquifers are fractured limestones, particularly near Quetta and Ziarat, Urak sandstone and Multana conglomerate. Generally, in consolidated rocks, groundwater occurs in confining conditions where the structure and bedding conditions are appropriate. Accordingly, there are a number of springs in various parts of Balochistan, which are normally perennial.

The principal aquifers are the coarse unconsolidated deposits of Quaternary age. These are composed of boulders, gravel, sand with subordinate amounts of silt and clay. These are normally associated with the piedmont slopes along the mountains. Valley floors are commonly underlain by the finer sediments i-e clay, silt with some percentage of coarse sediments. These do not yield sufficient quantities of potable water to be of consequence as a source of water supply. In unconsolidated rocks groundwater occurs generally under water table conditions, however, semi-confined and confined conditions may also be found at some places depending upon the distribution of impermeable and permeable formations.

In the various basins groundwater generally flows from catchment boundaries to the axis of each valley and then follow the general trend of surface drainage. In some valleys i-e Hamun-e- Lora, Hamun-e-Mashkel etc, it flows towards playa lakes which act as evaporation ponds. In some valleys it flows out of the valley and outflow of one valley may be the inflow of the adjacent valley.

Depth to water table varies from less than 3 feet to over 325 feet (1 to 100 m) but typically ranges from 16 to 160 ft(5 to 50 m). However, in most of the areas it is generally less than 100 feet (30 m).

Aquifer Characteristics

For groundwater development and exploitation, knowledge of aquifer characteristics is a prerequisite. The investigations conducted by WAPDA were aimed at determining the aquifer characteristics as expressed by values of the transmissivity (T)and storage coefficient(S) through pumping tests. The range of values of transmissivity and storage coefficient determined from these tests are given in Table 2.5.

M/s National Engineering Services, Pakistan Ltd. (NESPAK) and the Associated Consulting Engineers Ltd; (ACE) had carried out ground water investigations in October 1983, for Quetta water supply. These investigations included test drilling, installation of test tubewells and carrying out of aquifer tests on the test wells. Aquifer constants determined by the Consultants are given in Table 2.6.

The unconsolidated deposits are generally contaminated with silt and clay. Presence of fine sediments considerably reduces the aquifer parameters. However, some of the values of "T" calculated by WAPDA are even more than 500,000 US gpd/ft. but the specific capacity of tubewells installed in these aquifers is generally less than 24 US gpm/ft of drawdown. Therefore, values of "T" calculated by WAPDA seem to be on high side and are subject to verification. Values of storage co-efficient/specific yield determined by WAPDA generally range from 0.03 to 0.4, whereas, those determined by NESPAK and ACE in Quetta Valley are from 0.0037 to 0.12.

Table 2.5

AQUIFER PARAMETERS DETERMINED BY WAPDA

S.No	Name of Basin	Permeabillity (Us gpd/Sq.ft)		Transmissivity (US gpd/ft)		Storage Co-efficient/ Specific Yield (%)		Specific Capacity (Us gpd/ft)		Gradient of Water Table (ft/mile)	
		From	To	From	To	From	To	From	To	From	To
1	Hamun-e-Mashkhel		<5000	100000	500000	3	25	>20		20*	
2	Hamun-e-Lora	5	1700	500	146000	3.5	15.5	0.27	79.27	10	77
3	Porali River	24	10500	1638	2173600	13*		10	20	N.A	N.A
4	Hingol River	100	5000	15000	500000	11	40	10	50	10	20
5	Mula River	30	1375	3300	220000	5	25	1.72	20.7	15	250
6	Rakhshan River	1000	2000	100000	500000	12*		1.4	82.6	5	40
7	Gaj	6.5	2022	832	1822000	15	23	5	24	16	33
8	Dasht	20	5160	100000	200000	10.7*		10	40	2	31
9	Nari			16000	698000	13	23	N.A	N.A	5	50
10	Pishin Lora			120000	950000	7	22	N.A	N.A	15	80
11	Kachhi			2000	950000	7	22	N.A	N.A	2	13
12	Zhob (Alluvium)				860000	9	19	N.A	N.A	8	220
	" Multana &			150000	2200000	9	19				
	" Pab Sandstone			4000	20000	12*					

N.B : * Average Value of Co-efficient of Specific Yield

Source : Basinal Reports, Hydrogeologic Project, WAPDA

Table 2.6 AQUIFER CONSTANTS AT PUMPING TEST WELLS IN QUETTA VALLEY DETERMINED BY NESPAK

S.No	Test Well	Transmissivity * Sq.m/day		Transmissivity (US gpd/ft)		Storage		Specif Capacity of Test well
		Piezometer		Piezometer		Piezometer		gpm/ ft DD
		OBH-1	OBH-2	OBH-1	OBH-2	OBH-1	OBH-2	
1	QWS-3	98	591	7,890	47,590	0.012	0.1100	3.3
2	QWS-4	135	186	10,870	14,980	0.004	0.0037	3.0
3	QWS-5	211	126	16,990	10,150	0.120	0.1200	6.1
4	QWS-7	98	278	7,890	22,390	0.046	0.0530	2.5
5	QWS-8	111	109	8,940	8,780	0.067	0.0003	1.9

1 Sq.m/day = 80.53 US gpd/ft

Reproduced from " Quetta Water, Proposed Well Field (Ground water), October 1983 by NESPAK and ACE.

Water Quality

Perusal of the available data and reports indicate that most of the basins are underlain by both fresh and saline water which are normally hydraulically connected. Normally fresh water occurs in limestone, sandstone and piedmont deposits which flows from catchment areas to valley floors. On approaching the valley floors it becomes saline due to dissolving the salt contents of the formations it passes through and evaporation due to shallow depth to water table in valley floors. Concentration of dissolved solids generally range between 500 to 2000 PPM. In some valley floor areas concentration of dissolved solids is as high as 70, 000 PPM, however, in most of the areas the water quality is good to moderate.

Availability of Water

On account of the peculiar hydroclimatic and geologic conditions the surface water resources of the province are comparatively meagre and unreliable. Ground-water, however, holds the potential for further development in reasonably large quantities in some areas. Ultimate source of all types of water resources is precipitation falling over the watershed. More than 80% of the total precipitation contributes to run off and only less than 20 percent is estimated to infiltrate to the groundwater reservoir. In some basins run off accumulates in playas and is subjected to evaporation and in others it may flow from one basin to the adjoining one and ultimately into the Indus River and Arabian Sea.

The main contribution of rain water to groundwater recharge, in Balochistan, is through direct infiltration of precipitation. WAPDA assessed the groundwater recharge though infiltration and other processes i-e downward percolation of flood run-off, return from irrigation supplies etc. Infiltration factors for various basins were assumed on the basis of geologic set-up, topography, drainage, vegation etc and these range from 5 to 20 percent of the average annual rainfall.

WAPDA also determined discharge of various basins by performing an inventory of various discharge sources and carried out water balance studies. The results indicate that groundwater in the period of investigations was more or less in hydrodynamic equilibrium.

Available potential for future development as given in basinal reports is reproduced in Table 2.7. The table has been updated by the Consultants by estimating groundwater withdrawals after the period of investigations. These have been estimated on the basis of increase in groundwater irrigated area and population. For this, publications of Agricultural Statistics of Balochistan and census Reports have also been consulted.

The available potential assessed by WAPDA seems to be on high side and is subject to verification. This is evidenced by comparatively high rates of water table lowering in most of the areas. Potential areas and status of investigation are indicated on Fig 2.5.

Conclusions and Recommendations

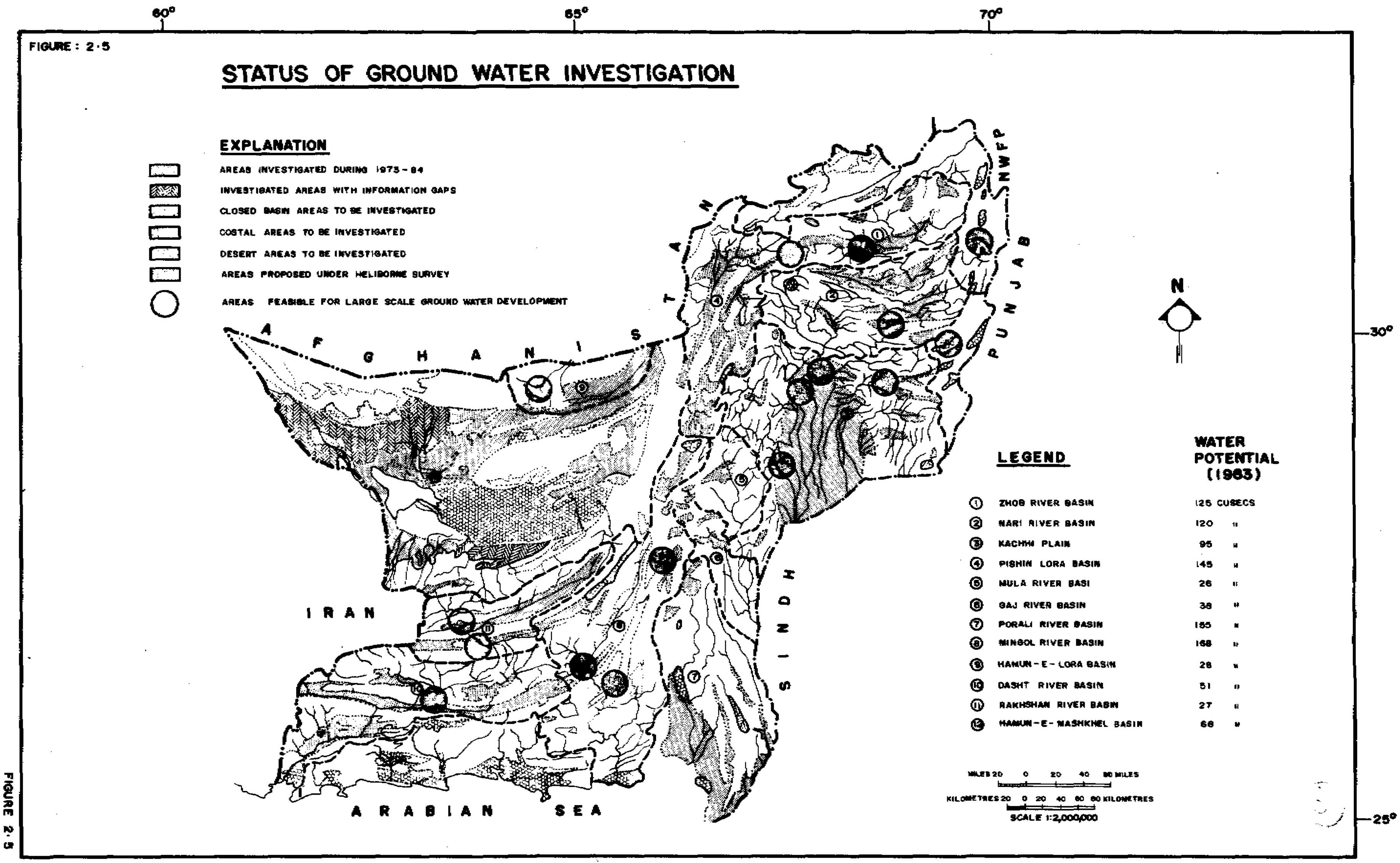
Investigations carried out by WAPDA indicate that in most of the areas of Balochistan groundwater potential exists for future development. Unconsolidated deposits of boulders, gravel, sand contaminated with silt and clay form the principal aquifers. Depth to water table and water quality is favourable for groundwater development. However, limited areal and vertical distribution of aquifer(s), comparatively high rates of depletion of water table in response to groundwater withdrawals, great heterogeneity in aquifer parameters and deterioration of water quality towards the valley floor warrants proper development and efficient management for implementing sustainable water supply schemes.

The in-discriminate extraction of groundwater may result in aquifer depletion and contamination of fresh water with saline water as a result of reversal of water table gradients. Investigations and studies that would generally be required for feasibility studies and planning of

Table 2.7 AVERAGE ANNUAL GROUNDWATER BALANCE AND GROUNDWATER POTENTIAL FOR FUTURE DEVELOPMENT (CUSECS)

S. NO.	Name of Basin	Based on Basinal Reports (WAPDA)				Potential Available for Development (1983)	Estimated Ground Water Development After WAPDA's Investigations	Estimated Ground Water Potential Available for Development (1989)	Utilization Percentage of Recharge
		Total Recharge	Discharge						
			Karezes, Springs, T/Wells, Open Wells, Base Flow etc.	Evapo-transpiration	Total				
1	Zhob River	1210	741	469	1210	125	13	112	62
2	Pishin Lora	675	340	335	675	145	27	118	54
3	Kachhi Plain	2060	1890	170	2060	95	33	62	93
4	Nari River	400	158	242	400	120	23	97	45
5	Mula River	77	35	42	77	26	3	23	49
6	Hamune Lora	51	8	43	51	28	14	14	43
7	Rakhshan River	49	15	34	40	27	20	7	71
8	Gaj River	106	34	72	106	38	7	31	39
9	Porali River	446	140	306	446	155	28	127	38
10	Hingol River	563	250	313	563	168	38	130	51
11	Dashat River	182	79	103	182	51	9	42	48
12	Hamune Mashkhel	200	64	136	200	68	20	48	42

N.B:- Perennial flows of streams have been considered to be a part of groundwater.



60°
65°
70°
30°
25°
FIGURE : 2·5
STATUS OF GROUND WATER INVESTIGATION
EXPLANATION
AREAS INVESTIGATED DURING 1973 - 84
INVESTIGATED AREAS WITH INFORMATION GAPS
CLOSED BASIN AREAS TO BE INVESTIGATED
COSTAL AREAS TO BE INVESTIGATED
DESERT AREAS TO BE INVESTIGATED
AREAS PROPOSED UNDER HELIBORNE SURVEY
AREAS FEASIBLE FOR LARGE SCALE GROUND WATER DEVELOPMENT
AFGHANISTAN
NWFP
PUNJAB
SINDH
IRAN
ARABIAN SEA
N
LEGEND
WATER POTENTIAL (1983)
1 ZHOB RIVER BASIN 125 CUSECS
2 NARI RIVER BASIN 120 "
3 KACHHI PLAIN 95 "
4 PISHIN LORA BASIN 145 "
5 MULA RIVER BASI 26 "
6 GAJ RIVER BASIN 38 "
7 PORALI RIVER BASIN 155 "
8 HINGOL RIVER BASIN 168 "
9 HAMUN-E-LORA BASIN 28 "
10 DASHT RIVER BASIN 51 "
11 RAKHSHAN RIVER BASIN 27 "
12 HAMUN-E-MASHKHEL BASIN 68 "
MILES 20 0 20 40 60 MILES
KILOMETRES 20 0 20 40 60 80 KILOMETRES
SCALE 1:2,000,000

FIGURE 2·5

Table 2.25 DATA OF PHED WATER SUPPLY TUBEWELLS VISITED IN QUETTA, PISHIN AND KALAT DISTRICTS

S. No	Name of Scheme	Design Discharge (Imp. gph)	Bore Hole: Drilling Method	Bore Hole: Dia. (Inch)	Bore Hole: Depth (Ft)	T/Well Depth (Ft)	Housing: Mater-ial	Housing: Dia. (Inch)	Housing: Length * (Feet)	Screen: Mater-ial	Screen: Dia. (Inch)	Screen: Length (Feet)	Slot Size (Inch)	Gravel Shrouding (%): 0.25 (Inch)	Gravel Shrouding (%): 0.125 (Inch)	Gravel Shrouding (%): 0.0625 (Inch)	D & T Data	Static Water Level (Feet)	Pumping Water Level (Feet)	Draw-down (Feet)	Specific Capacity (Imp.gpm	Pump: Type	Pump: H.P.	Suction Head (Feet)	Primemover: Moter (HP)	Primemover: Diesel Engine
1	Sara Ghurki	5400	ST. R.		490		MS	10	270	MS	10	90	0.06				N.A.	97	132	35	2.57	SM		160-394	20	
2	Ahmad Khanzai		ST. R.								8	50					N.A.									
3	Killi Bungalzai	3000	ST. R.		600	560	MS	10	300	MS	8	50					N.A.	96	216	120	0.40					
4	Killi Qambrani	7000	ST. R.		475	281	PVC	10	124	PVC	10	90					N.A.	32	92	60	1.95				20	
5	Killi Sarda	10000	ST. R.	24			PVC	8		PVC							N.A.	90	130	40	4.18	T		250	25	
6	Panjpai		ST. R.				MS			LCG	10/	29+48					N.A.									
7	Killi Mohammad Khail	2200	ST. R.	15	380		MS	10	165	LCG	10	60	0.03		40	60	N.A.	56	100	44	0.84	M		350	20	
8	Karbala	4000	ST. R.	18	350	350	MS	10	318	MS	10	30					N.A.	32	140	108	0.62	T	16	200	30	
9	Chur Badezai		ST. R.														N.A.								20	
10	Lajwar	5500	ST. R.		320	306	PVC	10	100	PVC	10/	50+70					N.A.	95	130	35	2.63	M			20	
11	Gulistan Bazar	3600	ST. R.		500		MS			MS	10	110					N.A.	245	310	65	0.92				30	
12	Gulistan (Abandoned)	4800	ST. R.		320	310	PVC	10	180	PVC	10	120					N.A.	185	200	15	5.38			275		
13	Hyderzai /Mandan	3000	ST. R.				PVC	8	202	PVC	8	100					N.A.	100	200	100	0.50	T	16	200	25	
14	Yaru (Not visited)		ST. R.			519	MS	10	350	LCG	8	50			50	50	N.A.	80								
15	Killi Naik Mohammad	6000	ST. R.			435	MS	10	170	LCG	10/	20+30			40	60	N.A.	95	165	70	1.43				20	
16	Lore Karez	4500	ST. R.		540	300	MS	10	108	MS	10	80					N.A.	99	120	21	3.57	T	16	285	35	
17	Tringer (BIAD)	2500	ST. R.						360			70					N.A.	112	192	80	0.53		10	300	75	
18	Kirdgab		ST. R.														N.A.									20
19	Babri	2500	ST. R.														N.A.	50	185	135	0.31		8	270	8	
20	Khanai Baba	3960	ST. R.				MS	10		MS	10	115	0.06				N.A.	170	200	30	2.20	SM	40	500		
21	Dilsora	3600	ST. R.			310	MS	10	196	MS	10	88	0.06	40	60		N.A.	106	136	30	2.00	SM	25			
22	Churmian	6000	ST. R.			350	MS	10	194	MS	10	79	0.06				N.A.	63	173	110	0.91	SM	25			
23	Sharan Zamistan	4500	ST. R.				MS	8	244	LCG	8	80	0.06		40	60	N.A.	100								
24	Balozai	5040	ST. R.				MS	10	275	MS	10	110	0.06	40	60		N.A.	165	205	40	2.10	SM	40			
25	Khanozai		ST. R.																			M			25	30
26	Maizai Adda ii		ST. R.														N.A					T	25	350	40	
27	Maizai Adda i	6000	ST. R.								10	120					N.A	85	180	95	1.05	T	30	320	30	
28	Huramzai	6000	ST. R.			300	PVC	10	80	PVC	10	110	0.06				N.A	80	120	40	2.50	M	20	200	20	
29	Haikalzai	5400	ST. R.								10	30					N.A	42	127	85	1.06	T	15	200	20	
30	Khudadadzai	10000	ST. R.				PVC			PVC	10	50					N.A	45	85	40	4.18		15	200	15	
31	Jungle Pir Alizai	5000	ST. R.	18	360	320	PVC	10	220	PVC	10	100					N.A	48	190	142	0.58	M			25	
32	Killi Tharatt	3600	ST. R.					10	235	MS	10	93		30	70		N.A	170	180	10	6.00	SM	30	400	30	

*	Below Natural Surface Level	PVC	Polyvinyl Choloride	SM	Submersible Pupm	D&T	=	Development and Testing
St.R	Straight Rotary	LCG	Low Cost Galvanised Steel	T.	Turbine Pump			
MS.	Mild Steel	NA.	Data Not Available	M.	Monolift Pump (Austrailia)			

various water supply schemes based on groundwater development would include but not be limited to:

- collection of available data and reports on climatology, hydrology and hydrogeology;
- determination of the lateral and vertical distribution of aquifer(s) and their hydraulic characteristics i-e transmissivity and co-efficient of storage/specific yield;
- determination of fracture systems in consolidated aquifers and grain size distribution of unconsolidated aquifer(s);
- determination of the ground water flow system;
- identification of discharge and recharge sources of groundwater;
- determination of chemical quality;
- determination of safe yield of aquifer(s) and the response of water table to groundwater pumpage on long term basis;
- assessment of lateral/vertical intrusion of saline water; and
- selection of specific sites for tubewells and open wells using geophysical methods where appropriate.

Groundwater studies and investigations should also include the formulation of detailed programmes for tubewell and groundwater monitoring and periodic maintenance of tubewells.

2.1.8 Administrative Districts

For administrative purposes, the Government of Balochistan divides the province into several tiers, each having varying levels of administrative powers and jurisdiction. These tiers are as follows:

- provincial;
- divisional;
- district;
- tehsil;
- union Councils;
- mauza; and
- village.

Provincial Level

The Provinces of present day Pakistan were integrated into one administrative setup from 1956 upto 1970, when this unit setup was dissolved Balochistan was given full fledged provincial status.

Under this federal setup the Provincial governments in Pakistan have a great deal of autonomy in terms of:

- provision of Law and order, social services and economic services;

- allocation of expenditures to the various productive and non-productive sector;

- collection of various types of tax revenues including land revenue, provincial excise, property tax, motor vehicle tax, stamps, and other duties and fees; and

- collection of non-tax revenues from general administration, community and social services, and economic services (eg. agriculture and irrigation).

In comparison, the Federal Government has control over national security, communications and collection of income and sale taxes.

Divisional Level

There are six Divisions in Balochistan:

- Quetta – Districts Quetta, Pishin & Chagai;
- Loralai – Districts Loralai, Qilla Saifullah & Zhob;
- Sibi – Districts Sibi, Ziarat, Kohlu & Dera Bugti;
- Nasirabab – Districts Jaffarabad, Tamboo & Kachhi;
- Kalat – Districts Kalat, Khuzdar, Lasbella & Kharan; and
- Makran – Districts Gwadar, Turbat, Panjgur.

In each Division, there is a Commissioner who is responsible for law and order. There is also a joint Director from local Government who is responsible for coordination of planning and implementation at the Divisional level.

District Level

There are twenty Districts in Balochistan as shown in Figure 2.6. Administratively, the District is the most important level for implementing development projects and administering activities of local government. District Councillors are elected members who make planning decisions for each district, in cooperation with local government officials.

Development plans are carried out by the various building departments and social services are administered by district staff of the relevant line department. The District Council is responsible for collection of local tax revenues and non-tax charges. The Deputy Commissioner is responsible for law and order in each district.

FIGURE 2.6

ADMINISTRATIVE DISTRICTS OF BALOCHISTAN

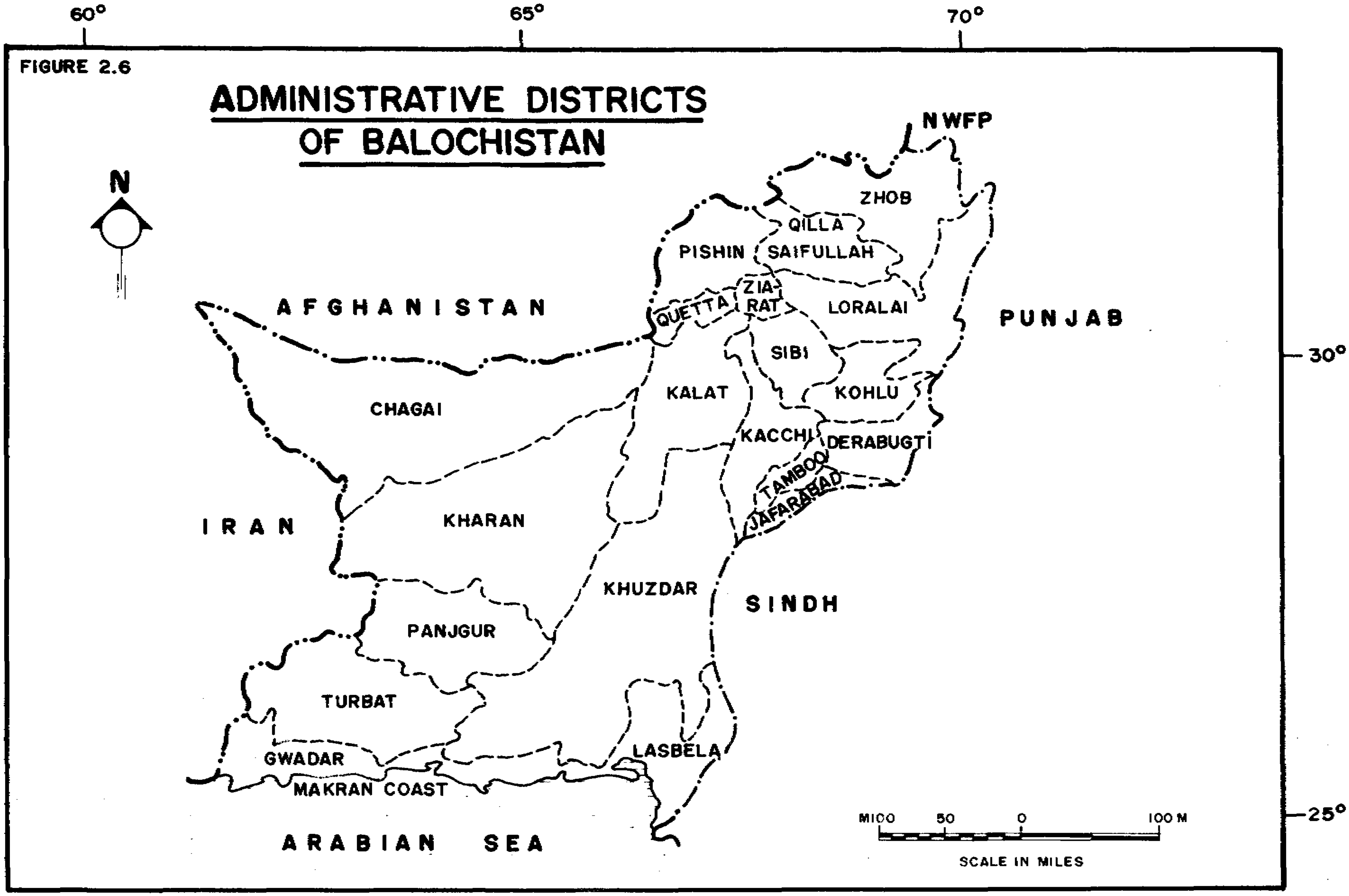


FIGURE 2.6

Tehsil Level

Formerly, there was a Tehsil Council that carried out administrative duties and included electoral representatives below the District level. These councils have been abolished although Tehsil and sub-Tehsil boundaries still exist.

Union Council

The Union Council is the lowest official level of local government, involving elected representatives (Union Councillors) and Local Government administrators (Secretary of Union Council). There are currently 315 rural Union Councils in Balochistan; this number will be revised upwards by the next census to reflect population growth. In general, each Union Council serves 10-15,000 people, represented by 10 to 15 elected councillors. They have authority to implement small schemes and collect local revenues. A district wise distribution of the Union Councils is given under:

District	Union Councils
Quetta	8
Pishin	31
Chagai	12
Loralai	35
Zhob	17
Qilla Saifullah	11
Sibi	11
Dera Bugti	10
Kohlu	9
Ziarat	4
Jaffarabad	25
Tamboo	12
Kachhi	28
Kalat Kalat	19
Khuzdar	22
Kharan	10
Lasbella	13
Turbat	21
Gwadar	6
Panjgur	11
Total	315

Mauza

A mauza is not an administrative unit but rather an electoral unit from which a Union Councillor is elected. For convenience, a mauza forms the lowest level of census reporting.

Village

Within each mauza, there may be several villages. There is no official administrative body at the village level. A village is defined as a settlement with a population less than 5000. Larger settlements are called towns and have legal right to form town councils with full administrative duties.

Currently, there are proposals to extend the civil administration to the village level. This may be appropriate and feasible in the more densely populated provinces of Punjab and Sindh, but there is some doubt about the viability of this concept in Balochistan due to small villages sizes, weakness of the existing administrative system at the Union Council level, low levels of education and development, and prevailing tribal conditions.

2.2 Institutions Involved in the Sector

The roles of various institutions that are involved with the water supply, sanitation and health sector are reviewed in the following sections. These include the provincial line departments and special government agencies, the local governments (District and Union Councils), elected representatives, and non-governmental organizations (NGOs). These discussions are limited to an explanation of mandates related to the sector, extent of involvement in the sector and a review of successes and failures.

The seven departments that have some degree of involvement in the water supply, sanitation and health sector are Planning & Development, Public

Health Engineering (PHED), Local Government and Rural Development (LGRDD), Irrigation, Health, Education, and Social Welfare. There are also various other separate agencies working in the water and sanitation sector.

2.2.1 Planning and Development Department

The P&D is the counterpart of the Federal Planning and Development Division in the provinces. Its functions include the preparation of the ADP, acting as the secretariat of the Provincial Development Working Party, monitoring the execution and performance of all development activities undertaken by the Province and liaising with donor agencies.

All projects in the sector are processed through the Water Section or the Local Government Section of P&D Department. They receive and process:

- PC I forms for actual project implementation;
- PC II forms for undertaking feasibility studies or preparing sector development plans; and
- concept clearance forms for initial start-up of negotiations with international donor agencies.

In essence, the Planning and Development Department coordinates the development activities of all other line departments.

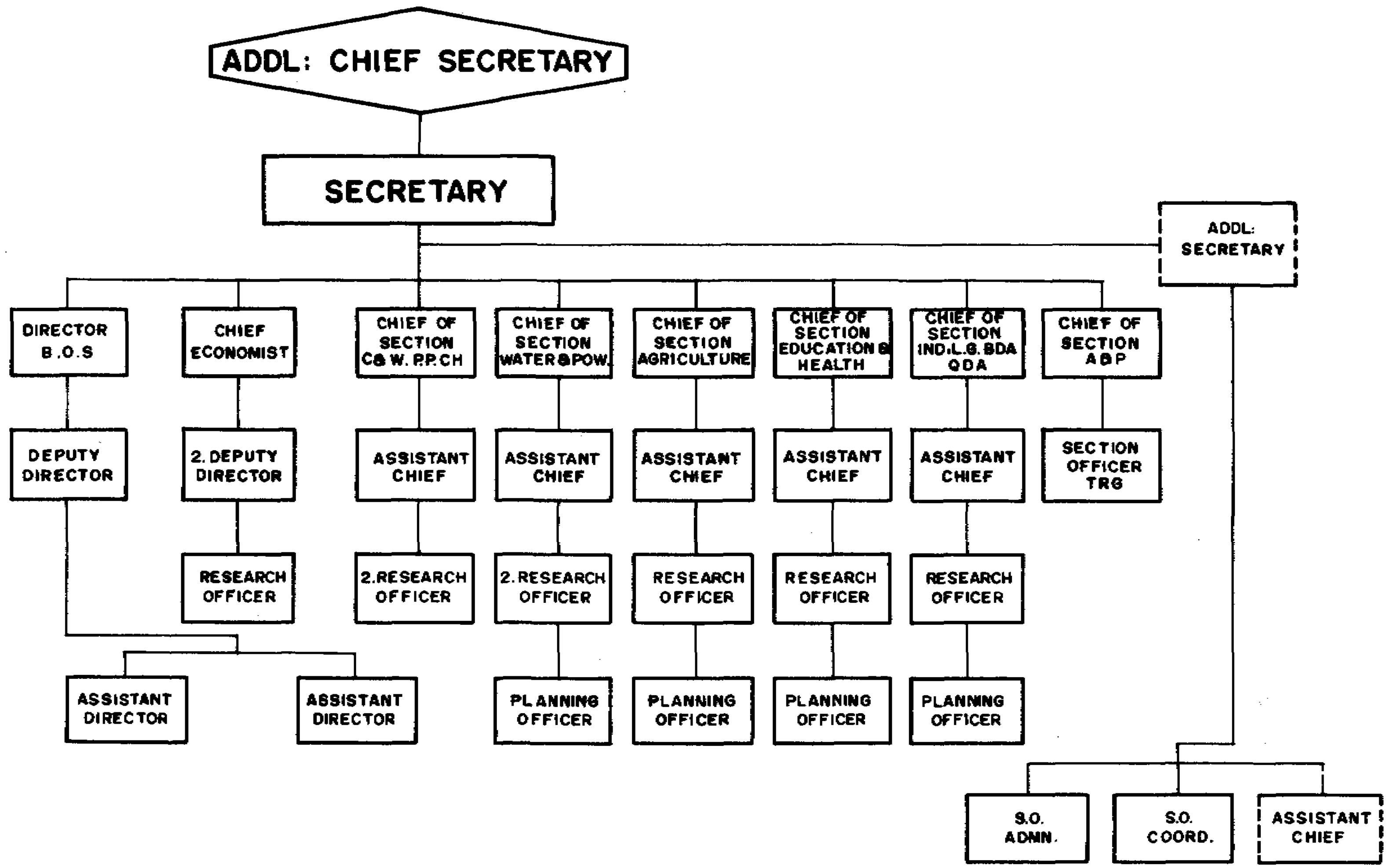
2.2.2 Public Health Engineering Department (PHED)

Description of Role in the Sector

The PHED mandate is to design and construct safe water supply

FIGURE 2

ORGANIZATION CHART OF PLANNING & DEVELOPMENT DEPARTMENT



schemes in urban and rural areas and to provide drainage for sullage and storm water in the medium and small urban settlements. PHED is also involved in operating and maintaining these schemes because the local bodies have not taken on this responsibility.

In Balochistan, the PHED has been in existence for less than two years but has the full status of a line department, headed by a Secretary. This indicates the high priority attached to water supply in the province. Since its inception, PHED has completed 80 projects, has 205 projects ongoing and another 160 schemes proposed, the majority of which are rural. It has also been faced with the responsibility of operating and maintaining 285 existing projects implemented by the Irrigation Department. In 1989/90, the Public Health Engineering sector received the largest share of the Provincial Annual Development Programme (ADP) funding, amounting to Rs. 270 million. This excludes expenditures on operations and existing schemes, which are met from the Recurring Provincial Budget.

In the short time with limited resources, PHED has done commendable work to meet the water needs in Balochistan. As of June 1989, the total water supply coverage in the province (rural and urban) is 45%. However, PHED has so far concentrated on towns or larger villages and coverage in the rural areas is subsequently in the order of 25%.

Human Resources

Figure 2.7 shows the organizational structure of PHED in Baluchistan. PHED has very limited resources in terms of professional staff, transportation, equipment facilities, and offices. To date, priority has been given to hiring or securing essential staff, mainly civil engineers, and to investing in drilling rigs. Figure 2.8 shows PHED's staffing levels for professionals and officers. PHED's total complement of staff including clerks, operators, peons, drivers and chowkidars is 2400.

ORGANIZATIONAL SETUP
PUBLIC HEALTH ENGINEERING DEPARTMENT
BALOCHISTAN

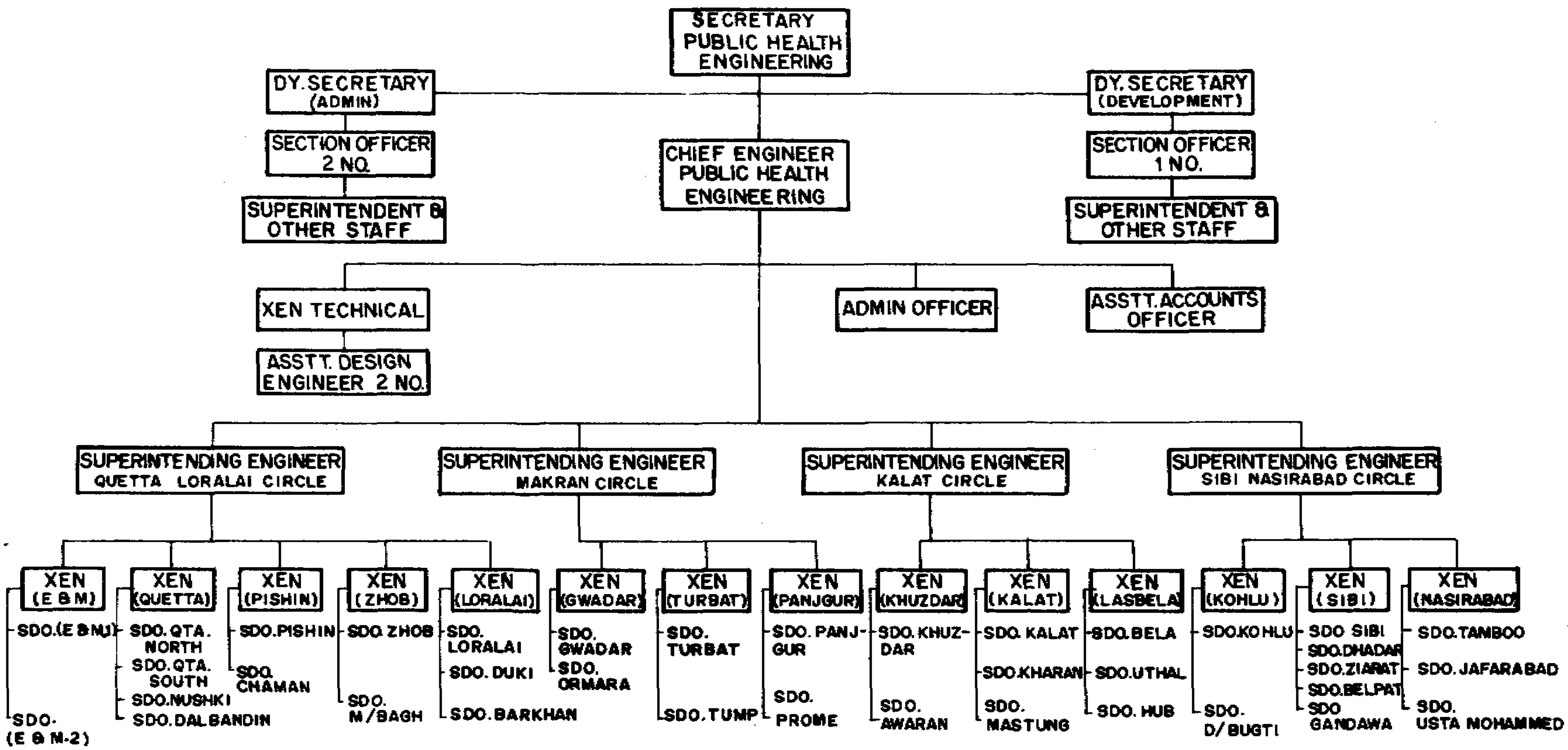


FIG. 2.7

Figure 2.8

STAFFING CAPABILITIES OF PHED

Administrative Level		Number of Staff	Staff Grade
Provincial	Chief Engineer	1	19/20
	Executive Engineer (Technical)	1	18
	Assistant Design Engineers	2	17
Division/Circle	Superintending Engineers	4	19
	Executive Engineer (Extension & maintenance)	1	18
	Sub-Divisional Officers	2	17
District	Executive Engineers	13	18
(Tehsil)	Sub-Divisional Officers	36	17
	Sub-Engineers	108	11-16

The department has no Human Resource Information System (HRIS). Presently no structured training programme exists for PHED employees. In Balochistan, the number and quality of staff available for the sector are limited and consequently they are spread very thin. In PHED, the number of schemes implemented each year has risen dramatically but staffing levels have not kept pace. At the senior level, most of the time is spent on administrative duties to implement schemes rather than on planning and design.

Conclusions

During discussions with government officials, the overwhelming consensus was that drinking water supply schemes should be primarily the responsibility of the Public Health Engineering Department. The main reason for this is that PHED has the knowledge and technical know-how of supplying drinking water to the people. However, it lacks community orientation and it has not undertaken any projects for sanitation and drainage. It was considered essential that PHED should create a cell within the Department for monitoring and evaluation.
In principle, a decision has also been taken that each individual household will have to pay water charges. At present there is no effective institutional arrangement for collection of these charges with the result that people have stopped paying any water charges. Therefore, it was considered advisable as well as desirable that the community should make payment regarding water charges in respect of all projects, old and new.

It was also considered necessary that if any new project for the supply of drinking water to the rural areas is undertaken, there must be community involvement in the planning, execution, operation and maintenance stages. In this manner they would consider the project as their own, otherwise they will remain aloof from the project and would take no interest in it. The absence of interest by the community is the main cause of failure.

To implement this, it is necessary that a political decision regarding cost recovery be made by the Government and that people be made to understand that the help, assistance and cooperation of the people is necessary because the government's resources are limited.

2.2.3 Local Government and Rural Development Department (LGRDD)

LGRDD is a community based organization dealing with the people at the community, union and the district levels. It is within the mandate of LGRDD to organize the communities, and provide basic services in the field of public works, (drinking water supply, tanks, ponds and other works of infectious diseases and system enforcement of vaccination), Drainage (adequate system of public drains and disposal of and waste) and Education (grants and subsidies to institutions and organizations engaged in the promotion of education). These are the compulsory functions of the local councils as laid down in section "A" and "C" of fifth schedule of Balochistan Local Government Ordinance 1980. Implementation procedure has also been laid down in the Manual of Instructions for Rural Development.

LGRDD consists of one Director located at Quetta; six Joint Directors at each of the 6 Divisional Headquarters; 20 Assistant Directors, 20 Assistant Engineers and 20 Chief Officers (LCS) at the District Headquarters; 47 Development Officers, 47 supervisors and 47 sub-engineers at the sub-divisional headquarters and 315 Secretaries of Union Councils (village workers). The organization chart and staffing levels of LGRDD are shown in Figure 2.9 & Figure 2.10 respectively.

LGRDD has the following main branches to deal with its functions as laid down in the Ordinance;

FIGURE 2.9

ORGANIZATION CHART OF LGRDD

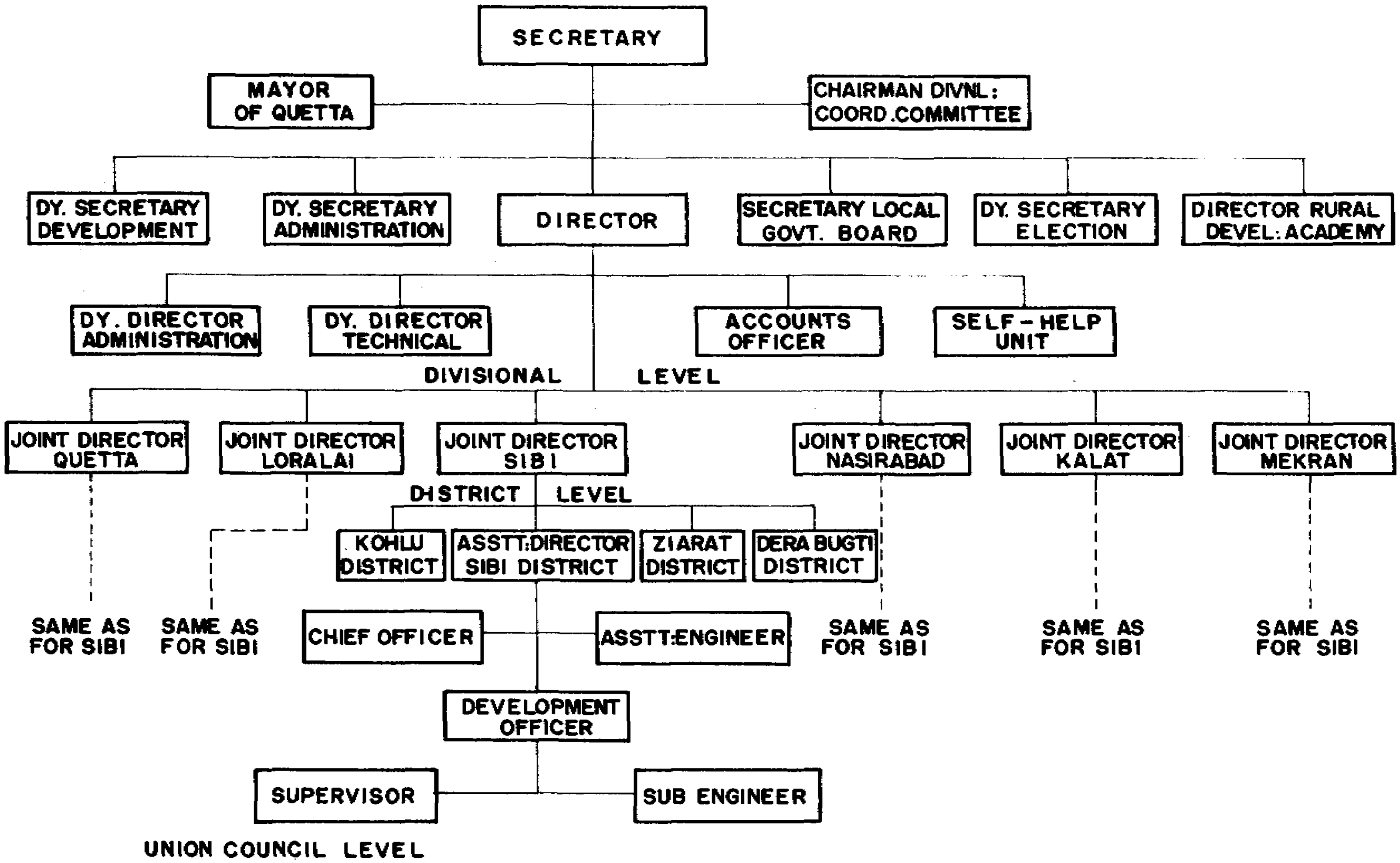


FIGURE 2.9

Figure 2.10

STAFFING CAPABILITIES OF LGRDD

Administrative Level		Number of Staff	Staff Grade
Provincial	Director	1	19
	Deputy Director Technical	1	18
	Dy. Director(H.Q)	1	18
	Planning Officers	2	17
	Asst. Director	3	17
	Assist. Engineer	2	16/17
	Town Planner	1	17
Divisional	Joint Directors	6	19
	Divisional Engineers	6	17
	Town Planner	6	17
	Ch. Officers	6	6/17
District	Assist. Director	20	17/18
	Chief. Officers	20	16/17
	Assist. Engineers	20	16/17
(Tehsil)	Development Officers	47	16
	Supervisors	47	9
	Sub - Engigeers	47	11
Union Council	Village Workers (Secretary U. Counl.)	315	5/6

Election Cell

The Secretary LGRDD is the Provincial Elections Authority and the Cell deals with the local bodies elections and by-election. The number of electoral constituencies at the local council level are given below:

	No.	Constituencies
Rural Councils:		
Union Councils	315	2,967
District Councils	20	315
Urban Councils:		
Town Committees	20	144
Municipal Committees	10	190
Quetta Municipal Corporation	1	48
Cantonment Board, Quetta	1	3

Appendix A Table A-1 shows the local councils, constituencies (wards) settlements, population (1981) and the projected population for the year 1988, 1993 and 1998 which is the plan period for strategic investment in the sector.

Local Council Board

The board is headed by a Secretary who is assisted by 9 Administrative Officers and acts as a personal department of local bodies to supervise the rural and urban councils in the formulation of budget proposals, taxation proposals, disbursement of funds and grants-in-aid. The Board is also responsible for the administration and management of the local councils for effective coordination and channelization. A proposal to increase the finances of the local councils has been suggested as over 50% of the local councils are facing deficits.

Rural Development Wing.

This Wing is responsible for the administration and management of field staff, and the allocation of funds to the local councils. The Wing is also responsible for monitoring and evaluation of the development programmes.

The source of funding for the development schemes is as under:

1) Regular Rural Development Funds.

2) Accelerated Development funds which includes funds outside the ADP, MPA/MNA fund , and rapid development funds.

3) 7 Marla and Katchi abadi funds.

4) Special development funds.

5) Dovetailed funds for the Projects of Education, health, social welfare, Revenue and other Govt. Deptt.

Funds at S.No. 1 above are compulsorily allocated to the Local Government Institutions where as those at S.No.2 to 5 are optional depending on the good will of the Government, MPA/MNA or the Department Concerned to involve the LGRDD institutions in the Implementation of Schemes.

The total funding allocated to the District Councils and the Union Councils in the ADP under the rural Development programme is between Rs. 50 to 60 million and its distribution is made on fifty fifty cum population basis between both these institutions. The Government has clear instruction to provide 25% of the allocation for water supply, health and sanitation projects. This provision is some time more and some times less depending on the initiatives of the councillors and needs of the Communities. The LGRDD sectoral allocations for water supply, health, sanitation and irrigation for the ADP 1988-89 are given in Table A-2 of Appendix. A.

The type of schemes included in the irrigation sub sector are dug wells, water tanks, Karez improvements, development of springs and water channels which is also a source for drinking purpose in rural areas. These activities are very similar to water supply schemes but greater emphasis is placed on schemes that generate income. Nonetheless it shows the capacity to implement schemes in the order of over Rs. 19 million each year within the sector under Rural Development and much more under the other optional funding.

Human Resources

The Local Government wing acts as the personnel department of local councils by providing them with officers. Through the Rural Development wing, the functions include the execution of the rural projects and special development programmes. The department at this time has no Human Resources Information Systems (HRIS) to organize staffing capabilities.

Currently the LGRDD are operating a Rural Development Academy out of temporary facilities in Quetta. There are two buildings, one for faculty members and one for administrative officers and a classroom. Training equipment (audiovisual) is limited and the blackboards are in poor condition. A library does exist, but without proper learning materials for students. There are five instructors and the necessary support staff, but the instructors appear to have limited capabilities. There is neither a set curriculum nor a proper plan of action. New facilities for the Academy are being constructed on the outskirts of Quetta and completion is scheduled for late 1990. Training activity is limited to courses for newly elected local councillors and LGRDD officials from the administrative wing of local government.

Conclusion

LGRDD works closer to the grass roots level than any other department. It has placed top priority on water supply schemes and the policy is to spend 25% of development funds in this sector (towns and rural areas). This would amount to Rs. 15 million annually for the rural areas. The actual expenditure of LGRDD development funds on water supply has been less because the dispersement of funds is at the discretion of District and Union Councils (see Sections 2.2.7 and 2.2.8). These amounts are considerably smaller than PHED's programme and when spread out over 315 Union Councils and 20 District Councils, the impact of the Rural Development ADP funds is minor.

LGRDD also provides institutional links at the village level but they have a thin network of field staff and none are females. They do not spend much time in the field due to office administrative tasks, lack of mobility and lack of incentives. This has reduced the departments effectiveness in rural development. LGRDD has a large number of technical staff but given their broad mandate it is difficult for them to meet all the demands. The staff requires improvements in planning and decision-making capabilities and some technical upgrading to meet the needs in the sector.

2.2.4 Health Department

Mandate

The Health Department is responsible for providing preventative and curative health care within the province. It operates a network of hospitals, clinics, dispensaries, Rural Health Centres and Basic Hèalth Units as part of the curative services. Activities in the preventative areas of health care and hygiene education have been limited. Most success has been in the field of immunization which has received assistance from foreign donors and NGOs. The organization chart and staffing capabilities of the Health Department are shown in Figures 2.11

FIGURE 2·11

ORGANIZATION CHART FOR THE HEALTH DEPARTMENT

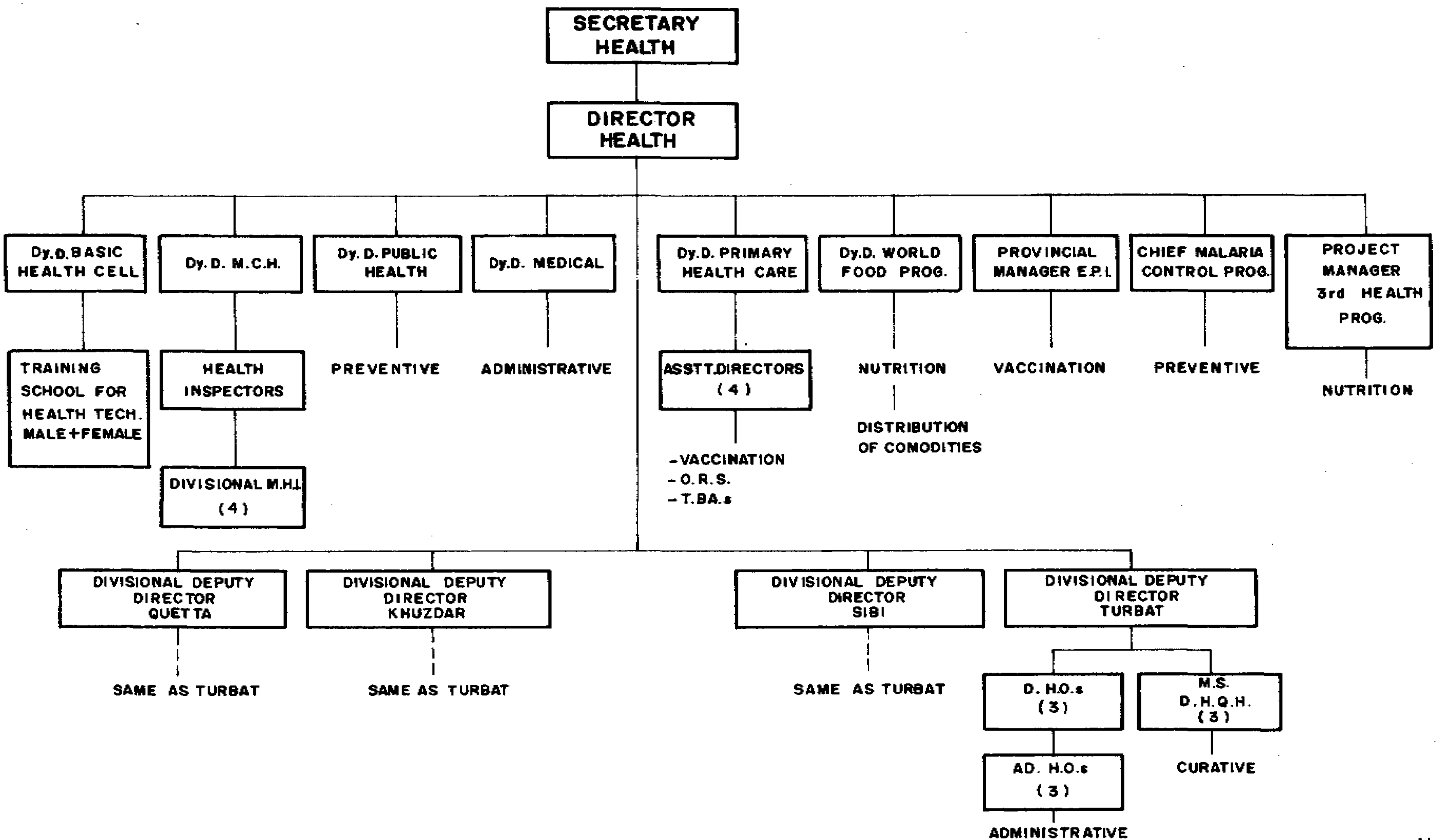


FIGURE 2. 11

Figure 2.12

STAFFING CAPABILITIES OF HEALTH DEPARTMENT

Administrative Level			No. of Staff	Grade
Provincial	Director		1	20
	1)	Dy. Director Health Services CDC	1	19
	2)	Dy.Director Health Administration	1	19
	3)	Prov. Manager EPI	1	19
	4)	Dy. Director PHC	1	19
	5)	Dy. Director MCH Services	1	19
	6)	DD World Food Programme	1	19
	7)	DD Basic Health Unit	1	19
	8)	Asst. Dir. Health Nutrition	1	18
	9)	Health Inspectors	1	18
		Provincial Chief Malaria Central Programme	1	19
Division	Deputy Director Health		6	19
	(1)	Ch.Health Education	1	18
	(2)	Ch. Health Educator	7	16
	(3)	Asst. Director AHP.	6	18
	(4)	School Health Service	4	18
	(5)			

	Dist. Superintendent Vaccination (D.S.V)	20	14
District	District Health Officer	17	19
	Asst.Dist. Health Officer/ Medical Officers	17	18
Sub-Division (Union Council)	Medical Officer R.H.C	20	17
	1.M.O.S.	200	17
	2.Health Technicians (male)	280	11
	(female)	280	11
	3.L.H.V's	130	9
	4.Compounders	226	11
	5.Vaccinators	139	11
	6.Midwives(T.B.A's certified?)	562	4

CDC - Communicable diseases control
AHP - Accelerated Health Programme
EPI - Expanded Programme on Immunization
MCH - Mother & Child Health
PHC - Primary Health Care.

and 2.12. respectively.

Health Facilities and Privative Health Come Programme

Table 2.8 shows the Health facilities and manpower capabilities of the department.

Table 2.8 **HEALTH FACILITIES (1988-89)**

Hospitals	47
Rural Health Centres	41
Dispensaries	269
Basic Health Units	334
MCH Centres	68
TB Clinics	16
Mobile Teams	70
Doctors	936
Nurses	297
Lady Health Visitors	267
TBAs	2004

In order to provide better health cover to the rural population in general and to mothers and children specifically, Mother and Child Health Centres, Rural Health Centres Basic Health Units and Mobile Health Teams are provided. The mobile teams consist of a Lady Health Visitor, a Medical Technician, a Dispenser/Vaccinator, an Ayah (nanny) and driver.

On the preventive side, the Government of Balochistan has approved an Accelerated Health Programme, the components of which are EPI, ORS and TBA training.

A BCG vaccination drive to protect children from TB is included under the EPI programme. The training of TBA's (Traditional Birth Attendants) is being done in collaboration with the Social welfare Department.

Other special programmes include the Malaria Control Programme, the nutrition programme and the Diarrhoeal Diseases Control (DDC) Programme. Appendix B provides details on these experience.

Hygiene Education

There is a Health Education Unit with 5 Health Educators for the Province. They have inadequate support staff and facilities and consequently have not been active in developing or delivering messages. At present other them the DDC programme, little is being done in relation to hygiene education. The DDC programme educates mothers in basic hygiene including washing hands, cleaning feeding bottles boiling water, and administrating ORS. Health and Hygiene education is delivered primarily through the media. TV, radio, news papers, posters, bill-boards and pamphlets are used for promotion. Low accessability to the media, and minimal educational levels, restrict these messages reaching the rural population.

Institutional Resources

The Bolan Medical College at Quetta set up in 1972, is the main source of medical doctors working in the various health institutions. No post graduate medical institution exists at present in the province. Over a thousand doctors have passed out from the college, which has a yearly intake of between 100-150. A teaching hospital at the College proposed, for the future.

Posting of doctors in the remote areas of the province has been a serious problem due to the lack of residential accommodation.This problem has been partially overcome by increased expenditure of the Government on providing accommodation.

At present there are three Training Schools for female and male nurses all situated at Quetta. But over a period of over fifteen years only between 700-900 nurses have passed out from these institutions.

A scheme for the establishment of a paramedical school is under active consideration by the Government.

Financial Resources

Allocation of ADP funds to the Health Department has increased significantly in 1989-90 to Rs. 150 million. Funds are also provided by foreign donor agencies. An estimate of expenditures in health and hygiene related to water supply and sanitation is not available, but it is known that the majority of funds are spent on curative health and immunization.

Conclusion

The Health Department is mainly active on the curative side, but for the last two years some measures have been taken for the separation of preventive care from the curative side. Detailed discussions were held with the Secretary of Health and Director of Health Services. The common view was that the protection of public health was the responsibility of the Health Department. The health activities include sanitation, drainage, hygiene education as well as measures which help prevent various diseases. It is thus, considered imperative that the teaching of proper sanitation, drainage, and hygiene education remain part of the Health Department. Resources currently available on the prevention side are inadequate to meet the growing needs and requirements of the people.

The Health Department is understaffed and many are under qualified to even meet the curative needs in Baluchistan. The number of staff working exclusively on preventative health care is approximately 550. This estimate mainly includes several existing donor assisted programmes such as the Expanded Programme of Immunization, Control of Diarrhoeal

Diseases and Malaria Control Programme. In order to reach the rural population with hygiene education messages, field staff of various departments will have to be utilized and will require appropriate training. The Department must also encourage more community involvement.

2.2.5 Department of Education

Although the Education is not directly involved in the sector, nonetheless it is has the potential for greater involvement. For instance, considerable benefit could be derived if primary school teachers would take up the challenge to educate children on the basics of health and hygiene. Similarly, the Adult Literacy Programme and the Mosque schools could be other effective means for the promotion of health and hygiene education.

Education Facilities

Balochistan's educational levels are the lowest of any of the provinces. Rural literacy for people aged 10-years and above was 10% for males and less than 2% for females in 1981. In 1986 there were 122,000 boys and only 25,000 girls enroled in primary schools. The drop-out rates (those not completing primary school) were 65% for males and over 80% for females. Throughout Balochistan, there are 3608 primary schools, 4430 Mosque schools, 549 Middle Schools and 275 High Schools. Details are given in Appendix C.

Opportunities for higher education are limited in Balochistan with the majority of the higher centres for learning located in Quetta. These include:

- University of Balochistan;
- Polytechnic;
- Rural Development Academy;

- Railway Accounts Academy;
- Medical College;
- Teacher Training Schools (several);
- Degree Colleges (Four, three boys and one girls);
- Vocational Colleges (two); and
- Commercial Institute.(one).

Outside of Quetta, higher level facilities that exist include eight intermediate colleges in twelve districts and ten degree colleges in nine districts of Balochistan. The districts of Ziarat, Gwadar, Qilla Saifullah and Jaffarabad do not have any colleges. There are also two vocational colleges one in Kalat and one in Khuzdar. The Department of Education is planning to start a small engineering university in Khuzdar as well.

Primary Education

In 1958, the commission on National Education recommended that education should be made compulsory up to class-v by 1969 and up to middle level by 1974. Consequently the number of primary schools increased in all provinces and in Balochistan. However, the general participation rate of 35% is still low. Moreover among girls it does not exceed 20%. The reasons for this situation are multiple, such as the rugged terrain transportation problems, cultural constraints and the drop-out rate which is the highest in the country as reflected in the following table:

Province - Wise Drop-out Rate % (1983-84)

	Punjab		Sindh		NWFP		Balochistan	
	Male	Female	Male	Female	Male	Female	Male	Female
Urban	12	24	40	50	60	70	56	80
Rural	18	56	77	89	70	78	68	93

The highest drop-out rate being in the grade I to II where almost 50% children drop-out of school.

This phenomenon could be attributed to the curriculum contents, teaching methods in the classroom, and the lack of good liaison between the school and the community.

These problems of primary education in the province has compelled the Government to the take measures to improve the situation and increase the rate of enrolment in schools. This also coincided with the trend in the nation which put's emphasizes on the improvement and expansion of primary education in the country. This is reflected in the 1989/90 Annual Development Plan of the Government of Balochistan allocating Rs. 58 million to primary education which is 30% of the total education budget of Rs. 173 million.

International agencies also such as, USAID are investing large sums of money for the expansion of primary education in the province. USAID has recently launched a 10-year project commencing June 1989 on "Primary Education Development Programme for Balochistan" to increase the participation rate in primary schools to 65% in 1999 by strengthening the infrastructure of the educational system in the province.

The National Education policy has also realized that to improve the state of education quantitatively and qualitatively, measures should be taken to reform the curriculum, to make it more relevant to the situation of the children and catering more to their needs of their families and communities, also to introduce more in the way of basic health and hygiene as the current curriculum contains very little health/hygiene segments. What is covered relates to Social and Islamic Studies, and generally textbooks display the health and hygiene message by pictures.

Institutions-Colleges of Technology and Polytechnic

The province currently operates a Polytechnic and technological Institutions in Quetta. A typical institutions offers a three year Diploma in the basic technologies (Electrical, Mechanical, Civil) as well as specialised areas. The programmes are structured on standardized curriculum (Federally controlled) and are designed to represent the topic on a basis of 70% practical and 30% theory. Due to the lack of equipment, less effort is actually spent on practical learning. The Civil department has eight faculty members and offer courses in Water Supply, Sanitation and Hydraulics but the material lends itself to the urban environment and not rural. The Mechanical department with eight faculty members has the capability to cover topics such as pumps, motors, engines, etc, but lacks the appropriate equipment. Teaching staff appear to need some technical upgrading.

Teacher Training

The Teacher Training process has a number of weaknesses. The training is too short and not consistent, and the availability of teacher learning materials including visual aids is limited. A large number of teachers have not received any teacher training.

Directorate of Manpower and Training

The Directorate operates two Government Vocational Institutes, one in Kalat and the other in Khuzdar. The existing facilities are small and lack the appropriate equipment for the course that they are offering. Instructors lack the practical experience of the trade. Courses cover a range of subjects such as machinist, bench fitter, welder, sheetmetal, auto mechanics, plumbing and pipefitting, carpentry, electrical installation, radio & TV, masonry and draughtsman. Curriculum is standardized to the trade and/or occupational skills analysis which is published by the National Training Board.

Non Formal Education

Beyond the formal education institutions, human resource development is available within government departments. Upgrading (refresher) courses for employees are provided and some effort is made to reach employees at the local (village) level, at least within the Local Government Department. There is a need to encourage this type of training and the facilities.

The Rural Development Academy in Quetta is presently expanding to a new location. This academy operates as a part of LGRDD, providing training courses for junior and senior staff. This facilities are also available for the elected representatives.

Conclusions

Throughout the formal educational systems, from primary school up, there is a shortage of qualified staff, and limited resources for equipment to facilitate learning. More Technical training centres are required as they generally provide a good standard of teaching for basic training skills, with emphasis appropriately placed on practical learning. They are suitably equipped for rural training needs and provide skills that are relevant to water supply and sanitation, such as masons, carpenters, electricians, diesel mechanics, millwrights, and cement finishers. Also more Politechical schools that offer basic level courses that lead to higher institutions for civil and mechanical engineering are needed.

2.2.6 Social Welfare Department

The functions of the department in the context of this sector include the training of Dais and the registration and control of non-governmental organizations. Dais are trained initially for a period of two weeks and refresher training courses are held every quarter for a two or three day period.

The department's funds for day to day operations come from the provincial recurring budgets, but most of its prevention-oriented promotional expenditure is financed through grants from donor agencies or the Women's Division in Islamabad.

2.2.7 District Councils

The District has enjoyed an important status in the administrative set up since the founding of Pakistan. For administrative convenience this level has been given due importance and as such the District Councils enjoy a pivotal position in Local Government. The number of District Councils currently in Balochistan is 20. The average land area and population covered by each district council is 173595 sq. kms and 217000 respectively. Also it is estimated that on the average 294 settlements (mauzas) fall within the jurisdiction of a District Council in Balochistan.

In Balochistan, the composition of District Council includes:

- one member elected on the basis of adult franchise from every Union Council. It has as many elected members as the number of Union Councils within a District;

- all elected chairmen of Town Committees within the District;

- members representing peasants, tenants, workers and women, the number of which is prescribed by the Government; and

- heads of government departments, but they neither can contest for the chairmanship nor have the right to vote.

The Government departments include Revenue (Deputy Commissioner), Agriculture (Extra Assistant Director), Education (District Education Officer), Health (District Health Officer), Communication and Works (XEN), PHED (XEN), Social Welfare (Assistant Director), and any other

Government Agency depending on its availability in the District. The Assistant Director Local Government and Rural Development Department acts as a Secretary of the District Council and a Chief Officer who belongs to the Local Council Service has been placed under his control. The District Council is permitted to recruit its own staff upto grade 15 and below. These include clerical staff, assistants, draftsman and support staff.

The District Councils are empowered to undertake rural development programmes, and plan, implement, coordinate and monitor these activities. The focus of planning for local improvement has been decentralized from provincial to district level enabling them to perform the rural water supply, health and sanitation activities as under:

Public Works: Installation of water pumps, tanks, ponds and other works of water supply.

Public Health: Prevention and cure of infections diseases and enforcement of vaccination. Promotion of sanitation, health and hygiene and educating people in public health.

Drainage: Provision and maintenance of an adequate system of public drains and regulation of the disposal of human waste.

Education: Payment of grants and subsidies to institutions and organizations engaged in the promotion of education.

Economic Welfare: Community development/organization, promotion of national reconstruction, promotion and development of cooperative movement and village industry.

Unlike other provinces no coordination committee has been set up at the district level. This function is performed by the District Councils where the heads of the nation building department are the members. However a coordination committee exists at the Divisional level. This committee, under the chairmanship of the Divisional Commissioner coordinates the activities of all local councils and all Nation building departments within the division. It appears that the Divisional Coordination Committee has complete hold over the affairs of District Councils in Balochistan. Such control by the Divisional Committee may render these District Councils ineffective and could be injurious to the role of local bodies.

Human Resources

There are no training facilities at the District Council level; meeting rooms can be utilized should the need arise. All training requirements are normally met by the Rural Development Academy in Quetta. When required (usually after an election), courses are offered at the Rural Development Academy to train new councillors in Local Government, Administration and Law, Rural Economics and Financial Management.

Local Revenue Collection

In order to finance the performance of their functions, district councils have granted fiscal powers, as per the Second Schedule of the Local Government Ordinance, to levy certain taxes. Details of these are given in Appendix A Table A-3. But it has not been practicable in Balochistan to impose all of these taxes due to the following reasons:

- the area is backward and people have limited financial resources;

- the big land lords, tribal chiefs and politicians are not in favour of imposing taxes; and

- councillors are reluctant to impose taxes as they feel this would make them unpopular in their constituencies.

As such the revenue base of the local councils is inadequate.

Half of the District Councils in Balochistan are facing basic deficits and depend on Government subsidies and grants.

Conclusion

Other than District Council Lasbella with a income of over six million the other District Councils are relatively small with income averaging between 1.5 million and .5 million. Given therefor the relatively weak financial base and limited development capabilities of the district councils in Balochistan, in short term other than minor water, drainage and sanitation components they cannot be considered as a potential executing agency for larger projects within the sector.

In the long run the real test of the success of any local government institutions is its capacity to mobilize its own resources to meet its development cost. The District Councils in Balochistan will have to break the barriers within the existing socio-political conditions and make a headway for the democratic process to succeed.

2.2.8 Union Councils

The number of Union Councils currently in Balochistan is 315. On average they cover an area of 1102 sq. kms and a population of 13800. The typical union council in the province consists of about 19 settlements (mauzas). The number of members varies from 9 to 15 per union council. The members of a Union Council are elected on the basis of direct adult franchise. The members then elect a Chairman. Since the women in Balochistan do not actively participate in the election two seats for women have been reserved on each Union Council. Similarly to ensure representation of the peasants, one seat has been reserved for them in each Union Council. The Union Councils are the elected bodies at the grass roots level, having representation from the villages in Balochistan.

The main functions of the Union Councils are listed in the fifth Schedule of the Balochistan Local Government Ordinance 1980. These include public health, education, water supply, sanitation, drainage and water conservancy, among others. A Union Council may sanction any such scheme when the cost does not exceed Rs. 50,000. Owing to the paucity of funds, Union Councils have been ineffective in carrying out these functions. Source of funds of Union Councils has been incorporated in Table A-4 of Appendix A.

There are no training facilities at the Union Council level. All training requirements are normally met by the Rural Development Academy in Quetta. Training activities are similar in nature to those of the District Councils.

Conclusion

Union councils have very limited financial and administrative capabilities. Therefore at the present time are not in a position to act as an executing agency for major investments in infrastructure in the rural areas, including those in the sector. However, the union councillors, who represent small electoral units, are potentially a resource and could be used for organising communities to manage projects at the village level.

2.2.9 Balochistan Integrated Area Development (BIAD)

Mandate

In 1980, a joint planning workshop between the Government of Balochistan and UNICEF was held. As a result of the workshop recommendations, the BIAD programme was evolved. The overall goal of BIAD is to extend basic and social welfare services to rural communities in each of the Districts of Balochistan. The specific goals included:

- provision of potable water systems;

- general village sanitation (individual household sanitary latrines);

- primary health care for mother and child through community volunteers and local TBAs;

- income generating activities and basic literacy training for women; and

- construction of multi-purpose community centres.

The provision of potable water was seen as a convenient and effective entry point into communities for developing other programmes. However, BIAD has had significant problems (discussed later) in the implementation of the schemes.

Phases of the BIAD Programme

In view of organizational and financial constraints, it was decided that the programme should be undertaken in the districts of the province in a phased manner, beginning from the period 1982 - 83 to 1987-88. Co-terminating with the National 6th Five Year Plan. The Programme was split into four phases and during each phase four districts were to be taken up for the BIAD programme. Figure 2.13 shows the BIAD phases.

Organization & manpower capabilities

The Organization is headed by Director General (Grade 20/21) and has four divisions, Monitoring and Evaluation, Community Development, Public Health Engineering and Administration. Each of these divisions are in turn headed by a Director. Each division has a multitude of auxiliary staff, as a large number of staff were required to implement BIAD's approach, but even after six years, they still have staffing limitations. To create an agency of this size in Balochistan it is difficult to find qualified staff to fill the positions. Figure 2.14 shows the Community Development Division and its staffing capabilities.

Figure 2.13

BIAD PROGRAMME

Phases & Completion

PHASE	DISTRICT	COMPLETION TARGET	COMPLETION ACHIEVED
Experimental (4 Pilot Projects)	Pishin Quetta	1982-83	
One (21 clusters)	Loralai Kalat Nasirabad (Tamboo) Gwadar	1983-84	1982-89
Two (29 clusters)	Pishin Kachhi Lasbella Turbat	1984-85	None Completed to date
Three (cluster not yet selected)	Chagai Panjgur Khuzdar Sibi(incl/Ziarat)	1985-86	
Four (clusters not yet selected)	Quetta Kharan Zhob (incl/Q.Saifullah) Kohlu Dera Bugti	1986-87	No work Commenced on these

Figure 2.14

BIAD STAFFING CAPABILITIES

(COMMUNITY DEVELOPMENT DIVISION)

Administrative Level	Staff	Staff Positions Allocated	Staff Positions Filled	Grade
Provincial	Director Comm. Development	1	0	19
	Asst.Directors (male/female)	2	2	17
	Comm. Development Officers	5	4	16
	. Medical(m/f)	(2)	(2)	
	. Sanitation	(1)	(0)	
	. Education	(1)	(1)	
	. Social Work	(1)	(1)	
District	. Mobile Teams			
	. Comm.Development Officers	14	14	16
	. Medical Technicians (male/female)	28	28	15
	. Sanitarian (male)	14	14	11
	. Lady Teacher	14	3	11
	. Social Worker (female)	14	2	11

Higher salaries and allowances are required to attract qualified staff that will work in background areas of the province. This option is not realistic for line departments because it would create discrepancies in pay scales within the staffing hierarchy.

Approach To Sector Development

The methodology and approach of the BIAD Programme was based on the premise that it is imperative for the rural population to understand the various dimensions of the Programme. The steps involved and the time taken by each programme activity are as described below.

First, of all the Hydrogeologists of the BIAD-UNICEF Organizations carried out preliminary hydrogeological surveys of the proposed Villages and Clusters of the Project District so that the source of water could be established for the construction of rural water supply schemes.

Based on the nature of the available water source the experts of the BIAD/UNICEF recommended the selection of particular villages and their groupings into viable "Clusters". While making recommendations for selecting the clusters, following considerations are given due weight:

- the Villages of the proposed cluster should be situated relatively close to each other;

- there should be a sizeable population to justify the launching of BIAD-UNICEF Programme;

- the proposed clusters should, preferably, be close to a vehicular road to facilitate the transportation of heavy drilling machines and other equipment to the site;

- there should be no rural water supply scheme already existing in the proposed cluster and the population of the Cluster needs the services of Health and Sanitation, Basic Education and Drinking Water the most; and

the residents of the proposed cluster should be prepared to accept the BIAD Programme and cooperate with it whole-heartedly.

This activity typically consumes a 6 month period.

After the hydrogeological survey is completed, Clusters are prioritized in consultation with the elected members of the District Council and the Local Administration. The consent of the District Council is secured in a formal way through its general meeting, and the decisions of the District Council are properly recorded as part of the minutes of the meeting. This activity takes approximately 4 months.

At the third stage, proper test tubewell operations are undertaken in the clusters to determine the precise quantum of groundwater availability. Before work on the Tubewell Drilling is started, two things are accomplished:

Firstly, at a site, where the Tubewell Drilling is to be carried out, one acre of land is transferred by the Local Community in the name of BIAD so that, subsequently, no dispute arises because of land ownership. The land is donated by the Local Community free of cost;

Secondly, a proper agreement is executed between the Local Community, on the one hand and BIAD/UNICEF on the other. In the agreement the obligations of the Local Community and the role to be played by BIAD are clearly spelled out. This is not a legal document; rather, a collective pledge which is made by the leadership. This activity takes about 8 months.

Simultaneously, work on the base-line Household Survey is also started. This is done through Mobile Teams which are already established in the District. Through the Household Survey, the BIAD Programme is introduced from house-to house through the personal contacts of the members of the District Mobile Team and, thus, basic information/data about the socio-economic needs of the cluster population are gathered. Later on, the Programme activities pertaining to Health and Sanitation, Literacy and Rural Water Supply Schemes are planned and executed on the basis of statistics collected through the Household Survey. These statistics indicate the health and sanitation conditions prevailing before the commencement of the BIAD Programme and, likewise, the subsequent evaluation would show what improvements have been brought about in the health status of a particular cluster/district as result of BIAD/UNICEF Programme. This activity consumes 3 months.

In the next phase, detailed designs of rural water supply schemes are prepared on the basis of the water source already determined. Since there are no senior level Public Health Engineers within BIAD, consultants are engaged to do this job under the supervision of UNICEF experts. These consultants prepare detailed designs, Tender Documents, evaluation of the Tender Bids, selection of the contractors, award of contracts and in the actual implementation supervision of the rural water supply schemes. This activity usually takes 12 months.

At this stage the District Mobile Team commence various activities pertaining to the Primary Health Care, Environmental Sanitation, Non-formal Education, organization of Villages and Cluster Committees and guidance to the rural women in initiating income-generating activities. These sub-programmes include the training of midwives (Dais) and Community Health Workers (CHWs), teaching women about personal hygiene, household sanitation and basic literacy, construction of low cost sanitary latrines in the houses, inoculation against preventable communicable diseases and child nutrition etc. The District Mobile Teams task is to impart simple but effective techniques of Primary Health Care to the local population, particularly the womenfolk through practical demonstration and developing constant personal rapport with the local people. Details of non-water schemes and programmes, are given under 2.2.12 (UNICEF).

Assessment of Completed water Schemes

Of the 28 water supply schemes included in the experimental phase and Phase.I, 17 are functional providing coverage to 26,000 people; and 11 of the 28 schemes are non-functional. Table 2.9 gives the details on of these.

Most of the schemes (except in Nasirabad) are deep tubewells with overhead storage reservoirs (OHSR) and distribution systems to standposts. The average capital cost is high at Rs. 2000 per capita. The reasons for the slow implementation rate and failure of completed schemes include:

- a lack of interaction between engineers and the community involvement wing of BIAD;
- the difficulty of promoting community involvement in tribal areas;
- the high cost of schemes resulting from over designing and increased maintenance costs due to design errors;
- low cost recovery;
- unrealistically high original targets;
- poor supervision of design and construction; and
- political desire to implement high profile schemes ("visible symbols of development"), hence the costly overhead surface reservoirs.

The BIAD experience also brought into question the viability of the cluster concept for water supply. Where villages are widely scattered, the cost and technical complexities of centralized schemes rise. There can also be conflicts amongst the recipient villages regarding the allocation of water and responsibilities for operation and maintenance.

Table.2.9 STATUS OF EXPERIMENTAL AND PHASE I SCHEMES

District	No of Schemes	Functional & Maintained by Community	by PHED	Non-Functional (A)	(B)	(C)
Pishin	1	1				
Quetta	3	2		1		
Loralai	7	5			1	1
Kalat	8		4	2		2
Gwadar	3	2			1	
Nasirabad	6	1	2		3	
	28	11	6	3	5	3

A. Completed B. Not Completed C. Abandaned

A. The Reasons for the completed schemes being non-functional are:-

Scheme	Reason
Babozai	Funds not available for major repair of (Quetta) submersible pump.(the pump used wasimported not of local manufacture)
Mastung Road	Illegal house connections destroyed hydraulics of system.
Dringar	Water level has gone down; the tubewell had not been developed properly.

B. Delay in completion of schemes is due to.

Scheme	Reason
Duki Killi	Tribal conflict amongst villagers
Gubd	Design Fault in Pump house, machinery has not yet been installed.
Goth Ahmedabad	Site twice affected by floods delaying completion (site is inappropriate)
Goth Murad Ali	Contractor Causing delay.
Goth Kanari	Reason not known.

C. The reason for the three schemes being abandoned is that the tubewell discharge was inadequate.

However the cluster approach should not be rejected outright become there may be cases where a single source can be developed more cost-effectively for several village. Also of the 17 functional schemes 11 are being maintained by the community successfully. Table 2.10 gives the details of these and the reason for their success.

Conclusion

Last October, the EEC who were the main donor for BIAD decided to withdraw their assistance through UNICEF and implement the programme themselves. All work related to the implementation of the water supply schemes was dropped. Since then Key staff of the Community Development Section, including the Director and Assistance Director have left and their posts are still vacant. The mobile teams have been on strike; and there has been a lack of monitoring and supervision. Hence there is great uncertainty about the future role of BIAD or even its continued existence.

2.2.10 Pak-German Self-Help Programme

Mandate

The Pak-German Self Help Project was established in 1983 within the LGRD Department.

The main objectives of the Project are:

- to promote the development of self help potentials in the Province of Balochistan by supporting schemes of self help groups for meeting their basic needs;
- maximum utilization of locally available resources including Manpower for the common benefit of the target groups;
- increasing internal lending and providing guarantees for bank loans used for income generating schemes; and
- providing training opportunities for members of the village organizations, Self Help Staff and staff in the line departments.

Table 2.10 BIAD SCHEMES BEING MAINTAINED BY THE COMMUNITIES

S.No	Name of Scheme (District)	Period of Service	Service Level *	No. of Villages/ Population in Cluster	O & M Community Contribution in Percentage	Water Rate (per H.H)	Community Input: Land	Community Input: Trenches Dug in Ft.	Reason for Success
1	Pir Ali Zai (Pishin)	5 year	H.C.(250)	5 (2225)	100%	Rs. 16	2 Acres	Data not available	Strong chairman of cluster Comm and well org. Comm
2	Meharabzai (Quetta)	4 year	S.P.(30) Converted to H.C by Comm	3 (1025)	100%	Rs. 20	1 Acre	24914	Good Comm relation-ship
3	Sindji (Quetta)	4 year	S.P.(25) Converted to H.C by Comm	4 (899)	100%	Rs. 20	1 Acre	54700	Good Comm relationship and Strong leadership
4	Dirgai Kudazai (Loralai)	3 year	S.P. (40) Converted to H.C by Comm	3 (1255)	100%	Rs. 15	1 Acre	40320	Comm Pays to landlord (on whose land the T/W is situated)
5	Uryagai (Loralai)	3 year	S.P. (30) Converted to H.C by Comm	1 (977)	100%	Rs. 15	1 Acre	21280	Strong progressive leadership
6	Dirgai Shabozai (Loralai)	3 year	S.P. (60)	3 (1518)	100%	Rs. 16	1 Acre	49075	Cluster Comm Chairman Provides Strong leadership and has good managerial abilities (retived Govt servant)

Table 2.10 BIAD SCHEMES BEING MAINTAINED BY THE COMMUNITIES

S.No	Name of Scheme (District)	Period of Service	Service Level *	No. of Villages/ Population in Cluster	O & M Community Contribution in Percentage	Water Rate (per H.H)	Community Input: Land	Community Input: Trenches Dug in Ft.	Reason for Success
7	Chipkalmatai (Gwadar)	3 year	S.P. (45) and 3 C.T.	12 (1800)	PHED operator and Valvman rest O & M borne by Community	Rs. 30	1 Acre	145850	Sincere leadership (Great need of people and no alternative
8	Gunz (Gwadar)	3 year	S.P. (4)	1 (1000)	100%	Rs. 10 (only O.P. salary no other O&M	-	8700	One vilage one community
9	Goth Abdul Rasheed (Tamboo)	1 year	S.P. (30)	4 (2,200)	100%	Rs 20	10 Acres	42700	Strong sincere Community Chairman
10	Rarkan (Loralai)	6 month	S.P. (30)	3 (2241)	100%	Rs. 20	1.5 Acres	15754	Educated Cluster Community
11	Deka Qasmani (Loralai)	2 year	S.P. (12)	4 (596)	100%	Rs. 10 (per earner)	1.5 Acres	11760	Sincere leadership Comm very needy (previously used to bring water from 10 mile)
				43 (15736)					

* HC - House Connections SP - Stand Posts CT - Community Tank

Initially in Phase one of the project the objectives were decided to be achieved by means of strengthening the local councils both financially and managerially as a vehicular force and vigorous base for carrying out development activities and to provide a self sustained mechanism at ward/village level. This system continued upto June 1986 when the old policy of depending on union councils was changed and it was decided that the project should be implemented through establishment of village organizations which should create a saving fund of their own. This decision was taken to avoid:

- self interest of individuals;
- influence of powerful classes;
- local disputes between various groups;
- disintegration of manpower in the disputes;
- dependence of the villagers on external resources; and
- defective planning for needs at the village level.

Table 2.11 shows the total number of schemes completed and ongoing and the amounts committed and spent in both the phases to date.

TABLE 2.11 **PAK-GERMAN SELF HELP PROJECT**
SUMMARY OF PROJECT.

Details	First Phase (8/83/to6/86)	Second Phase (7/86to6/89)	Total
Development Schemes			
No of Schemes Completed	322	79	401
No of Schemes Ongoing	___	80	80
Training Schemes	79	251	330
Credit Schemes	___	16	16
Amount committed (Rs. 000)	30544	21554	52098
Amount spent	30544	12719	43264
Saving of V.O's	N/A	2036	2036

* V.O - village Organization

Under the new policy the project area includes 9 Union Councils, 489 villages of which 180 have formed village organizations and a total of 4224 members. Table 2.12 shows the water related projects and other schemes that have been approved, started or completed under phase two.

Table.2.12 **PAK_GERMAN SELF HELP PROJECT**

SUMMARY OF SECOND PHASE SCHEMES

Development Schemes		Approved not yet Started	Started	Completed	Total
i)	Water Schemes				
	Well-Animal Driven Pump	0	0	2	2
	Well-Electric Pump	1	1	1	3
	Well-Hand Pump	5	28	9	42
	Well-Improvement	0	1	3	4
	Drinking Water Pipeline	1	1	9	11
	Lined Water Tank	1	2	10	13
	Lining of Water Channel	0	1	1	2
	Spring Improvement	0	1	0	1
	Water Storage Dam	0	1	1	2
	Sub-Total	8	36	36	80
ii)	Non-Water Schemes				
	Village Flood Protection	2	10	17	29
	Erosion Control	0	3	1	4
	Road Construction	6	10	13	29
	School Buildings	1	21	6	28
	Sanitation & Health	3	0	2	5
	Others	0	0	4	4
		20	80	79	179

2. **Training Schemes**

Training Schemes	Completed
Workshops & Conventions	54
Socio-Organizational Training	86
Agricultural Training	20
Livestock Training	29
Technical Training	45
Health Training	17
	251

3. **Credit Schemes**

Credit Schemes	Ongoing	Completed	Total
Internal Lending	12	2	14
Credit Scheme	2	0	2
	14	2	16

Total Schemes (i.e. Approved, Ongoing & Completed) 446

Source: Pak-German Self Help Project, 1989.

Organization and Manpower Capabilities

The Self Help Project comprises GTZ (Deutsche Gesellschaft fuer Technische Zusammenarbeit), whose services are made available by the Government of the Federal Republic of GErmany LGRDD counterparts. GTZ has six sections, Social Development, Agriculture and Livestock, Technical, Womens Affairs, Training and Administration each section is headed by a section head whose activities are co-ordinatedy by a Deputy Project Co-ordinator, whilst the whole project is under a Project Co-ordinator. These last two are both expatriates. The Self Help Wing of LGRDD has three sections - Training, Monitoring and Evaluation and Administration each headed by a Deputy Project Manager who inturn are under the supervision of a Project Manager and Project Director. Support staff include Development Officers and Sub-engineers, one from each Union Council.

Approach To Rural Development

The Village Organization (VO) is the primary unit on which the rural development programme is based. The Self Help Project (SHP) maintains that rural development is successful when human resources on the village level are incorporated into the planning process. Therefore a village that wants to co-operate with the SHP has to establish a V.O To ensure that the VO becomes a broad based institution with a potential for self reliance and sustainability, the following conditions have to be fulfilled:

- more than 50% of all families residing in the village must become members of the V.O.;

- the members of the V.O nominate with 2/3 majority 3 office bearers
  1. one Chairman
  2. one Organizer/manager
  3. one Accountant/Secretary

- all members of a V.O to have the same rights;

- one family can hold only one position of office;

- the V.O has to meet at least once a month; and

- all members of the V.O must make regular savings;

The SHP has established Rules of Cooperation and land down procedures, which the V.O has to comply with. Contents of these include:

- duties of the office bearers;
- procedure of meetings;
- savings;
- loans;
- implementation of Development Schemes; and
- operation, maintenance & repair, etc.

The project is introduced to the villagers by the Development Officers (D.O), who explains the Rules of Co-operation and the conditions to get support from the SHP. Once the villagers agree to form a VO the DO also gives the villages a cash book, a saving ledger and pass books and a book to write in the minutes of the meetings. Once all the conditions have been met the VO can apply for a development scheme from the SHP. A grant for the scheme will be sanctioned if:

- the proposed scheme is technically feasible and economically viable;
- the scheme bears no ecological or economical risks;
- the scheme is within the financial limits of the SHP;
- the VO is established & functioning according to the Rules of Co-operation;
- the scheme meets an urgent need and provides benefits to at least 75% of all families residing in the village; and
- the Operation & Maintenance of the proposed technology can be handled by the VO;

Once sanctioned the scheme is implemented with the supervision of the Development Officer and his field staff the Supervisor and, Sub-Engineer. The village provides the unskilled and semi-skilled labour for which they receive full payment, but out of their wages 1/4 must be deposited in the saving account of the VO. After completion the scheme is handed over to the VO who are then fully responsible for the scheme. The cost of operations and maintenance, is to be provided by the villages. The above stages are Summarised by way of the following flowchart.

Stages in Rural Development

Villagers Hear of SHP
Approach DO

|

V.O. Formed

|

Scheme Identified by V.O

|

Scheme Sanctioned by SHP

|

Scheme Implemented

|

Scheme Handed over to V.O

|

V.O Responsible for Schemes O & M.

Conclusion

Under the arrangements of cooperation between the two governments the initial financial grant-in-aid (out side ADP) from the donor Country was Dm. 6.00 million plus all necessary advisory services, logistics and other overhead charges. The matching funds provided by the Govt. of Balochistan under the special development programme during the period from 1985-86 to 1987-88 was Rs. 15 millions. As of June 1989, Rs. 43 million had been spent on 827 projects and training.

GTZ are planning to extent the Self Help Programme into the next decade. The 2nd phase projects have been on the whole successful though the rate of progress has been slower than anticipated. GTZ does not envisage a major charge in its approach to rural development, though the LGRDD role is expected to diminish. The success of the V.O has been due good management and monitoring but most importantly due to the fact that the villagers are not expected to contribute any thing towards development schemes (even their labour being paid for).

2.2.11 The Balochistan Area Development Project (BALAD)

USAID has been involved in a programme to improve the basic infrastructure and assist the socio-economic development in Makran Division. The project began in 1984 with an estimated cost of Rs 882 million over 6 years. USAID is financing roughly 90% of the cost through the Special Development Programme. The project office is situated in Turbat, where most of the expenditures are being made.

As of March 1989, Rs 50 million has been spent on the construction of roads, water infrastructure and strengthening of planning, management and human resources. In the water sector, they had completed work on 5 delay dams with another 6 in progress; improvement of 30 karezes by deep drilling, with another 7 in progress; and 10 water courses/ siphon/ infiltration galleries were completed, with another 6 in progress. The total expenditures in the water sector as of March 1989 are Rs. 22 million. Most of the water schemes have been focused on irrigation purposes but there have been some indirect benefits to drinking water supply.

USAID is interested in many more years of involvement in Makran and there is potential for greater emphasis on the development of drinking water schemes and augmentation of water resources.

2.2.12 UNICEF

UNICEF's mandate world wide is to help, protect the lives of children and promote their development. The greater their vulnerability, the higher the priority given.

Out-growing the distinction between humanitarian and development objectives, UNICEF is now involved in projects primarily concerned in a inter-related manner, with protective nutrition, primary health care and basic education of mothers and children involving as many people at the community level.

In the pursuit of its mandate it depends on voluntary financing, not only seeking Government and public support for programmes of cooperation but also tries to stimulate public awareness of children's needs and the means to meet them by advocacy, with Government, civic leaders, educators and other professionals, the media and local communities.

Involvement in the Sector

UNICEF has been very active in the sectors of Water, Sanitation and Health in Balochistan.

Water Supply

Details of UNICEF's involvement with BIAD in providing piped water to communities is given under 2.2.9 (BIAD). This year UNICEF has also initiated a hand pump project with GTZ , PHED and BIAD.

A project plan of action (PPA) has been signed with GTZ under which UNICEF is providing 40 hand pumps to GTZ this year in the expansion phase. This project is now in the implementation stage. With PHED the project plan of action has been agreed by the Chief Engineer. UNICEF will provide 10 handpumps to PHED in the demonstration phase. Implementation has not yet commenced. With BIAD the hand pump project is in the embryonic stage where the identification of sites for installation of handpumps has been completed and the PPA signed recently. UNICEF will provide 29 handpumps to BIAD in the demonstration stage.

UNICEF has also initiated negotiations with the Director LGRDD for the installation of handpumps in the rural areas of Balochistan. A PPA is to be evolved as soon as negotiations are finalised. It seems that UNICEF is steering the handpump project mainly towards the LGRDD because of the available infrastructure and community involvement of LGRDD in the project.

Sanitation

UNICEF's sanitation programme started in the last quarter of 1982. The main objectives of the programme was to seek eduction in mortality and morbidity (specifically related to diarrhoea) of children of Balochistan by providing pour flush latrines in households; proper use of safe drinking water facilities; educating the households regarding personal and food hygiene; and imparting environmental sanitation education. In the experimental and phase-i clusters the Thai pan and dome type construction was used. After two and a half years 650 latrines had been constructed.

In 1985 a new design of sanitary pan (Gibbs pan) latrine was prepared, as it was observed that due to shallowness, causing backsplashing of the sanitary pan, usage was low. Implementation of this new design started in the last quarter of 1985. Till December 1988, about 950 twin indirect pit pour flush latrines had been constructed which was about 34% of total targets for the last three years.

Keeping in view the low achievements of targets for the last three years it was decided to collaborate with the LGRDD as well, and a new programme was evolved.

The specific objectives of the new programme are to:

> construct 640 sanitary latrines in phase i & ii clusters through BIAD;

- train 30 Village Volunteers (VVs) in construction of twin indirect pit pour flush latrines in phase ii clusters identified by BIAD;

- construct 200 sanitary latrines in two selected districts of Balochistan by LGRDD on demonstration basis; and

- training of supervisors and Secretary Union Councils in sanitation programme, identified by LGRDD.

Four Union Councils have been selected by LGRDD, for implementation of the programme. Lists of applicants for latrines have been prepared for two Union Council's. Due to the interest of the counterparts good progress in expected.

Health & Hygiene

In this sector UNICEF has several ongoing projects. A project to improve technical knowledge and operational capabilities of LHV's running MCH centres. The main objectives of this project is to reduce the incidence of vaccine preventable diseases among children of 0-5 years by 5% and women between 15-45 years of age; and 10% annually in the number of deaths from communicable diseases in children and women. During 1988 and 1989 in cooperation with the DHS, nine MCH centres were selected for the purpose. A Deputy Director was responsible for implementation of the project. Nine LHV's were trained in collection and compilation of basic data about children and mothers and their health status; in immunization of children under five; vaccination of pregnant women, management of diarrhoea, malnutrition in children and anaemic women. They were also trained in reporting and feed back systems. The main idea behind the project is to streamline and improve the functions of the MCH services in the province. If these efforts met with success, UNICEF plan to extend it to the remaining centres in a phased manner.

BIAD mobile teams have trained TBAs in BIAD clusters, these TBAs have contributed significantly in giving TT vaccines to pregnant mothers after their training. UNICEF intend to increase, their involvement in TBA training and reinforce the role of the Dai as the catchment population around BHU's or larger institutions is extremely small and the services of the TBA or Dai are available to the community at large. UNICEF also have a extensive Oral Rehydration therapy (ORT) programme to reduce mortality rate from diarrhoea in children under five years of age. Under this programme ORT units have been opened and ORS packets delivered through mobile teams. To date 1697 households have been visited by the mobile teams, demonstration on sugar, salt solution and ORS packets were given to 1590 families and 30248 ORS packets distributed. A further 164,000 ORS packets were given by the Dept of Health. Divisional Level Training, on ORT has also been given to Boy Scouts, Girls Guides, schools teachers and LHVs.

With the collaboration of UNICEF and Provincial Government a DTU has been established in the provincial hospital 24 doctors are trained in batches from various districts of the province. ORT centres have been established in 16 districts of Balochistan.

Together with the health programme, educational material, has also been developed for food hygiene breast feeding, complementary feeding practices and immunization.

UNICEF envisages that in the future DTU and ORT units will be strengthened with necessary equipment and supplies. Health education will be imparted to mothers of infants and children during the period of heir child confinement in the ORT units. A training system will be established of village communities and workers as trainers for diarrhoea management and common health problems, and to provide linkage between communities and health education facility for delivery of services and referrals. Training in diarrhoea management for TBAs will be arranged in ORT unit or nearby health facility.

Conclusion

UNICEF has recently changed its strategy from integrated area development approach (the BIAD programme) to the sectoral approach. Several project plan of actions have been developed recently and implementation of these is expected during the last quarter of the year.

2.2.13 Private Sector

To assess the capability of the Private Sector in Balochistan, a detailed survey was carried out, this survey provided a data base on which the initiatives to enhance the private sector's role in the sector are built.

The surveys were broad based aiming at collecting indicative data. Issues/trends and overall quantification of Private Sector activity and its strengths, weaknesses root causes and potential initiative were determined.

The surveys looked at the topic from the perspective of non-government activities - the informal sector. Therefore the surveys looked at the community/household and studied the interactions with the technology/ services which are not supported by the government. Then the surveys looked at the private sector providers of the services/technologies. Working in preselected physiographic areas the surveys judiciously chose sub-areas; 22 villages in eight districts of Balochistan. Details of the questionnaires are given in Table 2.13.

The surveys determined the role of the Private Sector in providing water in Balochistan is two fold:

- exploitation of groundwater for irrigation; and
- providing drinking water through piped water and other schemes.

Irrigation

The Private sector role in irrigation can be further divided between:

- tubewell sinking, installation and maintenance;and
- karez construction and maintenance.

TABLE. 2.13 PRIVATE SECTOR SURVEYS

	Category	Questionnaires Completed
1.	Households	40
2.	Artisans	40
	. Masons	10
	. Plumbers	3
	. Mechanics	17
	. Electricians	5
	. Sarishtas(Karez Headman)	4
	. Qanati(Karez Cleaner)	1
3.	Contractors	15
	. Civil Contractors	7
	. Tubewell Drilling Contractors	4
	. Tubewell Installation Contractors	4
4.	Consultants (incl.Agencies)	11
5.	Manufactures	3
6.	Retailers	5
7.	Agriculturists (large scale	4
		128

Balochistan has over 8,600 privately owned mechanized wells for irrigation, of which roughly 70% are tubewells and the remainder are open wells. Mechanized pumps (diesel or electric) have been installed by various Government departments but now due to increased demand, they are being installed by the private sector with little or no subsidy. The capacity of the private sector with regards to boring, installation and repairs of tubewells has increased dramatically.

At present there are four major private drilling companies operating in Balochistan with 12 rigs at their disposal. In comparison, five government departments have a total of 44 rigs. All the major manufactures of tubewells are represented in Quetta through dealers.

Minor repairs could quite efficiently be dealt with at the nearest town, though major repairs still posed a problem. Repairs to submersible pumps had to be done outside the province, but new services are becoming available. Small scale manufacturing had also started for centrifugal pumps in Quetta, with an estimated output of 300 pumps a year.
The Karez is an ancient method of artificial irrigation indigenous to Balochistan and one that depends entirely on the private sector for construction and maintenance. Karezes typically supply from.3 to 1.5 cusecs of perennial water which supports a command area ranging from 40 to 250 acres. (Detailed description of a Karez can be found under section 2.4.1).

Excavation of a karez is an expensive venture and is constructed by joint capital and owned by serval co-sharers, each shareholder is entitled to water in accordance with his contribution. The karez headman (a hereditary position) is responsible for maintenance of the karez and money for maintenance work is collected from the co-partners, in proportion to the share held by each.

Due to rising costs the co-owners are finding it increasingly difficult to finance the annual cleaning of the karez. Also due to the lowering of the water table, many Karezes have dried up.

It was observed during the field trips that no charge is made for water from villagers by tubewell owners, as long as the villagers use the water for their own consumption and not for irrigation. Though only one large landowner (out of 4 interviewed) responded favourably to the suggestion of supplying water to a community tank hooked upto his tubewell, even if the community tank was constructed by the Government and part of the O&M costs were contributed by the community.

The reasons given for rejecting this arrangement were as follows:

- water is scarce and is not enough to fill community tanks every day and irrigate their lands;
- it would be impossible to collect O&M charges from the community;
- in winter when the tubewells are not running the community would suffer; and
- not ready to take on long term commitment (as would involve disputes with villagers etc).

Drinking Water

The private sector role in providing potable drinking water is restricted to construction of schemes by contractors for Government departments (PHED, BIAD etc) and providing repair services. Contractors are enlisted with the Public Health Engineering Department. At present there are 91 contractors registered in Quetta and 10-20 contractors were registered at each district headquarters. Only at Dunnok (a village near Turbat town) was the private sector actually involved with the operation and maintenance of a piped water supply scheme. The operator was charging Rs. 30 per month for each house connection, and except for the wages of one operator (paid by PHED) was maintaining the scheme at a profit. There were 116 house connections in the village.

Recommendations for Water Supply

The private sector has already expanded dramatically to meet the demand but lack of infrastructural facilities still hinder progress in the remoter areas of the province. On-site training, proper supervision and access to credit could overcome problems of poor workmanship and lack of adequate facilities.

Maintaining a karez requires an annual outlay of Rs. 50,000 to 60,000. Therefore credit required for maintenance could be channelled through the karez headman, who will have to account for it to the co-owners. Although occasionally new karezes are still being excavated (in Panjgur & Turbat districts), the huge expense and investment in these make it a dubious proposition to finance them. But other methods can be adopted to improve existing karezes and rehabilitate dead ones. Possible options are karez boring, karez capping, and karez lining. Contractors work should be supervised more thoroughly by PHED, contracting procedures need to be reviewed and some accountability mechanism needs to be built into the system.

The Dunnok example could be replicated in other parts of the province with the following modifications and additions:

- consumers be given a choice of contractor because competition will ensure a better service;
- contractors should be asked to bid for O&M contracts; and
- PHED should supply technical support.

Human Waste Disposal

The lack of demand of latrines due to low income and education levels, could be countered by motivation, education, providing credit and by reducing costs alternative technologies. Details of the survey results are given in section 2.4.3.

2.2.14 Non-Governmental Organizations

There are about 250 NGOs Registered with the social welfare Department Balochistan. Registration with the Social Welfare Department is necessary for the NGOs to be eligible for Government funds. These NGOs are mostly working in the field of Education, Women Affairs, Health (preventive health) and socio-cultural activities. Mostly NGOs are Urban based and only a few can be classified as rural.

Other than the Provincial NGOs there are several other National (e.g. APNA)and International NGOs operating in Balochistan. Some of these International NGOs are primarily concerned with the Afghan Refugees like ICRC, AICF and Mercy Corps. There are also a few semi-government organizations, like the Girl Guide Association and the Red Crescent Society. These are fairly well organized and have been operating for over 30 years. The Girl Guide Association trains school girls in community hygiene, self help, cooking etc. The Red Crescent Organization besides other activities runs a clinic in Quetta in association with the Bavarian Red Cross. Both these organizations depend on lotteries, meena bazars and other charity shows to raise funds.

Of the provincial NGOs the most active are the ones involved in womens activities, but they too are generally weak in terms of material, technical resources and have limited outreach. Recently a programme for women development activities was initiated by the Women Cell, Social Work Department, Literacy And Mass Education Commission, non-Government Organization Coordination Council and UNICEF. One of the specific objectives of the programme was to improve the NGOs capacity to plan, manage and monitor women's programme through workshops and to reinforce collaboration and linkage between government bodies, NGOs and all concerned with women's programmes through meetings, exchange visits and circulation of relevant material.

Conclusion

Many of the Provincial NGOs are simply social clubs or small scale organizations with unrealistic mandates to provide benefits to broad based population, given their resources. Many members simply drift away due to lack of commitment and interest. Therefore, other than in womens development the future role of provincial NGOs for development in the sector is seen as limited, as they don't have the capability or the resources to work in rural Balochistan.

2.2.15 Community Institutions

Communities look after a variety of issues through various village based institutions, a number of which are not formally registered. Prior to the introduction of Union and District Councils, most village affairs were run by tribal leadership and the Jirga system. Communities also relied on less recognised informal groups and religious matters were referred to mosque-imams.

Tribes are basic units of social identity in Balochistan. They effect personal, social and politically life. Tribal leadership is normally conferred on specific families and inherited. However, leadership changes can occur through general consensus. The tribal leadership has no fixed mandate but plays an important role in accepting and promoting or rejecting innovations affecting village life. The jirga is a village based organization traditionally composed of village elders. Its primary role is conflict resolution. Its members are chosen for their experience, impartiality and knowledge. The jirga can be called upon to adjucate on personal, criminal or socio-economic matters such as water rights and land disputes. Its forum is open to all villagers. Only if the jirga fails to resolve the problems is it refereed to official institutions such as the courts. Tribal jirgas meet when necessary. They have no financial resources at their disposal although can raise funds for specific purposes through contributions.

A survey of 46 communities was conducted to assess the abilities of existing informal community organization to contribute to sector development. The results of the survey are presented in Appendix D. Of the roles assessed in the survey, informal organizations play a major role in conflict resolution, lodging requests for development and supervising construction of community facilities. They play a lesser role in raising money, conducting womens projects and in running cleanliness campaigns. Community hiring is commonly limited to the Imam and a Chowkidar. Few communities currently hire operators for a scheme of any sort. Maintenance roles currently carried out by the community are limited. Most facilities are maintained partially or wholly by organizations external to the community. Whereas some CBOs carry out welfare work, the majority focus primarily on village development, providing or upgrading basic village amenities and infrastructure that range from roads to water, and school buildings. Frequently CBOs mobilize resources to meet government requirements for receiving external inputs. In the 46 villages surveyed at random, 5 (10.9%) had formally registered CBOs. Of these 3 had been formed by the self-help unit of GTZ and LGRDD (i.e. 60%), and 44 had some sort of informal organization, based mostly on tribal affiliations. The GTZ CBOs normally had different office bearers to look after specific tasks either on a project-to-project basis or by specialization. These office bearers were responsible for specific assignments and reported to the general body at regular meetings (usually once a month). The office bearers also mobilized support in the community and received feedback on a door to door basis.

The survey results show great awareness of communities towards the sector and a highly positive attitude towards financial contribution to water supply. Understanding of local councils was poor and with respect to women the communities ranked poorly. Women do not formally sit on or participate in any community institutions, and only contribute to decision - making through male relatives.

Other CBOs in the province have been set up by BIAD. BIAD's approach to seotor development was based on the premise that it is imperative for the rural population to understand the various dimensions of the programme. In order to do this BIAD formed cluster committees of villagers and informed them of their programme. If the cluster committee was ready to cooperate with BIAD, an agreement was signed between the committee and BIAD. In the agreement the obligations of the local community were clearly spelled out. This was not a legal document rather a collective pledge made by the community. BIAD has had mixed success with their approach. Out of a total of 28 water supply schemes 11 (40%) are being maintained by the communities (details in section 2.2.9).

The following Table evaluates the formal and informal CBOs in the 44 surveyed communities, by various criteria.

		Low	Medium	High
1.	Community Consciousness	13	19	12
2.	Leadership with Development approach	19	14	11
3.	Community Development activities within their village	20	21	3
4.	Ability of Raising funds within the Community	12	19	13
5.	Existing Community based system of decision and accountability	17	22	5
6.	Understanding of local councils system & level of its acceptance.	26	16	2
7.	Attitude towards women	22	20	2
8.	Knowledge & awareness level towards sector.	6	29	9
9.	Process of information collection within and out side the community and sharing this information.	32	11	1
10.	Attitude towards financial contribution to water supply and sanitation.	9	8	27

The 170 village organizations set-up by the self-help unit of GTZ/LGRDD have been more successful, but their success can be attributed principally to the fact that the villagers are not expected to contribute anything towards development schemes; in fact even their labour is paid for (details in section 2.2.10).

Conclusion

Communities in Balochistan in the past have not been capable of effective participation in the governmental process. The slow pace and character of community organization in Balochistan has been shaped by the twin forces of the harsh environment and existing group loyalties and identities.

The timing and rate of the modernization process, the fragmented character of the political culture, the highly centralized structure of decision making and the policy of controlled participation previously and regulated economy have combined to limit effective community mobilization and development. These systematic factors in turn have reinforced the internal characteristics and behaviour of the groups themselves which has made it difficult to fuse, re-structure and re-integrate group loyalties and identities in new ways.

Therefore, though there are success stories in the field, on the whole conflicting identities and loyalties divide and limit the development and impact of secondary associations and block the process of reintegration and participation along new lines.

2.2.16 Other Departments and Agencies

Other departments and agencies have an indirect or parallel relationship with the rural water supply sector. These include the Water and Sanitation Authority (WASA), the Water and Power Development Authority (WAPDA) and the Irrigation Department.

Water and Sanitation Authority (WASA)

WASA is essentially an urban agency dealing with the water and sanitation problems of Quetta. It is jointly funded by the Governments of Pakistan and the Netherlands.

The aims of the Authority are:

- to improve the overall sanitation conditions in the city of Quetta;
- to provide low-cost pour-flush latrines in those areas which cannot as yet be served by the sewerage system; and
- to re-use the waste water for irrigation purposes, after full treatment in the Sewage Treatment Plant.

Although the work that WASA does is more sophisticated than is required for rural areas, good knowledge and experience is being gained which will be applicable to rural areas. WASA is currently involved with the drilling of 23 tubewells in addition to the 5 which are now serving Quetta. It is also constructing a laboratory for water quality testing, a facility which is greatly needed in Balochistan. The success of WASA cannot as yet be assessed but it is further evidence of increasing concern and new priorities placed on water supply and sanitation in the province.

Water and Power Development Authority (WAPDA)

WAPDA is a federal agency established to coordinate large scale water resource and electrical power development. In Balochistan, WAPDA has a important presence due to requirements for water resource investigation and development and, more recently, rural electrification. In the 1989/90 budget, the Provincial Government has a allocated Rs. 56 million for activities to be carried out by WAPDA. This figure includes Rs. 24

million for administration and operation expenses.

WAPDA has a large hydrogeological department based in Quetta to conduct groundwater investigations, develop sources and test water quality. WADPA presently operates 16 rigs and has frequently assisted PHED with their development program. WAPDA has completed major groundwater investigations and is preparing for new studies, as mentioned in Section 2.1.7. WAPDA has also installed an electrical power grid system that serves most of the major centres with the exception of towns in Makran Division and some of the tribal areas. They have completed rural electrification for 1600 villages.

WAPDA has been designated as the lead executing agency for the proposed Integrated Valley Development Project. This is to be a ten year project involving 23 underdeveloped valleys that have good potential for groundwater development. The project would have a total cost of Rs. 7313 million, financed within the Special Development Program largely (75%) by local funds. Possible foreign donors include the United States, UNDP, the Netherlands, and Japan. The project would initially focus on groundwater development, then electrification and finally sectoral development schemes such as agriculture, roads, education and health facilities. Rs. 588 million has been estimated for water supply (including irrigation) which represents 8% of the total cost. This would involve the installation of more than 500 tubewells and 100 water supply tanks. The largest cost components are to be communications (e.g. roads) at 48% and electrification at 27%. Since these areas are controlled by federal ministries and given the large scale of the project, the decision to proceed with the project rests entirely with the Federal Government. Originally, the project was to be included in the current development plan but given the impending financial constraints, this project is likely to be delayed further or scaled down. The feasibility of the project is still under investigation.

It should also be mentioned that WAPDA has provided much of the groundwater testing and evaluation in the province of Baluchistan. Although it works quite independently of the provincial departments, much of the research data acquired is eventually passed on to help formulate provincial development strategies for water supply.

Irrigation Department

The Irrigation Department was responsible for the supply of drinking water until June 1987, when PHED was formed. It still plays an important role in water supply schemes which provide a combined irrigation and drinking water supply. The Irrigation Department has qualified staff and good equipment to undertake larger scale projects such as irrigation dams and canals. Its Financial allocations have been reduced since bifurcation with PHED but it still controls a sizeable budget of nearly Rs. 100 million in the 1989/90 ADP.

2.3 Sector Financing

2.3.1 Macro Resource Availability at the National Level

During the last few years, the resource position of the public sector has deteriorated significantly. Domestic resource mobilization has been constrained by a relatively small and narrow tax base which has proven difficult to exploit. Simultaneously, expenditures on various recurring heads like defence, debt servicing, general administration, subsidies, etc, have risen rapidly. In addition, recurring deficits of the provinces have widened considerably requiring large and growing subventions and grants-in-aid from the Federal Government. The consequence has been that development expenditure (ADP) in the public sector has become more dependent upon the flow of external resources, which in turn increases requirements for debt financing.

Table 2.14 presents the Annual Development Programme (ADP) expenditures at constant prices of 1987/88 during the Fifth and Sixth Plan periods and in the first year, 1988/89, of the on-going Seventh plan. In addition, based on the recently announced federal budget, a projection has been made of the level of real ADP for the next financial year, 1989/90. The table reveals some significant trends. Real ADP of the Federal Government remained more or less constant annually during the Fifth Plan period but showed some growth during the Sixth Plan period. On the other hand, the allocations of ADP fundings to the provinces have demonstrated some growth throughout the decade culminating with exceptionally large increases between 1985/86 and 1987/88, as the Government of the time tried to implement its Five Point Programme which envisaged a big push in rural development through large increases in allocations for social and physical infrastructure (including rural water supply and sanitation), primarily through provincial line departments.

The tightening of the resource situation and emergence of inflationary pressures in the economy has led to a cutback in development allocations. At the federal level, it is expected that during the current financial year, real ADP expenditure will decline by about 2% in relation to the previous year. The only component which is likely to increase significantly is the Special Development Programme (SDP), implying higher development allocations to the relatively backward areas of the country, including Balochistan.

The Government has launched a new People's Programme, which is likely to get into full swing in 1989/90 involving a development allocation of Rs. 2.5 billion (at 1987/88 prices). It will involve allocations primarily for rural development including roads, education, water supply, and health. We understand that the execution of this Programme has not been finalised in Balochistan, however, in other provinces, execution responsibility will primarily rest with district committees (political bodies) working directly under the control of the Federal Government.

The first indication from the federal budget of 1989/90 is that the recently established pattern in real ADP expenditures will continue. The federal ADP could decline further in real terms by about 3% and the total provincial ADP by an equivalent percentage. The prospects for the remaining years of the Seventh Plan period (up to 1992/93) are for continued pressure on public finances with anticipated rapid increases in debt servicing liabilities, which have emerged as the largest item in the recurring budget of the Federal Government.

TABLE 2.14

REAL ADP EXPENDITURES (AT CONSTANT PRICES OF 1989/88*)

(Rs. in Billion)

	Federal	Provincial	Special	Programme	Total
Fifth Plan Period:					
1978/79	29.4	7.2	-	-	36.6
1979/80	26.9	5.3	-	-	32.2
1980/81	29.8	6.4	-	-	36.2
1981/82	30.1	8.0	-	-	38.1
1982/83	29.7	8.3	0.2	-	38.2
Sixth Plan Period:					
1983/84	27.4	8.9	0.5	-	36.8
1984/85	31.7	8.4	0.6	-	40.7
1985/86	31.5	10.7	0.9	-	43.1
1986/87	34.7	13.1	0.7	-	48.5
1987/88	34.0	14.5	1.3	-	49.8
Seventh Plan Period:					
1988/89	33.4	11.2	3.4	-	48.0
1989/90**	32.4	10.8	3.1	2.5	48.8

* ADP expenditures at current prices have been converted into constant prices by applying the implicit GDP deflator for gross domestic capital formation

** Budget

Sources: Pakistan Economic Survey, 1988/89, Economic Advisers' Wing, Ministry of Finance, GOP.

Budget-in-Brief, 1989-90, Ministry of Finance, GOP.

Consequently, the emerging scenario for the next few years is characterized by the following salient features: no growth or only modest growth in the overall public sector ADP, a larger share (inclusive of the Special Development Programme and the People's Development Programme) being executed by the Federal Government and higher priority to investments in physical infrastructure and consequently lower real allocations for the social sectors.

Finally, it needs to be emphasized that the resource constraints being confronted by the Government are not only operative on the development side but also on recurring expenditures. The last two federal budgets have included an economy drive in current expenditures by government departments. Table 2.15 indicates the trend in real recurring expenditures on general administration, social, economic and community services (including PHED) by the federal and provincial governments. These expenditures grew quite rapidly up to 1986/87. Since then an attempt has been made to contain the increase. Consequently, real recurring expenditures by both levels of government on administration and on the operation and maintenance of publicly provided services are likely in 1988/89 to be below the level attained in 1986/87, with the prospect that they would be reduced even further in 1989/90. The pressure on provincial governments in particular, to cut back on recurring expenditures is likely to be exceptionally strong in view of the decision by the federal government to freeze the total flow of fund (revenues from divisible pool of taxes plus non-obligatory grants) to the provinces at the nominal level of 1988/89.

The economy drive on recurring expenditures is likely to imply that the ability of provincial line departments (including PHED and LGRDD) to expand employment or to undertake new initiatives may be severely limited in the next few years. In addition, there will be strong pressures to limit operation and maintenance expenditures on the existing network of services. Simultaneously, the provincial governments may try to develop their own revenue sources in the face of limits on Federal Government support. This opens up the prospect for a more serious effort on cost recovery with escalation in the level of

TABLE 2.15

GENERAL ADMINISTRATION AND SERVICES** RECURRING EXPENDITURE BY FEDERAL AND PROVINCIAL GOVERNMENTS

(Rs in Billion)

	Federal At Current Prices	At Constant Prices*	Provincial At Current Prices	At Constant Prices*
Sixth Plan Period:				
1983-84	11.2	15.1	15.2	20.5
1984-85	13.2	17.8	16.8	22.7
1985-86	14.1	17.4	19.6	24.1
1986-87	21.1	22.8	24.0	25.9
1987-88	18.0	18.0	27.5	27.5
Seventh Plan Period:				
1988/89	21.6	19.8	27.8***	25.5***
1989/90	23.1****	19.3	n/a	n/a

* At constant prices of 1987/88. The nominal expenditures have been converted into real expenditure by using the implicit GDP deflator for the public administration and defence sector in the national income accounts.

** On economic, social and community services (including PHED)

*** Budget estimate

**** Including cost of 5% salary increase for employee up to BPS-16.

Sources: Pakistan Economic Survey, 1988/89, Economic Advisers' Wing, Ministry of Finance, GOP.

Budget-in-Brief, 1989/90, Ministry of Finance, GOP.

Budget Speech, Federal Minister of State for Finance, June 3, 1989.

user charges and improvements in revenue collection mechanisms.

2.3.2 Sector Resource Availability at the Provincial Level

The Government of Baluchistan depends upon the Federal Government for 100% of its development budgets (the ADP and the local portion of the SDP). For the recurring budget, Federal revenue assignments of divisible taxes (income and sales taxes) contributed 73 percent in 1986-87 while revenue generation by the province through taxes and user charges (largely the irrigation charge) accounted for only 7 percent.

The deficit, 20 percent, is the recurring expenditure which has been met by Federal grants and subventions. Although 93 percent of the recurring Budget has been financed by the Federal Government,the grants to cover the deficit have increased at the annual rate of 18 percent over the last ten years.

Therefore, financial trends at the national level have a direct bearing on the provincial budget. On the other hand, Balochistan is unique in terms of its political status and the recognition it receives as an underdeveloped region. Since this province only represents 5 percent of the total provincial accounts dispersed by the Federal Government, Balochistan can often follow a different path to development within these resource limitations. In terms of allocating resources between sectors, there is some degree of provincial autonomy and efforts to reduce these powers will be strongly resisted.

Table 2.16 shows historical expenditures for the provincial budget and proposed allocations for next year. These figures confirm that Balochistan has managed to expand its development programmes and still permit increases in the recurring budget. The addition of the Special Development Programme ensures that Balochistan has a higher amount of development funds relative to the national trends.

TABLE 2.16

PROVINCIAL EXPENDITURES (At Current Prices - Rs. million)

Sixth Plan Period	Current Expenditures	ADP	SDP	Total	% Annual Change
1983/84	1750	720	90	2560	----
1984/85	2200	780	100	3080	20.3%
1985/86	2630	900	120	3650	18.5%
1986/87	3530	1170	120	4820	32.0%
1987/88	3890	1410	160	5460	13.3%
Seventh Plan Period					
1988/89	4150	1508	293	5951	9.0%
1989/90 (Budget)	4681	1692	620	6993	17.5%

PROVINCIAL EXPENDITURES (At Constant Prices of 1987/88 - Rs. million)

Sixth Plan Period	Current Expenditures	ADP	SDP	Total	% Annual Change
1983/84	2422	996	125	3543	----
1984/85	2967	1052	101	4120	16.3%
1985/86	3245	1111	148	4504	9.3%
1986/87	3814	1264	130	5208	15.6%
1987/88	3890	1410	160	5460	4.8%
Seventh Plan Period					
1988/89	3804	1382	269	5455	0.0%
1989/90 (Budget)	3911	1413	518	5842	7.1%

Sources: Finance Department, White Paper - Budget 1988/89.
Budget Speech by Minister for Finance for 1989/90.

2.3.3 Financial Allocations For Rural Water Supply

The Government of Balochistan has increased the amount of funding for rural water supply because access to potable water supply is one of the main priorities for increasing the living standards. Previously, the emphasis had been on education, health and economic development, but now water supply is considered equally essential. Most of the funding has been for the development of tubewells and installation of piped water systems.

PHED

Table 2.17 shows historical development (ADP) expenditures for PHED and LGRDD as well as proposed allocations made in the recent provincial budget. PHED development expenditures have increased rapidly from Rs 45 million at the beginning of the Sixth Five Year Plan to Rs 270 million proposed for 1989/90. In real terms, this represents an increase of 3.7 times. As a share of total ADP, PHED expenditures have grown from 6.3 percent to 16.0 percent. These figures include urban schemes but rural water supply generally accounts for 75 percent of PHED's expenditures. In 1988/89, Rs. 162 million was allocated to the rural water sector and in 1989/90, Rs. 215 million was approved.

LGRDD

LGRDD has not been as fortunate. At the beginning of the Sixth Five Year Plan, allocations for rural development and for public health were roughly equal. Allocations to LGRDD grew in 1985/86, reflecting the policies of the Five Point Programme. Since that time, allocations have declined in real terms and LGRDD's share of total ADP has fallen from a peak of 9.3 percent to roughly 5.0 percent during the last three annual budgets.

LGRDD allocates roughly 70% of their ADP funds as grants to District and Union Councils. LGRDD has guidelines that 25% of these funds should be

TABLE 2.17

PROVINCIAL SECTORAL EXPENDITURES IN THE ADP

(At Current Prices - Rs. million)

Sixth Plan Period	PHED*	Share of Total ADP	LGRDD	Share of Total ADP
1983/84	45.0	6.3%	48.2	6.7%
1984/85	50.0	6.4%	46.2	5.9%
1985/86	65.0	7.2%	83.4	9.3%
1986/87	80.0	6.8%	80.0	6.8%
1987/88*	163.0	11.6%	71.2	5.0%
Seventh Plan Period				
1988/89**	196.1	13.0%	77.2	5.1%
1989/90(Budget)	270.0	16.0%	85.2	5.0%

(At Constant Pricees in 1987/88 - Rs. million)

Sixth Plan Period	PHED*	Annual Change	LGRDD	Annual Change
1983/84	60.7	------	66.7	-----
1984/85	67.4	11.0%	62.3	-6.6%
1985/86	80.2	19.0%	102.9	65.2%
1986/87	88.4	10.2%	86.4	-16.0%
1987/88*	163.0	84.4%	71.2	-17.6%
Seventh Plan Period				
1988/89**	179.8	10.3%	70.8	-0.6%
1989/90(Budget)	225.8	25.5%	71.2	0.6%

* PHED was bifurcated from Irrigation Dept. in 1987/88 but estimated expenditures were made based on actual expenditures on water supply schemes, as provided in Revised Annual ADP's.

** The figure for PHED was provided by PHED. No figure actual expenditure was available from LGRDD, so the ADP allocation is present here.

Sources:
- Planning and Development Department, Annual Development Programmes, various years.
- Finance Department, White Paper - Budget 1988/89.
- Public Health Engineering Department, 1989.

LGRDD allocates roughly 70% of their ADP funds as grants to District and Union Councils. LGRDD has guidelines that 25% of these funds should be allocated to water supply. In 1988/89, the actual expenditures were estimated to be Rs. 7.5 million for water supply and Rs. 0.6 million for drainage (refer to Table A-2 in Appendix A - ADP of Rural Development). An additional Rs. 12 million was spent on irrigation schemes of which an estimated 20% contributes to water supply. Therefore, the total amount of expenditure made was Rs. 11 million or 20% of total grants to District and Union Councils. Using this same ratio, the estimated expenditures for 1989/90 will be Rs. 12 million based on allocated grants of Rs. 60 million.

Rapid Development Programme (RDP)

Although allocations to LGRDD have not increased in real terms, there is additional funding available for rural development through the new Rapid Development Programme. This focuses on community development schemes in rural areas, of which drinking water supply is a main priority. The government has allocated Rs 207.5 million to the programme for 1989/90. Rs. 5 million is allocated to each rural MPA (38 in total) and Rs. 2.5 million to each urban MPA (7 in total). The allocation of funds to sectors has not been established because MPAs are still identifying schemes. It is likely that 15% to 20% will be for water supply schemes; a conservative estimate of Rs. 30 million has been assumed for investment planning purposes. Depending upon the size of scheme, the projects could be implemented through line departments (i.e. PHED or LGRDD) or by local councils or directly by MPAs. This amount of funding is assumed to be available in future years because a similar amount of funding existed previously under the old Special Programme that also involved MPAs.

Valley Development

Another special item in the ADP is the Valley Development Programme which is for development in the tribal Districts (Kohlu and Dera Bugti). These funds amounted to Rs. 60 million in 1988/89 and Rs. 40 million in

1989/90. They are administered by a Project Director in each District. The schemes are handed over to relevant line departments for operation when completed. It is estimated that Rs. 10 million has been spent on rural water supply in the last two years.

WAPDA

The 1989/90 ADP allocations provide Rs. 56 million for WAPDA, Hydrogeology, of which Rs 39 million is for procurement of assets and indirect expenses. Of the remainder Rs. 13.3 million is for monitoring groundwater levels in Pishin, Quetta, Mastung and Mangocher (the latter two are in District Kalat). Hydrogeology investigations have been driven by irrigation needs.

Health Department

The Health Department has not allocated any development funds for hygiene education. Instead, all costs of the Health Education Unit are financed by the recurring budget. The only preventive care programme that receives priority is the Expanded Programme on Immunization (EPI). Rs 19 million has been allocated for this programme, of which Rs 8.6 million was approved for 1989/90.

2.3.4 Donor Agency Involvement

The Special Development Programme was established in 1980/81, and the first allocations of funds were made in 1982/83. During the first five years, the donor agencies contributed 60% to 80% of the annual SDP in the form of loans or grants. This percentage is no longer a compulsory requirement. In the 1989/90 budget the total SDP allocation is Rs 856 million, of which Rs 650 million (76%) is the local (federal) component and Rs 206 million is foreign. The reason for this turnaround could be the result of greater utilization of previously committed funding that has not been spent. In the rural water supply sector an estimated Rs. 45 million is commited for 1989/90. This includes BIAD, the Pak-German self help programme and BALAD.

Existing Involvement

Several foreign aid agencies have been involved in rural water supply. UNICEF, CIDA, EEC and Govt of Netherlands have contributed Rs. 264 million for the BIAD phases I and II (28 water supply schemes with a planned coverage of 43,000 people). CIDA and the Dutch Government dropped their support for the programme in 1987. UNICEF has recently put their plans on hold, awaiting new agreements with the Government of Balochistan. The European Economic Commission (EEC) has decided to allocate unused funds (Rs 150 million) to complete phase II of BIAD within a 2 to 3 year period.

The German Government through GTZ has been involved with the Pak-German Self Help programme for 6 years. They have committed Rs. 52 million for the programme up to 1990/91, of which Rs. 43 million has been spent. An estimated 50% of funds have been spent on rural water supply schemes such as handpumps, mechanical pumps for wells, water tanks, etc. GTZ has recently decided to extend their involvement in Balochistan over the next decade but arrangements with LGRDD could be altered and more emphasis may be placed on income generating schemes rather than infrastructure.

In Makran Division, USAID has been involved in infrastructure improvements, including some water schemes (mostly for irrigation) and rehabilitation of 95 karezes (refer also to Section 2.2.11). Very little has been spent directly on rural water supply over the last 5 years, but there is potential for greater involvement in the future according to USAID officials.

Ongoing Negotiations for New Involvement

The World Bank is presently conducting a study of 16 townships in Balochistan for water supply and sanitation. This project would involve PHED as the executing agency for improved water supply and sanitation systems. An estimated Rs. 1850 million would be allocated to this project over 10 years, of which a yet undetermined amount would be financed by foreign loans. Funding for the project is anticipated for 1990/91.

The Government of Netherlands has formulated a project for institutional and human resource development for the Rural Development Academy in Quetta. An estimated cost of Rs. 3.5 million would be provided by the Dutch to properly equip the new Academy, train instructors, develop new curricula and give seminars/workshops. The project is proposed to start in 1990/91 and would last 4 years.

The Italian Government has approved a US$ 5 million grant for a 3 year project with the Hydrogeological Directorate in Balochistan. The project would involve: the collection , analysis and management of hydrogeological data; assistance in rehabilitating tubewells (in Quetta and Pishin Districts); and training of local staff in drilling and maintenance of tubewells. Foster Wheeler has been selected to work with WAPDA, Hydrogeology to execute the project. The project has been delayed because the Federal Ministry has not agreed to release funds for the local component which would be in the order of Rs. 150 to 200 million.

2.3.5 Internal Financing from Local Councils

In Balochistan, the District and Union Councils generate few funds for development from revenues. With the exception of Lasbella and Jaffarabad/Tamboo Districts, local councils are generally in poor financial shape and must rely totally on ADP grants for development projects. The local councils that are profitable tend to invest in revenue generating activities rather than public services. Consequently, this source of funding provides little to the sector at present and potential in the short term is generally poor. Nonetheless there are isolated cases where local councils have been successful and they should be promoted as positive examples for others.

2.4 Current Situation

2.4.1 Water Supply

Balochistan faces certain problems with respect to rural water supply chiefly due to :

- desert like climate;
- underdeveloped nature of the area due to low incomes and poor infrastructure; and
- small dispersed population.

Since the founding of Pakistan, and particularly since the creation of Balochistan as a province, the government has taken an active role in the provision of water supply to rural areas. Accordingly Public Health Engineering Department (PHED) was created in June, 1987. Prior to that the Irrigation Department had the mandate for provision of all water supplies and, therefore, most schemes were developed for irrigation purposes. Many private tubewells were developed to provide water for agricultural production for a limited number of landowners. In areas with a scarce supply of water, these tubewells also served as a source of drinking water for the local population. Today, schemes are developed solely for the purpose of potable water supply. In areas where tubewells do not exist, people still rely on surface water from rivers and streams and rainwater collection ponds. Table 2.18 shows the various types of water supply technologies by implementing agency.

A rapid increase in the number of schemes has occurred recently, reflecting the government's high priority now given to this sector. In two years, the Public Health Engineering Department (PHED) has completed 200 rural water supply schemes. The Local Government and Rural Development Department (LGRDD) has also completed smaller schemes (1800 in the last 5 years) such as gravity based systems, rehabilitation of dug wells, construction of water tanks, rainwater collection ponds and karez improvement.

Table 2.18

WATER SUPPLY TECHNOLOGIES IN USE IN BALOCHISTAN

Agency	Technology Type	Number of Schemes
PHED	1. Tubewell, Pumping, Transmission, Distribution	300
	2. Spring W/WO Pumping, Transmission, Distribution	few
	3. Infiltration Gallery, Collection Chamber, Distribution	few
	4. Canal, Slow Sand Filtration, Pumping, Distribution Transmission, Distribution	5
	5. Openwell, Pumping, Transmission, Distribution	100
	6. Rain Water Collection Pond, Treatment, Distribution	10
BIAD	1. Tubewell Schemes	28
LGRDD	1. Wells, Pumping, Community Tank	numerous
	2. New Karez	few
	3. Karez Improvement	hundreds
	4. Water Collection Ponds	numerous
	5. Water Tanks	numerous
Pak-German	1. Handpumps	100
Private Sector	1. Karezes	hundreds
	2. Tubewell Irrigation	8300
	3. Wells	numerous
	4. Hand pumps	very few

Source : Various departments, agencies and government statistics.

Description of Technologies in use

This section deals with the current water supply schemes being used Balochistan and the recommendations from the consultants, on the basis of field surveys conducted in 13 districts of Balochistan. An attempt has been made to see as many PHED, LGRDD, Pak-German & BIAD water supply schemes as possible. A total No of 87 schemes have been visited & surveyed including some of the schemes needing rehabilitation in Quétta & Pishin Districts. More than 120 villages have been visited which had no water supply schemes.

Groundwater Pumping Schemes

Most of the PHED schemes are designed for ground water pumping. A typical PHED scheme has the following components, drilling and development of source, construction of pumphouse installation of pumping machinery, construction of transmission main, construction of distribution system which is further subdivided as:

a) Overhead Service Reservoir (OHSR) - usually located at source
b) Community Tanks
c) House connections
d) Standposts

Although most systems depend upon tubewells, it appears that due consideration is not given to the existence of ground water for the proper location of the bore hole and no proper pump or aquifer tests are carried out which occasionally causes failures of some of the sources which could have been avoided.

Another alternative is to dig a well and install pumping machinery. In mountainous regions an elevated surface reservoir is the most desirable proposition for cost effectiveness as compared to OHSR. There is a need for proper design of the pumping machinery to cater for the needs of the community for a design horizon of 20 years, so that unnecessary replacements of the transmission main are avoided. The usual range of pumping machinery (Pump & Motor)for most of the PHED schemes range between 20-40 horsepower. Based on the quantity of water required for drinking water supply, this size of motor is excessive.

Proposed Modifications & Recommendations

As Balochistan in general falls in the seismically active region, it is proposed that OHSR should be avoided and the Surface Level Tank be used more frequently. The main pump & motor supplying the Surface Level Tank (SLT) will be of relatively low power. Another pump & motor of adequate size shall pump direct to House connections or Community Tanks. These recommendations will go a long way to make the scheme cost effective particularly if house connections are adopted subject to willingness to pay by the community.

Basic design must be for house connections. Initially the scheme might be implemented with community tanks due to limitation of funds allocated, but soon the people may realize the necessity of water within the compounds and the provision of house Connections will not be difficult; upgrading will be relatively easy and effective. The initial installation charges might have to be increased from Rs. 1000 for effective cost recovery. The monthly water charges might have also to be increased.

In mountainous regions an elevated surface reservoir can most easily be adopted in the design which helps reduce the capital and operating cost to a great extent because water from elevated surface reservoir (ESR) can feed the system by gravity. It was estimated that for a Reservoir of 20,000 gallons, the saving in cost for adoption of an ESR instead of OHSR will be of the order of Rs. 250,000. (15% of the capital cost). This will also permit faster construction of the scheme.

The pump & motor will normally be run by electric power, a standby diesel engine is desirable but will make the scheme slightly costlier. In areas not provided by electric supply pump & motor must be diesel driven.

Karezes

The Karez system is a very old system mainly meant for irrigation in Balochistan. Karezes are found in Quetta, Pishin, Sibi, Kachhi, Loralai, Zhob, Kalat, Turbat, Panjgur and Kharan districts and are extensively used for irrigation system.

Near the foot of the mountain where underground water is available, a well is dug, usually called the Mother well. There follow a series of wells at intervals of 200-300 ft. in the direction where the water is meant to be taken. All of these wells are joined by a sloping tunnel, 2-3 ft. wide. From the last well downstream, an open channel leads to the field or orchard to be irrigated. Average discharge available in karezes may be from 0.5 to 3 cusecs.

Extensive use of tubewells by private owners has caused the discharge from karezes to diminish and some of the karezes have become dry. 'Delay Action Dams' and digging of karez wells to deeper zones of water bearing strata are the methods for augmenting the yield from the Karezes.

Water Supply Scheme from Existing Karez

Three potential options for improvement of Karezes for drinking water supply were assessed.

Option A

This envisages fitting of a low horsepower pump at the mother well, a surface level tank of appropriate capacity nearby, and a 3" dia pvc line leading to community tank/tanks in the village. Willingness to pay might lead to house connection to make the scheme more cost effective. Surface Level Tank might be of 5000 Gallons capacity for a village of 500 persons. The village might have two community tanks of 2500 Gallons each. The mother well must be covered to prevent contamination.

Option B

Considering a village of 500 persons again, this will include a Ground Reservoir of 5000 gallons, covered properly against the possibility of pollution. A centrifugal pump of 2-5 horsepower, and a transmission main to two community tanks of 2500 Gal. capacity each. A small pumphouse will also be required. As the Ground Reservoir will be located just at the place where the karez water enters the open channel, all the wells upstream will need to be covered against possible pollution.

Option C

This option includes a Ground Level Reservoir of 5000 Gal. capacity, with the same assumptions as above, at the location as in the case of Option B above, but does not consider covering the wells except envisages treatment of water with chlorine/bleaching powder,before pumping to the community. The following Table shows a cost comparison for the above three options.

COST COMPARISON BETWEEN THREE OPTIONS FOR WATER SUPPLY SCHEMES FROM EXISTING KAREZ

Option	Total Cost(Rs)	Cost/Capita (Rs) *
A	550460	1101
B	332960	666
C	297960	596

* using settlement size of 500 people

The above table shows that option C. considering a Ground Level Reservoir, pumping to Community Tanks and treatment with chlorination/bleaching powder is the most suitable for adoption, the saving is due to non-provision of covers to the karez wells upstream.

Spring Source-Gravity System

In the mountainous regions many springs exist which can be utilised for provision of water supply systems to villages. A spring box is constructed after developing the source which may include some excavation. The usual size of the spring box is 3 cubic feet. Inside it is filled with a metallic perforated pipe & connected to a main pipe line in which water flows by gravity.

The perforated pipe in the spring box is connected to the transmission main, leading to community tank(s). The overflow & washout are generally provided at the community tanks. The overflow might be led by a pipe to a designated area for irrigation purposes.
The distribution system consists of either community tanks or house connections. The transmission main should be min. 3" dia pvc class B and 1" or 1-1/2" size pipe may be used for distribution an house connections. In the case of house connections the overflow must be taken care of near the source & led to an irrigated area.

Infiltration Galleries

Infiltration galleries derive water from a water bearing strata and bring it to a wet well or a collection tank from which water may be pumped to communities directly or may flow by gravity to a distribution system. The water bearing strata /layers are usually found in river beds or at places where artesian conditions exist. The design of the gallery is such that water collected is filtered naturally so that no such operation is required at a latter stage. If the water is being collected from a river bed the perforated pipe, should be wrapped up by geotextile fabric must be below the scour depth of the river to safeguard against dislocation and failure of the system due to seasonal floods.

An alternative system might use radial galleries leading to a wet well/collection chamber from which the flow may be by gravity to community tanks, standposts or house connections. For a secure water supply system the sub surface flow must be perennial. Data must be collected beforehand for designing such a system regarding flood frequency, rainfall and run off characteristics.

In mountainous regions gravity flow will usually be possible. The main pipe line and the distribution system may consist of appropriate dia meter pvc pipe leading to community tanks, standposts or house connections. Overflow from the system, if any, may be taken care of by feeding an irrigation system.

Slow Sand Filtration Plants

In certain areas of Balochistan like Kachhi & Nasirabad, where ground water potential is scarce but surface water like canal/river is available, slow sand filtration schemes are the option. Slow sand filtration is one of the most effective water treatment process subject to the condition that canal/river water must contain total dissolved solids and other impurities within allowable limits. The total dissolved solids must not exceed 1500 parts per million.

The salient features of the process consist of an intake structure whereby the canal/river water is collected in a sump. From the sump water is pumped or flows by gravity to sedimentation tanks whose size depends on the total water needs during the closure period of the canal in particular. In the sedimentation tanks the turbidities and the suspended particles of the raw water are removed.

The relatively clear water then passes to the slow sand filter beds whereby turbidity is amply reduced as well as some of the micro organisms. The filtered water is led into a clear water tank from where it is pumped into the distribution network to the consumers. Depending on the bacteria present, chlorination might be needed. This task is sometimes accomplished by bleaching powder as well.

Sedimentation tanks are necessary because without these water will be carrying heavy silt loads which will choke the filter material. The micro-organisms present in water are constantly being accumulated in the bed causing it ultimately to choke and the filter stops functioning.

The remedy for these problems consists of occasionally scrapping the upper layer of sand bed (12-25 mm thick) to render it functioning again. This process continues until a minimum practical thickness of sand bed is left in position. At this time the entire sand bed is to be replaced, or full practical thickness of sand bed is restored.

One potential option (depending upon the water quality) is to remove the slow sand filter altogether and have two settling tanks in a series so connected that either one or both may be used. Chlorination or bleaching powder should be introduced after the water passes both the tanks. This is a simple low cost operation that should be considered for smaller villages in Balochistan.

Another alternative is the Rapid sand filtration process which although has a rate of filtration many times that of slow sand filter, 5760 g/day/sq. ft. Provision must be made to have a small low height OHSR to back wash the filter bed, but this renders the alternative quite costly compared to slow sand filtration. Also, the rapid sand filtration process is more complicated and therefore requires more experienced operators. For these reasons, this option should not be considered.

<u>Recommendations for Slow Sand Filtration, Plants</u>

1) The filtration rate of 0.1 cubic metre/hr./sq.metre(144 g/day/sq.ft.) is recommended which will reduce the size of filter beds to one third, thus effecting the cost considerably.

2) Standby diesel generators are recommended to safeguard against load shedding/power failure. This provision will also eliminate the need for a OHSR.

3) The area required for a slow sand filtration plant is much larger compared to other technologies, so land acquisition is necessitated which might be donated by the villagers as a part of community the involvement process.

Dug Wells

For smaller communities where ground water potential is favourable and the water table is relatively shallow, dug wells are recommended. In soft strata these may be of comparatively larger diameter and are recommended to be covered to avoid pollution, and lined to prevent caving in.

In hard strata like shingle the cross-section may be much smaller like (4 foot diameter). The well must be covered to prevent contamination. For small villages a manual lifting mechanism should be used to avoid costly operating and maintenance. The preferred lifting mechanism would be a handpump which prevents contamination of the well. For larger villages, it would be feasible to install a small pump and motor.

Open Dug Reservoirs

Such type of water supply schemes have been implemented by PHED in District Kachhi implemented by PHED. An open pit is dug in the ground at a suitable place and the extra excavated material is dumped on the sides of the pit with or without an inlet for rain water to enter. The water collected in the rainy season usually fills the reservoir and the villagers consume this water over a period of 4-6 months. The water is generally polluted and is shared by people and animals equally. Similar schemes were seen in Kalat and Zhob District which were implemented by LGRDD. This option does not satisfy the basic level of service recommended.

Some sort of treatment like small scale filtration (slow sand) & disinfection by bleaching power and pumping to a small size community tank(s) would be required to provide on acceptable level of service. Home treatment and disinfection might also be promoted but the community will need to be trained for that.

Handpumps For Dug Wells

In areas where dug wells are used handpumps are also recommended. It is better if they are located on top of a shallow dug well (preferably existing) of appropriate diameter . The well must be lined, fitted with ladder rungs for access, covered with an R.C.C. slab and having a frame and cover on top , to facilitate minor repair work even by the community themselves.

The criteria for design must meet the following requirements:-

- low cost unit;
- easy maintenance by simple tools even by community; and
- should be easily operable by women & children.

At present hand pumps are available which can operate up to depths of 50 metres. Some handpumps use plastic bearings which out perform even the robust roller bearings and can be replaced in a matter of seconds. Recent Hand pumps are maintainable with ease even by women using very simple tools.

Hand Pumps on Boreholes

These may be cheeper than the ones on dug wells unless the dug well exists already. It is worth mentioning here that some problems might occur in case the water table lowers. This will involve removing all the pipes to deepen the bore and refix the handpump. Putting handpumps on boreholes in a locality where there are enough dug wells at present is not recommendable.

The Afridev pump is suitable for wells up to 50 metre. It is manufactured locally and has also a good record of operation and low cost. The Mark II manufactured in India has also a good reputation for deep set pumping.

Utilization of Existing Irrigation Supplies.

Many private tube-wells mainly meant for irrigation could be utilized to provide cheap water supplies to the communities. Water may be pumped from the existing sump on the tube well to a community tank. The villagers would have to pay for extra fuel or electric charges required to operate the system. To design the system it must be made sure that adequate supply of water exists in the well to feed the proposed community tank and that the supplies must also be regular, daily or seasonal depending on the existing conditions. The consent of the owner will be required before this can be implemented.

Similarly in the case of a privately owned open well it can be mechanised with a pump and motor of adequate size and fed directly into community tank(s). The well must be covered against possible pollution. It also must be ensured that the well is able to supply sufficient quantities of water to meet the needs of the community. The community pays for fuel, lubricants, electric & operating charges for the system.

Capital Costs

The cost evaluation, including capital as well as O & M, of these schemes has been carried out. Table 2.19 and 2.20 give the details.

The cost of certain systems vary by size of settlement served because there are economics of scale. It is generally recommended that new schemes should be developed in those areas where ever on extreme shortage of water exists and people use water from open reservoirs of rain water which is shared with animals. Also those areas should be considered where water is being used from open wells or streams and Nullahs which are definitely polluted.

The cost estimates for various water supply systems were derived by:

- assessing existing and proposed projects by the various implementing agencies (PHED, BIAD and Pak - German);
- inspection of schemes during field visits;
- assessment of UNICEF design modules;
- evaluation of PHED cost estimates based on bills of quantities and schedule of rates;

Table 2.19 **CAPITAL COST OF WATER SUPPLY SCHEMES**

Types	Total Scheme (Rs)	Cost/ Capita (Rs)
Piped water (Tubewell)		
. Large (3500 people)	2,100,000	600
. Medium (1500 people)	1,500,000	1000
Canal Water with Slow Sand Filtration		
. Large (3500 people)	3,000,000	850
Piped Water (Gravity/spring Fed)		
. Medium (1000 people)	450,000	450
. Small (500 people)	300,000	600
Infiltration Galleries with Pumping		
. Large (3500 people)	1,900,000	550
. Medium (1300 people)	1,050,000	820
Simple Pumped Schemes		
. Small (500 people)	400,000	800
Karez Improvement		
. Medium (1000 people)	350,000	700
Handpump (serving 150 people)		
. on a new bore hole	50,000	330
. on a existing dug well	30,000	200
Community Tank (serving 500 people)	50,000	100

Table. 2.20 **ANNUAL O & M COST OF WATER SUPPLY SCHEMES**

Types	Total Cost/ Scheme (Rs)	Cost/ Capita (Rs)	of which Labour Cost
Piped water (Tubewell)			
. Large (3500 people)	105,000	30	57%
. Medium (1500 people)	80,000	55	56%
Canal Water with Slow Sand Filtration			
. Large (3500 people)	105,000	30	57%
Piped Water (Gravity/spring Fed)			
. Medium (1000 people)	25,000	25	90%
. Small (500 people)	30,000	60	90%
Infiltration Galleries with Pumping			
. Large (3500 people)	100,000	29	60%
. Medium (1300 people)	65,000	50	70%
Simple Pumped Schemes			
. Small (500 people)	25,000	50	68%
Karez Improvement			
. Medium (1000 people)	25,000	25	70%
Handpump (serving 150 people)			
. on a new bore hole	1,500	10	N.A
. on a existing dug well	1,050	7	N.A

assessment of cost factors based market prices for various components (eg. bore hole, drilling, pipes, machinery, etc); and

comparison of costs in other provinces, where applicable.

Tubewell schemes with mechanized pumping, storage and distribution systems have per capita cost averaging Rs. 600 for large villages and Rs. 1000 for medium sized villages. These schemes are not recommended for small sized villages because the cost per capita is much higher due to fixed inputs, such as the tubewell, machinery, etc.

Infiltration galleries cost Rs. 550 to Rs. 820 per capita for large and medium sized villages, assuming, pumping, storage and distribution systems are installed. Schemes with spring sources and gravity systems range from Rs. 450 to Rs. 600 per capita for medium and small villages. These options are generally limited to the northern highland areas. The existing dug well option with new mechanical pumping and protected source would cost Rs. 800 per capita for small villages. Handpump schemes on existing dug wells are much less expensive, costing Rs. 200 per capita (where one unit supplies 150 people). Deep hand pumps on a new bore hole are more expensive, costing Rs. 330 per capita.

Operating and Maintenance Costs

For piped water schemes with mechanical pumping, operating and maintenance costs are Rs. 30 per capita per annum for large villages. For medium sized villages, they are Rs. 55 For piped water schemes with gravity flow, the operating and maintenance costs range from Rs. 25 to 60 per capita per annum for medium and small sized villages, respectively. The operating and maintenance costs for handpumps range from Rs. 7 to 10 per capita per annum.

Water Consumption Habits & the Role of Women

Collection of water is the primary duty of women even the source is foraway. Often duties of women include collecting fuel (wood dry bushes for burning), preparation of food, raising of children, washing clothes and other household chores. Outside the home they work in the fields, and even tend the flocks, taking them to pastures for grazing. Inspite of all these duties and hardships the women have to bear, they are generally ignored and have no say in the affairs of the household. The exceptions are the elders who are respected and there advice is often sought after.

Household uses of water include drinking, cooking, washing and bathing. After fetching, water is stored in pitchers and mashkeezas (bags of animal skin). Drinking water is kept in a cool, shady shelter, constructed of wooden columns with a roof of palm leaves. A glass or an earthenware jug is used for extraction of the water from the container, and it is the same utensil that is used for drinking purposes. This method is unhygiene and leads to contamination of the drinking water. Due to water scarcity people do not bath often and even washing hands is not frequent. The use of water for personal hygiene is minimum.

Definition of Basic Coverage

Discussion of coverage implies the question of safe and adequate water supply. The definition of coverage used in this report is:

- that the source, specially open wells must be protected against possible pollution;
- minimum supplies provided must not be less than 5 gallons/person/day;
- access to the source of drinking water for the villagers must be within 500 feet of the dwellings; and
- quality of water supplied must be potable.

The PHED schemes generally meet the first and second criteria. The design standard for PHED scheme is generally based on 10 gallons (45 litters)/person/day with a design horizon of 20 years to allow for population growth and to avoid frequent replacements of piped main or distribution systems.

Access to a drinking water source is not strictly within the prescribed limits as indicated above but the criterion might be met with the provision of smaller and more numerous community tanks or stand posts.

Regarding quality of water supplied, the criterion is generally met in the case of tube wells sources but is not satisfied in schemes using uncovered open wells. In case of open cut rainwater ponds or reservoirs, the criterion is definitely not being met.

Estimated Coverage

A precise statement on coverage in rural areas is difficult to derive because there are numerous traditional schemes that provide marginal service levels. For this reason, it is not appropriate to simply state that one system provides coverage and an inferior system does not. Rather, it is more important from an investment planning approach to identify existing proportions of service levels, and then give highest priority to areas with the lowest service levels. Also in terms of investment decisions, it may be more effective to upgrade service levels of marginal systems rather than install complete new systems at high cost.

The Balochistan team was active in the field during the months of April and May visiting 11 districts to inspect PHED water supply schemes, schemes built by other agencies (such as BIAD, Pak - German), and traditional water schemes. Figure 2.15 shows the areas where field investigations were conducted and the PHED schemes and other villages visited. Appendix E shows the list of villages visited, specifies which have public schemes and identifies the implementing agency. The results of survey work shows that the vast majority of schemes are functioning most of the time. There are periods when water supply is interrupted due to equipment breakdown or scheduled servicing. People relying on open wells springs and nullahs (streams) have insufficient water supply during the driest period of the year, which can last for several months.

FIGURE 2.15

SCHEMES / VILLAGES VISITED BY CONSULTANTS

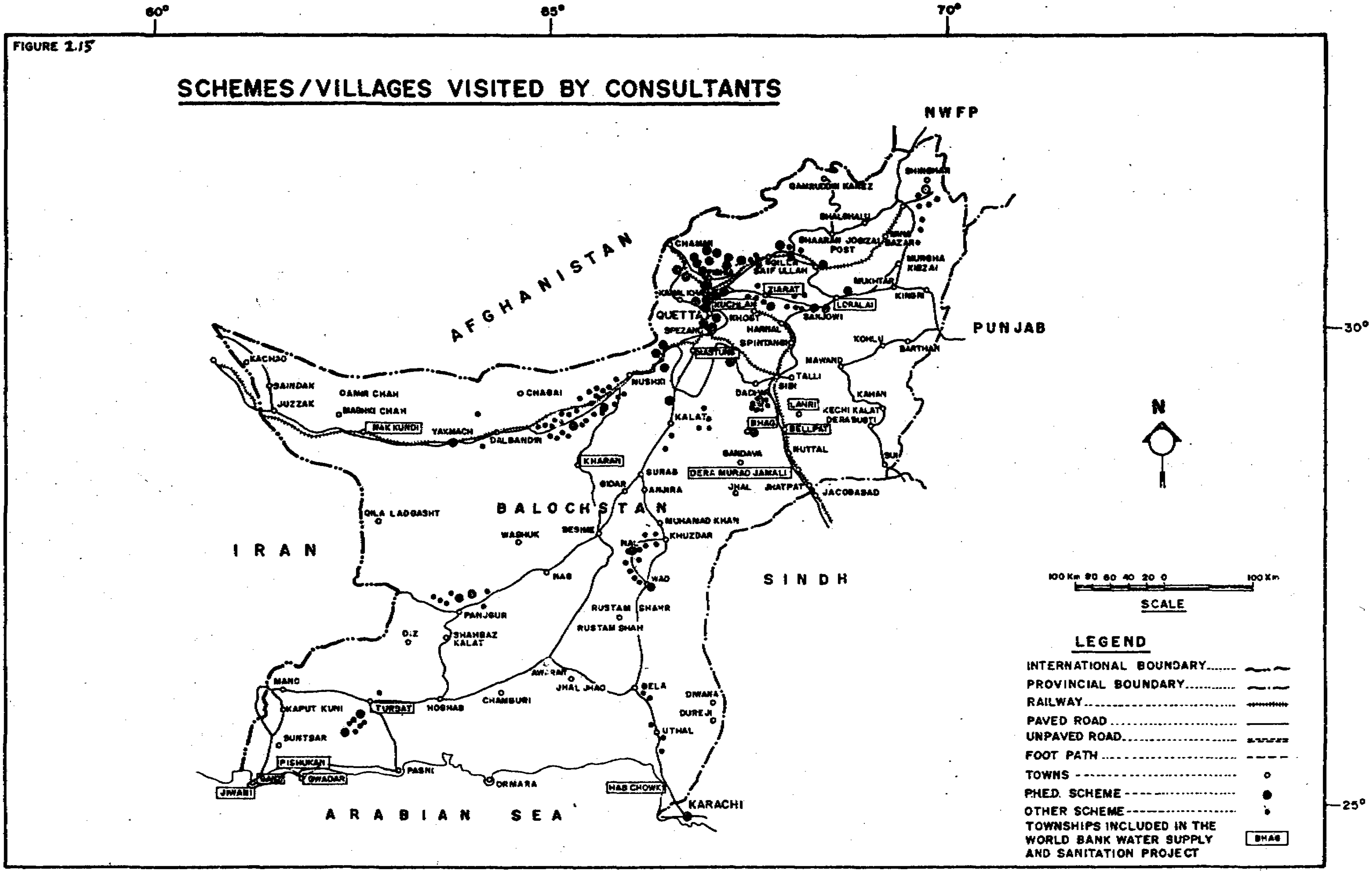


FIGURE 2.15

The PHED has supplied a list of schemes that are not functioning properly, which includes some BIAD schemes now transferred to PHED. Some schemes have failed because the source of water was not adequate in terms of water quantity or quality. The solution is to reuse the existing facilities once a new water source is located. Often, the money for finding an alternate water source has not been provided, therefore these schemes remain idle until funding is approved. There are presently 13 piped water schemes that are not functioning (3 used to belong to BIAD) which have been excluded from the coverage estimates. The majority of rehabilitation requirements represent systems that need improvement and possibly upgrading. They still represent coverage but unless attention is given soon, they may deteriorate further and stop functioning. Table 2.21 summaries rehabilitation requirements for PHED schemes by district. The new estimate for rural coverage has been adjusted down from 25% to 22% based on field verification work. Completed BIAD schemes have been included in the estimates. Smaller schemes by LGRDD and the private sector that provide adequate coverage are very few and have not been quantified. Table 2.22 shows revised estimates of rural coverage for water supply.

A crude attempt was made to quantify the status of the uncovered population. Table 2.23 a shows the number of public water schemes plus irrigation and traditional schemes such as the karez. Based on this information and the typical number of people served by each facility, estimates of various water sources for the entire rural population were made for 1988. Population relying upon springs, rivers/canal water or open wells were calculated as residuals and apportioned on the basis of local physiographic conditions (e.g. availability of springs, groundwater or surface water). Table 2.23 b shows the results of this exercise and gives the assumptions used. It reveals that a significant share of the rural population (20%) has access to water from irrigation schemes for which the quality and quantity is relatively good (although reliability and access may be less so). Another 12 to 13% have access to gravity sources (springs and karezes) but for the karezes, the source is not protected, although the quality is far superior to surface water.

Table 2.21 **REHABILITATION REQUIREMENTS FOR PHED SCHEMES**

District	Not Functioning #	Not Functioning Repair Cost (Rs m.)	Needing Repairs & Upgrading #	Needing Repairs & Upgrading Cost (Rs m.)	Needing Repairs & Upgrading Upgrade Cost (Rs m.)	Total Cost (Rs.m)
Quetta	4	5.00	7	0.75	6.75	7.50
Pishin	2	1.25	7	0.90	5.65	6.55
Chagai	-	-	3	1.40	4.40	5.50
Kalat	3	2.07	-	-	-	-
Khuzdar	-	-	1	0.00	1.00	1.00
Gwadar	-	-	3	6.10	3.40	9.50
Lasbella	-	-	6	2.40	7.60	10.00
Jaffarabad	-	-	3	1.6	5	
Tamboo	1	2.00	1	0.00	1.00	1.00
Zhob	1	1.00	6	0.60	4.70	5.30
Q.Saifullah	1	1.50	5	0.45	3.85	4.30
Loralai	1	0.65	14	0.00	4.65	4.65
Sibi	-	-	2	0.00	7.00	7.00
Ziarat	-	-	1	0.40	1.60	2.00
Kohlu	NR	NR	NR	NR	NR	NR
Dera Bugti	NR	NR	NR	NR	NR	NR
Kachhi	-	-	3	0.00	7.00	7.00
Turbat	-	-	5	0.45	5.05	5.50
Panjgur	-	-	3	0.15	3.35	3.50
Kharan	NR	NR	NR	NR	NR	NR
TOTAL	13	13.45	70	15.25	76.05	91.30

NR - District did not report

Source: PHED and adjustments by consultants based on field surveys.

Table 2.22

ESTIMATES OF RURAL WATER SUPPLY COVERAGE

PHED SCHEMES			BIAD SCHEMES		ESTIMATED COVERAGE		
District	No. of Schemes	Population Covered '000	No. of Schemes	Population Covered '000	Total Pop.	June 1988	June 1990
Quetta	20	81.6	3	1.9	83.5	87%	92%
Pishin	30	123.3	1	2.2	125.5	33%	52%
Chagai	10	47.2			47.2	34%	37%
Loralai	41	84.9	5	6.6	91.5	19%	24%
Zhob	25	34.1			34.1	14%	14%
Sibi	9	45.6			45.6	63%	85%
Ziarat	1	0.3			0.3	1%	20%
Kohlu	18	13.5			13.5	17%	17%
Dera Bugti	10	12.9			12.9	10%	10%
Jaffarabad	3	12.8	1	2.2	15.0	5%	8%
Tamboo	3	8.9	2	4.9	13.8	8%	15%
Kachhi	8	40.8			40.8	13%	14%
Kalat	23	72.7	6	5.4	78.1	19%	30%
Khuzdar	24	136.2			136.2	31%	38%
Kharan	18	22.1			22.1	16%	34%
Lasbella	6	36.7			36.7	21%	32%
Q.Saifullah	11	19.5			19.5	11%	11%
Turbat	36	118.1			118.1	26%	34%
Panjgur	11	27.8			27.8	12%	18%
Gwadar	9	38.7	2	2.8	38.7	52%	52%
TOTAL	316	974.9	20	26.0	1000.9	22%	30%

Notes: Estimated coverage for 1990 is based on schemes completed in 1988/89 and completion of ongoing schemes by the end of 1989/90.

Number of Schemes refers to completed schemes.

Population Covered excludes schemes that are not functional.

This table refers only to PHED's rural water supply schemes which was defined as settlements below 5000 or otherwise classified as a town by Government authority. The rural schemes represent approximately 75% of PHED's coverage. Total rural and urban coverage including other agencies (particularly in Quetta), is estimated to be 45% as of June 1989,compared to roughly 25% for rural areas.

Source: PHED, BIAD and revisions made by Consultant based on field investigations.

TABLE 2.23a NUMBER OF RURAL WATER SCHEMES, HAND PUMPS, IRRIGATION TUBEWELLS & OPEN WELLS, AND KAREZES

DISTRICTS	PUBLIC PIPED WATER SCHEMES		HAND PUMPS	IRRIGATION SOURCES		FUNCTIONAL KAREZES
	PHED	BIAD	Pak-German	TUBEWELL	OPEN WELL	
QUETTA	20	3	13	1100	0	37
PISHIN	30	1		1669	80	58
CHAGHI	10			349	60	133
LORALAI	41	5		299	900	38
ZHOB	25			269	75	57
QILA SAIFULLAH	11			268	75	57
SIBI	9		25	57	5	11
ZIARAT	1			56	5	11
KOHLU	18			48	13	8
DERA BUGTI	10			47	12	7
JAFFARABAD	3	1		24	3	0
TAMBOO	3	2		23	2	0
KACHHI	8		24	75	350	14
KALAT	23	6	28	3271	390	89
KHUZDAR	24			331	100	27
KHARAN	18			63	20	86
LASBELLA	6			256	100	0
TURBAT	36			347	300	13
PANJGUR	11			88	700	145
GWADAR	9	2		7	0	0
PROVINCIAL TOTAL	316	20	90	8647	3190	791

Sources: - PHED, BIAD, GTZ, Irrigation Department and LGRDD (karezes).

TABLE 2.23b SOURCES OF WATER SUPPLY FOR RURAL HOUSEHOLDS IN BALOCHISTAN - 1988

DISTRICTS	1988 RURAL POPULATION (000)	PIPED WATER SCHEMES (percent)	COMMUNITY HAND PUMPS (percent)	IRRIGATION SOURCES		GRAVITY SCHEMES		CANALS RIVERS & PONDS (percent)	OPEN WELLS (percent)	TOTAL (percent)
				TUBEWELLS (percent)	DUG WELLS (percent)	SPRINGS (percent	KAREZES percent)			
QUETTA	96.3	86.7%	2.7%	4.5%	0.0%	0.0%	0.0%	0.0%	6.2%	100.1%
PISHIN	384.8	32.6%	0.0%	47.7%	2.3%	1.3%	7.5%	1.3%	7.3%	100.0%
CHAGHI	138.1	34.2%	0.0%	27.8%	4.8%	0.0%	23.9%	0.0%	9.4%	100.1%
LORALAI	473.7	19.3%	0.0%	6.9%	20.9%	10.6%	4.0%	10.6%	27.7%	100.0%
ZHOB	250.1	13.6%	0.0%	11.8%	3.3%	20.0%	11.4%	12.0%	27.9%	100.0%
QILA SAIFULLAH	178.4	10.9%	0.0%	16.5%	4.6%	11.2%	16.0%	11.2%	29.5%	100.0%
SIBI	72.4	63.0%	6.9%	8.7%	0.8%	2.8%	7.6%	2.8%	7.6%	100.0%
ZIARAT	39.2	0.8%	0.0%	15.7%	1.4%	12.8%	14.0%	12.8%	42.6%	100.0%
KOHLU	77.4	17.4%	0.0%	6.8%	1.8%	12.9%	5.2%	12.9%	42.9%	100.0%
DERA BUGTI	131.2	9.8%	0.0%	3.9%	1.0%	11.4%	2.7%	11.4%	59.7%	100.0%
JAFFARABAD	278.4	5.4%	0.0%	0.9%	0.1%	0.0%	0.0%	71.8%	21.7%	100.0%
TAMBOO	168.7	8.2%	0.0%	1.5%	0.1%	0.0%	0.0%	59.3%	30.9%	100.0%
KACHHI	317.0	12.9%	1.5%	2.6%	12.1%	3.2%	2.2%	47.3%	18.2%	100.0%
KALAT	422.5	18.5%	1.3%	26.0%	10.2%	1.2%	10.5%	0.0%	32.3%	100.0%
KHUZDAR	435.3	31.3%	0.0%	8.4%	2.5%	0.0%	3.1%	8.8%	45.9%	100.0%
KHARAN	139.3	15.9%	0.0%	5.0%	1.6%	0.0%	30.9%	0.0%	46.7%	100.0%
LASBELLA	173.1	21.2%	0.0%	16.3%	6.4%	0.0%	0.0%	11.6%	44.6%	100.0%
TURBAT	459.0	25.7%	0.0%	8.3%	7.2%	2.2%	10.9%	10.9%	34.8%	100.0%
PANJGUR	225.3	12.3%	0.0%	4.3%	34.2%	0.0%	32.2%	2.2%	14.8%	100.0%
GWADAR	75.0	51.6%	0.0%	1.0%	0.0%	0.0%	0.0%	13.3%	34.0%	100.0%
PROVINCIAL TOTAL	4535.2	22.1%	0.4%	12.9%	7.7%	4.0%	8.5%	15.7%	28.7%	100.0%

Source: Estimated by the consultants based on piped water schemes from PHED and BIAD, handpumps installed by GTZ, number of irrigation tubewells and open wells, and number of functioning karezes in each District.

Roughly 30% of the rural people get water from open wells but these sources may not be adequate in terms of quantity, quality, proximity and reliability. The remaining 15% of the population rely upon canals, rivers or ponds in which the quality of water is unacceptable for human consumption. Nonetheless, people are drinking this water untreated.

From an investment point of view, this crude analysis shows that there are several options for improving rural coverage that include protection of sources (springs, karezes and open wells), potential to install handpumps on open wells, and possibly better utilization of some irrigation schemes through the provision of community tanks. The 20% of the population with some access to irrigation water supplies are lower priority than the 15% of people using untreated surface water, particularly those that must travel long distances to fetch water.

Evaluation of Service Standards

The technologies in use were evaluated in terms of basic criteria to provide an adequate level of service. These were as follows:

- quantity: PHED schemes are designed for 10 gallons (45 litres)per capita per day; minimum acceptable requirements would be 5 gallons per capita per day for other systems (handpumps, covered wells, trucking of water to community tanks, etc);

- quality: It was assumed that the quality of water from tubewells or spring source was adequate, provided the source was protected (eg. covered). For dug wells and karez sources the quality of water was not considered to meet minimum acceptable standards unless the source was properly protected, which is rarely the case. Surface water sources were not acceptable unless treated. For groundwater sources, the maximum acceptable level for salinity is 1500 PPM;

- <u>distance:</u> Due to the small size of settlements in Balochistan, each being relatively compact, a point supply source within the village or within 150 meters of the village was considered to meet the minimum standard of acceptable service; and

- <u>reliability:</u> Water should be available to the community for several hours each day, either through the provision of continuous supply (handpump, gravity feed source, etc) or by supply to community tanks (from tubewells, or other delivery mechanisms). Water should also be available throughout the season and disruptions for scheduled maintenance should Back-up systems and replacement parts should be available to minimize the disruption period when mechanical problems occur.

Table 2.24 shows which of the existing technologies meet the above criteria and proposed technology modifications to satisfy these criteria in the future. Modifications are required to improve quality, reliability and convenience of supply. These are considered to be appropriate technology options based on technical capabilities, technical feasibilities, cost implications, and sustainability of systems.

Service standards vary from scheme to scheme and are subdivided as follows:

- House Connections
- Community Tanks
- Standposts

Table 2.24

SERVICE LEVELS PROVIDED BY VARIOUS TECHNOLOGIES

Technology Type	Quantity	Quality	Distance	Reliability
Existing Systems				
Piped Water Systems				
- Tubewells	**	**	**	*
- Open wells	*	0	*	*
- Springs	*	*	*	0
- Infiltration Gallery	**	*	*	*
Handpumps				
- bore holes	*	*	*	*
- dug well (covered)	*	*	*	*
Surface Water				
- untreated	**	0	*	*
- treated	**	*	*	*
Open wells	*	0	*	*
Karez	*	0	*	*
Rainwater ponds	0	0	*	0
Proposed Modifications				
Piped Water Systems				
- Covered dug wells with pumping	**	*	*	*

Covered dug wells	*	*	*	*
Karez improvement	*	?	*	*
Trucking to tanks	*	*	**	*

Codes - 0 - criteria not satisfied
- * - minimum criteria satisfied
- ** - minimum criteria exceeded
- ? - treatment may be needed

Source: Consultant´s assessment.

In case of house connections full coverage to all houses is generally assumed. In most cases all houses have not got yard connections and therefore the coverage cannot be assumed to be 100%. Moreover the supplies are generally for 1/2 to 1 hours in the morning and the same in the evening. At some of the schemes the supply is only once during 24 hours for 1/2 to 1 hours or so.

Supply and service standard through community tanks is better at places where the village is smaller. People get water supply for periods each day. When the source is a spring there is constant supply from it the overflow from the community tank is usually utilized for irrigating.

In case of standposts, a lot were found damaged, and their taps were missing In some of the PHED systems provided so many standposts that house connections would have been more cost effective. However, the would mean greater water consumption.

Recommendations for Rural Water Supply

There are several issues that were identified during the Inception Report phase. Further evaluation has focused on three issues and recommendations have been developed. These issues include:

- system design;
- operation and maintenance; and
- type of service demanded.

System Design

An assessment of the PHED piped water schemes revealed that designs could be improved in two areas:

avoidance of an overhead service reservoir wherever surface level reservoirs are feasible; and use of smaller pump sizes to keep discharges within the capacity of the tubewell.

Overhead surface reservoirs are costly, time consuming to construct, and present safety risks in areas with high seismic activity, such as Quetta valley. Surface reservoirs on elevated ground should be preferred, and there is evidence that PHED has adopted this policy in some areas. Where topography does not permit surface reservoirs without additional pumping, a decision should be made between a booster station which adds cost and complexity to operation versus the safety risk of an overhead surface reservoir.

Another option that has been investigated is direct pumping systems. Owing to the lack of reliable power supply, this type of system has not been generally considered viable. The lack of reliable electricity supply could be overcome by having a diesel motor to back up the electrical machinery. This option should be considered in larger villages and towns where long service hours are required.

Regarding pump sizes, PHED's current practice is to estimate the size of pump required, and then increase to the next largest size to provide a safety margin. The result is that most pumps on tubewells are between 20 and 30 HP. This results in higher equipment costs, lower operating efficiency, and in some cases adversely affects the tubewell operation, resulting in costly damages. PHED should initially install smaller pump sizes and allow for staging to expand the system with larger or additional pumps, to meet growing demands. Where capacity is limited, increased demand should be met by the installation of another tubewell.

Operation and Maintenance

The quality of operation and maintenance is not satisfactory for many schemes due to the lack of skilled operators and inadequate training support provided. As a result, operator errors have been noted as a major reason for costly repairs being required. PHED should set up a training programme for operators within each administrative circle. Most operators only have matric level education and receive minimum operator training. Operators still must be supervised occasionally by PHED, but staffing is limited and the burden for operating and maintenance essentially falls on the operators.

Type of Service Demanded

In Balochistan, people perceive that only piped water systems represent water supply. This perception may make it difficult for some people to accept alternate technologies, such as community hand pumps. People are quite willing to accept piped water supply to community tanks, although they naturally desire yard connections. PHED's new policy is to provide only community tanks, but yard connections could be provided if the community is willing to finance the additional cost. In Pushto speaking areas, the men have expressed greater insistence on yard connections to ensure privacy for their women. However, this feeling was not equally shared by the women. Since many of the Pathan communities have higher incomes, it may be possible to encourage community financing for yard connections.

Based on field investigations, it is recommended that standposts should not be promoted. Wherever standposts were used, there were problems of illegal connections, malfunctioning taps, and drainage problems. Standposts do not provide a system conducive to collection of water tariffs. Given the small size of villages in Balochistan, community tanks can provide water at a convenient distance and pose fewer drainage problems. Where a higher level of service can be paid for, yard connections are recommended for the majority (if not all) of households in the village, so as to prevent illegal connections that may ultimately affect the operation of the distribution system. The distribution system should be designed to accommodate further growth. Also, it is very important that proper drainage be provided, preferably within the yard (e.g soak-away pits or channelled to vegetable plots).

Community drainage systems are far too costly to install in rural villages of Balochistan and they are often ineffective due to low rainfall for flushing and blockages caused by sand and refuse.

2.4.2 Water Resource Development

Equipment

PHED at present has six straight rotary drilling rigs and one percussion rig. Five more straight rotary rigs have been ordered recently from Japan (subject to financing arrangements grants).

To develop their bore hole more effectively and efficiently, PHED should use turbine pumps. At present they are using air compressors, though one turbine pump is on order. They have only one set of Electrical Resistivity equipment but no testing laboratory. Therefore, water quality is only judged by electrical resistivity.

Tubewell Design

Proper tubewell design is a blend of hydraulic efficiency and economic efficiency of the well over its life span. It includes the selection of the site, the drilling method and the design of various components of the tubewell. The design of a tube well depends on the intended use, the desired capacity, the aquifer characteristics and the water quality.

In order to check the design criteria, efforts have been made to collect all the available data on the tubewells visited at various locations in Balochistan. The available data are shown is Table 2.25. The results of the evaluation of tubewell design is summarised below:

1. Selection of Tubewell Site

In Balochistan areal and vertical distribution of aquifers is limited and they usually grade into aquitards and aquicludes. It is, therefore,

Table 2.25 DATA OF PHED WATER SUPPLY TUBEWELLS VISITED IN QUETTA, PISHIN AND KALAT DISTRICTS

S. No	Name of Scheme	Design Discharge (Imp. gph)	Bore Hole: Drilling Method	Bore Hole: Dia. (Inch)	Bore Hole: Depth (Ft)	T/Well Depth (Ft)	Housing: Material	Housing: Diam. (Inch)	Housing: Length * (Feet)	Screen: Material	Screen: Diam. (Inch)	Screen: Length (Feet)	Slot Size (Inch)	Gravel Shrouding% 0.25 (Inch)	Gravel Shrouding% 0.125 (Inch)	Gravel Shrouding% 0.062 (Inch)	D & T Data	Static Water Level (Feet)	Pumping Water Level (Feet)	Draw-down (Feet)	Specific Capacity (Imp. gpm)	Pump: Type	Pump: H.P	Suction Head (Feet)	Primemover: Moter	Primemover: Diesel Engine
1	Sara Ghurki	5400	ST. R.		490		MS	10	270	MS	10	90	0.06				N.A.	97	132	35	2.57	SM		166-394	20	
2	Ahmad Khanzai		ST. R.								8	50					N.A.									
3	Killi Bungalzai	3000	ST. R.		600	560	MS	10	300	MS	8	50					N.A.	96	216	120	0.40					
4	Killi Qambrani	7000	ST. R.		475	281	PVC	10	124	PVC	10	90					N.A.	32	92	60	1.95				20	
5	Killi Sarda	10000	ST. R.	24			PVC	8		PVC							N.A.	90	130	40	4.18	T		250	25	
6	Panjpai		ST. R.				MS			LCG	10/	29+48					N.A.									
7	Killi Mohammad Khail	2200	ST. R.	15	380		MS	10	165	LCG	10	60	0.03		40	60	N.A.	56	100	44	0.84	M		350	20	
8	Karbala	4000	ST. R.	10	350	350	MS	10	318	MS	10	30					N.A.	32	140	108	0.62	T	16	200	30	
9	Chur Badezai		ST. R.														N.A.								20	
10	Lajmar	5500	ST. R.		320	386	PVC	10	100	PVC	10/	50+70					N.A.	95	130	35	2.63	M			20	
11	Gulistan Bazar	3600	ST. R.		500		MS			MS	10	110					N.A.	245	310	65	0.92				30	
12	Gulistan (Abandoned)	4000	ST. R.		320	310	PVC	10	180	PVC	10	120					N.A.	185	200	15	5.38			275		
13	Hyderzai /Mandan	3000	ST. R.				PVC	8	202	PVC	8	100					N.A.	100	200	100	0.50	T	16	200	25	
14	Yaru (Not visited)		ST. R.			519	MS	10	350	LCG	8	50			50	50	N.A.	80								
15	Killi Naik Mohammad	6000	ST. R.			435	MS	10	170	LCG	10/	20+30			40	60	N.A.	95	165	70	1.43				20	
16	Lore Karez	4500	ST. R.		540	300	MS	10	108	MS	10	80					N.A.	99	120	21	3.57	T	16	285	35	
17	Tringer (BIAD)	2500	ST. R.						360			70					N.A.	112	192	80	0.53		10	300	75	
18	Kirdgab		ST. R.														N.A.									20
19	Babri	2500	ST. R.														N.A.	50	185	135	0.31		8	270	8	
20	Khanai Baba	3960	ST. R.				MS	10		MS	10	115	0.06				N.A.	170	200	30	2.20	SM	40	500		
21	Dilsora	3600	ST. R.			310	MS	10	196	MS	10	88	0.06	40	60		N.A.	106	136	30	2.00	SM	25			
22	Churmian	6000	ST. R.			350	MS	10	194	MS	10	79	0.06				N.A.	63	173	110	0.91	SM	25			
23	Sharan Zamistan	4500	ST. R.				MS	8	244	LCG	8	80	0.06		40	60	N.A.	100	130	30	2.50	SM	25			
24	Balozai	5040	ST. R.				MS	10	275	MS	10	110	0.06	40	60		N.A.	165	205	40	2.10	SM	40			
25	Khanozai		ST. R.														N.A.					M			25	30
26	Maizai Adda ii		ST. R.														N.A.					T	25	350	40	
27	Maizai Adda i	6000	ST. R.								10	120					N.A.	85	180	95	1.05	T	30	320	30	
28	Huramzai	6000	ST. R.			300	PVC	10	80	PVC	10	110	0.06				N.A.	80	120	40	2.50	M	20	200	20	
29	Haikalzai	5400	ST. R.								10	30					N.A.	42	127	85	1.06	T	15	200	20	
30	Khudadzai	10000	ST. R.				PVC			PVC	10	50					N.A.	45	85	40	4.18		15	200	15	
31	Jungle Pir Alizai	5000	ST. R.	18	360	320	PVC	10	220	PVC	10	100					N.A.	48	190	142	0.58	M			25	
32	Killi Tharatt	3600	ST. R.					10	235	MS	10	93		30	70		N.A.	170	180	10	6.00	SM	30	400	30	

*	Below natural surface level	PVC	Polyvinyl Choloride	SB	Submersible Pump
St.R.	Straight Rotary	LCG	Low Cost Galvanised Steel	T	Turbine Pump
MS	Mild Steel	NA	Data not available	M	Monolift Pump (Austrailia)

advisable to select the tubewell site by performing electrical resistivity survey. One probe costs about Rs. 10,000 as compared to drilling costs of a tubewell of about Rs. 150,000. Perusal of the available subsurface lithological logs of some of the tubewells indicate their installation in aquicludes and accordingly their performance is very poor. For example, a tubewell at Killi Bungalzai has been installed in predominantly silty clay formation and its specific capacity is only 0.4 Imp. gpm/ft of drawdown. Moreover, over drilling of bore holes (i-e Lore Karez, Killi Qambrani) can also be avoided by conducting electrical resistivity survey.

2. <u>Drilling Method</u>

A conventional, direct mud rotary rig has been used for the installation of tubewells. The method is appropriate for the subsurface lithology underlying the various areas.

3. <u>Diameter and Depth of Bore Hole</u>

PHED tubewells are gravel packed. The screens used in these tubewells are of 8 inches and 10 inches diameters. For lowering of these screens bore holes of 16 inches and 18 inches diameter are required. Existing tubewells have normally been installed in 18 inches diameter bore holes, which are adequate, however, some 8" inch diameter screens (i-e tubewell for Killi Sarda) have been installed in 24 inch diameter bore holes which is not required.

Depth of bore hole depends upon the aquifer conditions and the desired capacity of the tubewell. Hence, knowledge of hydrogeology is necessary for the selection of depth of bore hole. Excessive drilling of some of the bore holes (i-e Lore Karez, Qambrani etc) indicates that no electrical resistivity survey was carried out at the site of the tubewell.

4. Tubewell Assembly

Public Health Engineering Department is using mild steel, low cost galvanised steel and PVC casings. PVC casings and screens are comparatively cheaper but are unable to withstand the periodic rehabilitation measures whenever necessary. Therefore, experience has shown that the use of metallic screens is more practical in the long run.

Diameter of housing pipe depends upon the discharge and hence on the size of the pumps bowls. Discharge of water supply tubewells of PHED schemes normally varies between 4000 to 10,000 Imp gph. Optimal size of housing for this range of discharges is as follows.

Discharge (Imp GPH)	Optimal size of Housing (inches)
4000 - 9000	8
8000 - 17500	10

Use of 10 inch diameter for discharge of less than 9000 Imp gph is also justifiable in some cases, where hydrogeologic conditions require a comparatively long housing pipe. PHED is using 8 inches and 10 inches diameter housings.

The most important component of the tubewell is the screen. Selection of its length, diameter and slot size depends upon the character of the aquifer, desired yield, grain size distribution and the desired service life of a production well. Slot size of a production well, installed in unconsolidated deposits, is designed on the bases of sieve analyses results of aquifer material. Data of sieve analyses are not available and, therefore, size of slot cannot be checked.

The optimum length of well screen is mainly based upon the desired yield, thickness and permeability of aquifer and desired service life of a tubewell. A study of actual case histories of production well failures, made by Walton in 1962, showed that well screens are more likely to be clogged by the grain size of the finer aquifer material. In general aquifers of low permeability are composed of finer-grained material than aquifers of the Permeability. In order to avoid migration of fine aquifer materials towards well screen the entrance velocity of water should be in occurrence with the hydraulic conductivity of the aquifer. In assessing the designs of PHED tubewells, Walton's 1962 criteria has been used.

The permeability of the aquifer is determined from aquifer test. In the absence of aquifer test, co-efficient of permeability "K" has been calculated by using specific capacity data of PHED water supply tubewells. The calculated values of "K" are generally less than 150 Imp. gpd/sq.ft. (Table. 2.26).

Small value of "K" may be due to silt and clay or improper development of tubewells. However, for preliminary assessment let us assume that "K" is less than 400 Imp gpd/sq./ft, for which optimum screen entrance velocity is 2 ft/mt. (Walton, 1962). Hence, screen for a tubewell of capacity 100 Imp gmp will be as follows:

Co-efficient of Permeability (Imp gpd/sq./ft)	Entrance Velocity (ft/mt)	Diameter (Inches)	Length of Screen (ft)		
			Open Area (%)		
< 400	2		10	15	28
		6	102	68	36
		8	77	51	28
		10	61	41	22

Perusal of the Table 2.27 indicates that lengths of screens are generally on the high side. Longer screens are good as these reduce entrance velocity and effect partial penetration of aquifer but may pose problems in the development of the tubewell.

Screens should be installed against the most productive formations. Exact location of these formations should be determined by conducting

Table 2.26 HYDRAULIC CONDUCTIVITY CALCULATED BY USING PHED WATER SUPPLY TUBEWELLS DATA (QUETTA, PISHIN & KALAT DISTRICTS)

S.No	Name of Water Supply Schemes	Discharge (Imp.GPM)	Static Water Level (Feet)	Pumping Level (Feet)	Drawdown (Feet)	Specific Capacity (Imp.gpm/ft)	T Imp gpd/ ft	Lenght of Screen (Ft)	K Imp gpd/ ft
1	Sara Ghurki	90	97	132	35	2.57	4750	90	53
2	Ahmad Khanzai							50	
3	Killi Bungalzai	50	96	216	120	0.40	740	50	15
4	Killi Qambrani	117	32	92	60	1.95	3600	90	40
5	Killi Sarda	167	90	130	40	4.18	7700		
6	Panjpai							77	
7	Killi Muhammad. Khail	37	56	100	44	0.84	1550	60	26
8	Karbala (Two Tubewells)	67	32	140	108	0.62	1150	30	39
9	Chur Badezai								
10	Lajwar	92	95	130	35	2.63	4850	120	40
11	Gulistan Bazar		245	310	65	0.92	1700	110	15
12	Gulistan (Abandoned)	80	185	200	15	5.33	9840	120	82
13	Hyderzai (Mandan)	50	100	200	100	0.50	920	100	9
14	Yaru (Not visited)		80					50	
15	Killi Naik Muhammad		95	165	70	1.43	2640	50	53
16	Lore Karez ii	75	99	120	21	3.57	6600	80	83
17	Dringar (BIAD)	42	112	192	80	0.53	980	70	14
18	Kirdgab								
19	Babri	42	50	185	135	0.31	570		
20	Khanai Baba	66	170	200	30	2.20	4060		
21	Ditsora	60	106	136	30	2.00	3700	88	42
22	Churmian	100	63	173	110	0.91	1680	79	21
23	Sharan Zamistan	75	100	130	30	2.50	4620	80	58
24	Balozai	84	165	205	40	2.10	3880	110	35
25	Khanozai								
26	Maizai Adda ii								
27	Maizai Adda i	100	85	180	95	1.05	1940	120	16
28	Huramzai	100	80	120	40	2.50	4620	110	42
29	Haikalzai	90	42	127	85	1.06	1950	30	65
30	Khudadzai at Haikalzai	167	45	85	40	4.18	7720	50	154
31	Jungle Pir Alizai	83	48	190	142	0.58	1070	100	11
32	Killi Tharatt	60	170	180	10	6.00	11080	93	119

Table 2.27

EFFECTIVE OPEN AREA AND ENTRANCE VELOCITY
OF PHED WATER TUBEWELLS VISITED IN QUETTA,
PISHIN AND KALAT DISTRICTS

S.No	Name of Water Supply Schemes	Designed Discharge (Imp.gpm)	Screen Material	Length of Screen (Ft)	Diameter of Screen (Inches)	O.A%	Effective open area (Sq.Ft)	Entrance Velocity (Ft/Mt)
1	Sara Ghurki	90	M.S.	90	10	10	11.78	1.23
2	Ahmad Khanzai			50	8			
3	Bungalzai	50	M.S.		80	10	5.24	1.53
4	Qambrani	117	P.V.C.	90	10	15	17.67	1.06
5	Killi Sarda	167	P.V.C.			15		
6	Panjpai		L.C.G.	77	1.25	30	26.47	
7	Killi Muhammad. Khail	100	L.C.G.	60	10	30	23.56	0.25
8	Karbala (Two Tubewells)	67	M.S.	30	10	10	3.93	2.73
9	Chur Badezai							
10	Lajwar	92	P.V.C.	120	1.25	15	20.80	0.71
11	Gulistan Bazar	60	M.S.	110		10	14.40	0.67
12	Gulistan (Abendoned)	80	P.V.C.	120	10	15	23.56	0.54
13	Hyderzai (Mandan)	50	P.V.C.	100	8	15	15.71	0.51
14	Yaru (Not visited)		L.C.G.	50	8	30	15.71	
15	Killi Naik Muhammad	100	L.C.G.	50	10	30	17.27	0.93
					8			
16	Lore Karez ii	75	M.S.	80	10	10	10.47	1.15
17	Trengar (BIAD)	42		70				
18	Kirdgab							
19	Babri	42						
20	Khanai Baba	66	M.S	115		10	15.05	0.70
21	Dilsora	60	M.S.	88	10	10	11.51	0.84
22	Churmian	100	M.S.	79	10	10	10.34	1.55
23	Sharan Zamistan	75	L.C.G.	80	8	30	25.12	0.48
24	Balozai	84	M.S.	110	10	10	14.40	0.94
25	Khanozai							
26	Maizai Adda ii							
27	Maizai Adda i	100		120				
28	Huramzai	100	P.V.C.	110	10	15	21.60	0.74
29	Haikalzai	90		30				
30	Khudadzai at Haikalzai	167	P.V.C.	50	10	15	9.82	2.73
31	Jungle Pir Alizai	83	P.V.C.	100	10	15	19.63	0.68
32	Killi Tharatt	60	M.S.	93	10	10	12.17	0.79

M.S = Mild Steel
P.V.C = Polyvinyle Choloride
L.C.G = Low Cost Galvanised Steel

well logging. Normally PHED does not perform well logging.

5. Gravel Shroud

In the absence of sieve analyses it is not possible to check requirements and the design of gravel pack. However, gravel from Mach area has been used as gravel shrouding which is almost 100 percent limestone. It may have adverse effect on the formation of conglomerations. Gravel shrouding should consist of clean, well rounded uniform size grains of sandstone. Calcareous material should not be more than 5 percent.

6. Development and Testing

As these tubewells are mainly drilled with a straight rotary rig by using bentonite as drilling fluid, the development and testing (D&T) should be initiated as soon as possible after the completion of the well. This will avoid formation of mud cake around the well which makes the development difficult and a time consuming job.
All the tubewells have been developed with an air compressor only. Final development and testing with turbine pump, which includes multiple step-drawdown test, has not been carried out. Without a multiple step-drawdown test data it is not possible to check whether the tubewells were developed properly or not.

7. Selection of Pump and Primemover

The selection of a pump should be based on the results of final development and testing with a turbine pump and "not on the basis of the development with a compressor". Development should be checked by performing multiple step-drawdown tests with a turbine pump. A pump selected on the results of incomplete development may cause high operation costs through out its life time.
Characteristics of the selected pump should meet the designed discharge and head requirement. The head should be calculated by considering the following:

- existing static water level;
- seasonal fluctuations of water table;
- general lowering of water table due to pumpage;
- deterioration of the well @ 25 percent;
- submergence of pump;
- uncertain drought conditions; and
- delivery head.

Conclusions & Recommendations

Review of available data and the study of problems (Table 2.28) encountered in PHED tubewells reveal that tubewells were not designed in accordance with hydrogeological conditions. Accordingly, their performance is poor. Performance of WASA tubewlls, which were designed and constructed under the supervision of NESPAK in Quetta Valley, were far better. Performance data of WASA, Quetta, tubewells are given in Table 2.29. Comparison of performance of WASA and PHED tubewells shows the importance of proper designing of tubewells. It is, therefore, recommended that PHED staff should receive training in evaluation of groundwater resources, well hydraulics, design of tubewell and well field.

Presently tubewell monitoring is not being carried out. Tubewell monitoring is essential to assess rehabilitation requirements in time. Monitoring of tubewells should be carried out systematically. Specific capacity tests should be carried out on each tubewell at least twice a year. Proper rehabilitation measures should be adopted when the specific capacity decreases by 25 percent. This will help in decreasing the operational cost and increasing the life of tubewells and thereby decreasing the requirement of new tubewells.

PHED Requirements

Fresh water is one of the basic necessities for the sustenance of life. Its requirement has ever been increasing and will continue to increase with the growth of population and socio-economic uplift. The

Table-2.28

PROBLEMS ENCOOUNTERED IN PHED WASUPPLY TUBEWLLS AND THEIR POSSIBLE REASONS
QUETTA, PISHIN AND KALAT DISTRICTS

S.No	Name of Water Supply Schemes	Sp. Cap (Imp/gpm/ft)	Problems	Reasons
1	2	3	4	5
1	Sara Ghurki	257.00	Suction Break(S.B)	May be due to lowering of water table
2	Ahmad Khanzai	NA	Water Brackish(W.B)	Tubewell installed in valley floor(V.F)
3	Bungalzai	0.40	W.B;Pumps silt	V.F;Slot seams not to be in accordance with the lithlolgy.
4	Qambrani	1.95	Over drilling 194 feet	Geophysical survey was not carried out
5	Killi Sarda	4.18		
6	Panjpai	NA		
7	Killi Muhammad. Khail	0.84	Pumps silt & V.F.Sand.	Slot size seems not to be in accordance with the aquifer
8	Karbala (Two Tubewells)	0.62		
9	Chur Badezai	NA		
10	Lajwar	2.63	Pump lifts water after 3 minutes running	May be due to some defect in the pumping unit
11	Gulistan Bazar	0.92		
12	Gulistan (Abendoned)	5.33	Dried up.	
13	Hyderzai (Mandan)	0.50	Motor burns due to S.B.	Tubewell siting not proper.
14	Yaru (Not visited)	NA		
15	Killi Naik Muhammad	1.43	Pumped silt after three months running	Water cleared after one days pumping which indicates that the tubewell was not developed properly.
16	Lore Karez ii(Abandoned)	3.57	Suction Break	Tubewell may be chocked.
17	Taringar (BIAD)	0.53	Discharge reduces after 3 minutes running & well vibrates on running	May be S.B. due to chocking of the t/well Tubewell's vibration indicates poor construction
18	Kirdgab	NA		
19	Babri	0.31	Water is saline.	Tubewell siting not proper.
20	Khanai Baba	2.20		
21	Dilsora	2.00		
22	Churmian	0.91		
23	Sharan Zamistan	2.50		
24	Balozai	2.10		
25	Khanozai	NA		
26	Maizai Adda i	NA	Tubewells are about 250	Distance betwenn the tubewells seems to
27	Maizai Adda ii	1.05	feet apart	be small.
28	Huramzai	2.50		
29	Haikalzai	1.06	Pumps silt on increasing pump setting depth.	Gravel shrounding & slot size seems not to be in accordance with the lithology.
30	Khudadzai at Haikalzai	4.18		
31	Jungle Pir Alizai	0.58		
32	Killi Tharatt	6.00		

N.B: voltage fluctuation problem is common
NA=Data not availabe

Table 2.29

OPTIMUM DISCHARGE OF TUBEWELLS IN QUETTA WATER SUPPLY PROJECT
BASED ON DEVELOPMENT AND TESTING DATA
(NESPAK)

S.No	Tubewell Numbers	Total Depth (Ft)	Static Water level (Ft)	Length of Housing Pipe (Ft)	Development and Testing Data			Available Drawdown (Ft)	Optimum Yield (Imp/gph)
					Maximum Tested Discharge (Imp gph)	Drawdown (Ft)	Specific capacity (Imp.gpm./ft of drawdown)		
1	2	3	4	5	6	7	8	9	10
1	S-1	649	180.50	434.70	32560	23.95	22.65	246	33,000
2	S-2	634	216.50	436.33	16940	164.04	1.72	210	16,500
3	S-3	647	150.92	369.08	22440	149.21	2.49	210	19,800
4	S-4	647	147.64	429.75	26180	97.77	4.46	279	27,500
5	N-1	616	219.82	318.25	8800	100.26	1.45	98	6,160
6	N-2A	492	160.76	351.71	12100	107.97	1.87	183	11,000
7	N-3	619	91.86	239.50	27060	105.51	4.27	131	19,800
8	N-4	313	42.65	313.32	15840	25.75	10.24	269	22,000
9	N-6	400	144.36	350.07	13640	146.59	1.54	200	11,000
10	N-7	354	91.86	342.85	9680	124.48	1.30	246	7,480
11	N-9	473	187.00	326.44	8360	109.61	1.27	134	6,160
12	N-10	405	134.50	348.43	16500	112.83	2.44	203	16,500
13	W-3	234	65.62	224.08	16500	30.28	9.08	223	16,500
14	Mariabad	457	134.51	308.40	32560	10.66	50.88	160	33,000
15	Pashtun-abad	550	210.00	397.01	27060	25.00	18.04	183	28,600

hydrogeologic conditions and limited recharge sources of Balochistan demand proper development and efficient management of groundwater resources for obtaining sustained yields from aquifers at comparatively economical cost and adequate quantity of suitable quality. Hence, PHED should be well equipped with sufficient number of rigs, compressors, turbine pumps, other equipment/tools drilling crew and professionals. The electrical and mechanical division of PHED (E&M) has 6 straight rotary and one percussion rig and is arranging 5 more rotary rigs. Reported progress is about 8 tubewells /rig/year. Progress is low because drilling by PHED is normally carried out in one shift only. Moreover, the workshop is located at Quetta and in case of major repairs rigs are to be shifted to Quetta. Limited number of crews is the major cause of low progress. Number of crews should be increased to facilitate drilling in two shifts at least. There should be separate crews for installation and for development and testing of tubewells.

With the addition of 5 rotary rigs, there will be 11 rotary rigs and one percussion rig with the division. To achieve reasonable progress and proper supervision of tubewell siting and installation, sufficient staff would be required. Existing and proposed staff requirements are listed below:

Designation	Sanctioned	Actual	Proposed
1. Senior Mechanical Engineer	1	1	1
2. Junior Mechanical Engineer	2	2	3
3. Chief Hydrogeologist	-	-	1
4. Senior Hydrogeo-logist	1	1	2
5. Junior Hydrogeo-logist	5	3	10
6. Geophysicist	1	-	3
7. Electrical Engineer	-	-	1

2.4.3 Human Waste Disposal in Rural Communities

Proper facilities for human Waste Disposal in rural Balochistan are practically non existent. Males and Children use open fields, while the women -folk use open surface latrines within the house or wait for darkness to go to the field, as the land is barren and does not offer any privacy during the day time. The lack of proper latrines is due to lack of demand which in turn is due to low income and education levels.

Estimates of coverage

There is no reliable data for the percentage of rural population using latrines. The 1988 World Bank Sector review quoted estimates of 25% and 35% coverage from survey conducted in 1973 and 1982-83, respectively but local officials feel these estimates are greatly overstated. These latrines would have all been privately constructed and their condition of operation is unknown today. PHED does not have any scheme for latrines. BIAD has implemented sanitation projects in 32 villages, including the installation of over 1500 latrines GTZ has also constructed a few dozen latrines in a couple of villages. No other agency has been actively constructing sanitation facilities in rural Balochistan, but private initiative has lead to some increase.

As part of the private sector study, householders were interviewed to establish the sanitary facilities being used by them. The household survey revealed that of a total of 3,395 Households, 300 had some sort of latrines (i.e. 8.8%).of these 155 had been constructed by Govt/foreign agencies, while the remaining 145 had been installed by the householders themselves.

If the open surface latrine is to be excluded, as it provides little in way of enhancing sanitation, then the percentage of households with proper (i.e. Vip/Pit/Pour Flush) latrines 5.5%, of which:

- Installed by households .9%
- Installed by Agency 4.6%

Table 2.30 gives the details of latrine coverage in the surveyed villages.

Table 2.30 **LATRINE COVERAGE IN SELECTED VILLAGES**

District	Village	Total No.of Households	Households with Latrines	Latrine Type	Ins-talled By
Kachhi	Killi Musa Khan	40	15	VIP	P.German
	Mushkaf	300	60	Pour Flush	BIAD
Kalat	Karez Noth	200	30	"	BIAD
	Mastung Rd.	150	20	"	BIAD
	Ghousabad	200	-	-	
	Umardore	200	30	"	BIAD
	Dasht-e-Gombela	70	-		
Chagai	Pishuk	15	-	-	
	Anum Bostan	200	-	-	
	K. Badl-Khan	150	1	"	H/H
	Killi Noor Mohammed	50	-	-	
Kharan	Patak	50	50	-	-
Turbat	Dunnok	200	20		
	Bhaman	100	10		
Sarikan		350	35	Charki	H/Hs
	Chitkan	300	30		
	Zandaydaz	200	20		
Qilla	Loi Karez	40	-	-	
Saifullah	Kam Karez	50	-	Pour-	House
	Nasai	80	4	Flush	Holders
Pishin	Chawkal	250	-		
	Faizabad	200	5	Pour Flush 20 Dry Pit	House Holders

Summary:

- 22 villages in 8 Districts were surveyed.
- 3395 households in villages surveyed.
- 300 households had latrines:

  . 150 pour flush;
  . 15 VIP
  . remainder were dry pit;
  . the latrine installation;
  . 15 Pak-German; and
  . 140 BIAD.

Nearly all the Householders who had proper pour flush latrines constructed by their own initiative and money were either councillors or the few rich villagers. And even these had been constructed primarily in the vicinity of their rooms and not for their daily use.

If the result of the private sector survey are extended across the whole province, the following coverage percentage (as per type of service) emerges:

	Men	Women and Children
Pour Flush Latrines*	1.5	1.5
VIP Latrines	0.5	0.5
Pit Latrines	0.5	0.5
Surface Latrines	2.5	2.5
Defecation Area **	0.0	14.0
Fields	94.0	80.0

* This is based on 1% of all private householders having a pour flush latrine installed on their own initiative plus 2000 PF latrines having been constructed by agencies.

** Percentage estimated.

Types of Facilities Used their Evaluation & Costs.

Several types of facilities were identified in Balochistan. They vary depending upon social practices, incomes (social status), and education of the population.

Pour - Flush Latrines

These have been introduced recently by foreign donor agencies and BIAD. The requirement for water usually means latrines are installed in villages with convenient water supply, such as piped water schemes or to standposts. This type of facility has also been installed in some schools.

The Pour Flush Latrine is a hygiene and satisfactory method of excreta disposal provided a reliable water supply exists.

V.I.P. Latrines

BIAD and the Pak-German Self Help Programme have been responsible for the installation of these latrines.

If a VIP latrine is not installed or maintained properly, i.e. if the ventilation pipe is not high enough; or householders are not educated in its usage, it leads to foul odour permeating the household.

Pit Latrines

It was also observed that numerous simple pit latrines have been installed privately by villagers. The top of some of these latrines are not covered, (with a concrete or wooden slab)and many people especially children from fear of falling in do not use them. These latrines also suffer from bad odour due to lack of proper ventilation.

Surface Latrines

Some households have constructed compounds with 4 foot boundary walls for privacy but without disposal mechanisms (no pit or vault). Thus the excreta has be removed frequently. These latrines are used by women and children.

Excreta removed from these latrines is frequently thrown out on to the streets, causing health hazards and the growth of flies, which in turn leads to contamination.

Defecation Area

In many compounds, certain areas are designated for defecation beside walls or in courtyards frequented by animals. The excreta is simply left to decay naturally.

This system is extremely unsatisfactory as excreta is left inside the house, putting the householders especially children at great risk of contamination.

Fields

Most men go to fields for defecation. This is seen as a natural and socially acceptable norm. In rural areas, it often provides the greatest convenience.

It is also more hygienic than surface latrines and defecation areas inside the house. Though it could be unsafe at night, as there is always a risk that excreta can be brought in advertently by stepping in it.

Associated Facilities

The more recently constructed pour-flush or VIP latrines often have washing areas associated with them for bathing. For other types, no special facilities were provided next to the area for defecation.

Costs

The approximate costs of the above technologies (excluding super structure costs) are as follows:

Pour Flush Latrine	Rs. 2000
VIP. Latrine	Rs. 1500
PIT Latrine	Rs. 700
Surface Latrine/ Defecation area	NIL } as only superstructure costs apply.

2.4.4 Sanitation and Drainage

Description of Conditions

Throughout Balochistan, the conditions of sanitation and drainage in rural villages is very poor and neglected. The sanitary situation for villages with a water supply is often much worse because drainage systems are not adequate for disposal of sullage. This stems from the villages not originally being concerned with drainage for storm water due to low amounts of precipitation, high evaporation, and/or good natural drainage or infiltration. The need for drainage is still not felt, either by the villagers or by the government. However, the state of sanitary conditions is poor and could be improved with simple low cost solutions. What is needed is education to make villagers aware of the health hazards of unsanitary conditions. Secondly, villagers need to be informed as to what solutions exist for improving their situation. For example, an LGRDD engineer could explain where to locate disposal sites, how to construct these sites, how to construct soak pits, and how to improve drainage channels in the village. The villagers could manage all of these requirements themselves with some supervision and a small amount of training. All material and labour costs could be borne by the community. But before the communities are willing to participate, they must be made aware of the health benefits.

In Balochistan, a distinction has to be made with respect to sanitary conditions within the villages and within the house compound. In most villages, roughly 50 percent of the land area is devoted to open spaces within these compounds. These compounds are used for vegetable plots, livestock pens, cooking and bathing areas, play areas for children and work areas for women. In the Pathan ethnic areas, women spend most of their time within these compounds.

The condition of the compounds depends upon two factors -- the type of system used for human waste disposal, and the availability of a water supply within the compound. In the vast majority of cases very rudimentary methods are used, meaning that human wastes are not properly disposed. Also, when piped water is introduced to the compound, the sullage water is poorly handled. If the sullage water is channelled outside the compound, there is no concern for its drainage through the rest of the village.

Conclusions

PHED is not actively involved in rural sanitation and drainage schemes. Drainage canals primarily include crude ditches dug by local people to improve the natural drainage conditions. The low population density and small size of villages, combined with low precipitation, high evaporation, and hilly terrain alleviate the need for large civil works for drainage in most parts of Balochistan. The only area where drainage is a concern is in Nasirabad which is situated on the Indus Plain and which is served by an extensive system of irrigation canals.

2.4.5 Health and Hygiene Education

Health Conditions Relating to Water Supply, Sanitation and Drainage

The quantity and quality of water supply and sanitation facilities, combined with people's water use, human waste disposal and hygiene habits are fundamental determinants of health. It is within this context that health concerns are considered, rather than focusing on all health issues.

The primary water and sanitation related diseases include diarrhoea, worm infections, poliomyelitis, hepatitis A, malaria, and skin and eye infections. The improvement of water availability, water quality, drainage of waste water, and disposal of human excreta can contribute to improved health standards.

In rural Balochistan, all of the above diseases are prevalent and widespread. However, it is difficult to measure the present health status accurately because data are lacking and the quality of measurements that are available are very crude. Even when good indicators are available, it is difficult to determine the degree of impact for each possible cause. As a result, it is also hard to assess the health benefits once water and sanitation programmes are implemented. However, it is widely acknowledge that proper use of water and good hygiene are essential before major improvements in health can be realized. Most of the rural population lacks the knowledge or awareness of the link between hygiene and disease. Micro-organisms move from person to person in water, in food, on the hands, or on other objects that get contaminated with faeces which in turn get passed into the mouth the "faecal-oral transmission route". Breaking this chain is a requirement for reducing the occurrence of these diseases.

Diarrhoea is by far the most important cause of illness and death, particularly of children, that stems from inadequate water and sanitation. The incidence of diarrhoea is therefore used as the primary indicator of water and sanitation related health status. Diarrhoea is defined as three or more watery stools per day. Almost all diarrhoea is caused by indigestion of one of three kinds of micro-organisms -- bacteria, viruses, or protozoa. Viral causes tend to be important in the colder areas of Balochistan where as in the other parts of the province bacteria is the main cause. In a 120 bed paediatric ward in Quetta, Dr. M. Rafique has recorded the relative number of gastrointestinal track diseases (virtually all diarrhoea) as a proportion of all admissions and deaths of children over a 12 year period. Diarrhoea related deaths accounted for 45% of all deaths, and diarrhoea as a proportion of all admissions has risen from 44% to 54% in the last few years. These figures have an urban bias, but they are useful to confirm the importance of diarrhoea in Balochistan.

In 1984 the Pakistan Demographic Survey was conducted by the Federal Bureau of Statistics. Sample surveys were made of urban and rural clusters. In Balochistan, the survey included 15 urban clusters, of which 553 households were surveyed, and 22 rural clusters, of which 817 households were sampled. The results are presented as follows:

Mortality	Pakistan	Rural Pakistan	Balochistan
	Occurrence per thousand		
Crude death rate	11.8	13.1	16.6
Infant mortality	126.7	135.2	219.4
Neo-natal mortality	70.0	78.3	85.7
Post neo-natal mortality (2nd-12th months)	56.7	56.9	133.7

Although the sample sizes are small, these figures clearly indicate that health conditions in Balochistan are significantly worse than the rest of Pakistan, even rural Pakistan. Infant mortality is 70-80% higher in Balochistan than in the rest of the country. Neo-natal mortality is only slightly higher than national figures while post neo-natal mortality is 2.5 times higher. This may be due to breast-feeding habits, the harsh conditions experienced by a poor population which has a greater impact on infants, or the lower quality of facilities and poor access to them. Since this survey, slightly lower estimates of the infant mortality rate for Pakistan have been made:

- World Bank (1987) 105/1000
- UNICEF (1987) 115/1000
- Government of Pakistan (1988) 80/1000

Hygiene Practices and Taboos

Though variations in practice, perceptions and belief related to water and sanitation exist among the different ethno-geographic zones in Balochistan, some similarities on some major aspects of health determining behaviour can also be identified. Field surveys were conducted by the consultants to try to verify existing information on health and hygiene practices. The size of the samples does not permit scientific analysis but some important practices were confirmed along with other interesting findings.

It has been observed that rural families generally live in unhygienic conditions. Almost all the mothers interviewed reported diarrhoea as the most common disease among their children under the age of 5 years, other disease reported are cholera, typhoid, measles, worms, fever, evil shadow lit and skin disease). Also frequency of death among children under the age of 5 years seems to be high. More than 75% of all women interviewed reported child mortality and the average child mortality per mother seems to be two. Compared with other provinces more mothers reported causes of death of their offspring and the disease mentioned are diarrhoea, fever, measles and symptoms of dehydration and evil shadow. However, a remarkably high level of awareness prevails among rural women on matters related to health; for instance, most of the mothers know that polluted water may cause disease and also know the water borne disease. They are also aware of the causes of fever and diarrhoea among children under the age of 5 years. But dehydration and its various symptoms are not associated with diarrhoea and therefore, its causes and treatment both are attributed to supernatural powers (i.e. evil shadow).

The survey results show that knowledge is not reflected in practices. For example, most of the mothers do not report washing of hands after defecation and none after cleaning of baby´s feazes. Bottle feeding is also quite common in rural areas especially for male children among the financially better off families. Either formula milk or goal´s milk is prepared in the bottle with greeks delation or younger babies. Despite the reported awareness of many mothers regarding the causes of diarrhoea and other diseases, that water for Formula preparation is generally not boiled.

This discrepancy between knowledge and practice may be explained by two factors: environmental conditions such as scarcity of water and of clean water; and due to local beliefs about the causes of dehydration and perceptions about proper handling of excreta. Although the smell of adult human excreta may be considered a taboo, excreta itself may not be. Child faces is considered harmless and no efforts are made to avoid it. Both human and cattle excreta is used in the fields as fertilizer. Some animal excreta is used as fuel for cooking and is also considered to possess healing qualities and is applied on injuries and on the infant´s umbilical cord at birth.

As regards medical facilities and their utilization none of the respondents reported use of a government facility though most of the villages surveyed had access to a B.H.U. Almost all the mothers reported utilization of a private doctor's services, actually often dispensers whenever children suffer from fever or diarrhoea. These dispensers are also the major source of information on health related matters for rural women. There does not seem to be any "purdah" restriction on contact with real health workers. Most of the women who know about O.R.S., immunization and even about formula milk have learnt it from health workers. Only in Chagai and Kachhi was information about immunization and O.R.S.provided by the mobile teams. However in cases of dehydration and its symptoms a doctor is rarely consulted. The child is treated by elder women for shrunken pallet and fallen fontanelle (Talu girna). In Zhob, mothers consult Molvi for most of the symptoms of dehydration except for "talu Girna" which is treated by elder women. In Ziarat, Sibi, Panjgur and Qilla Saifullah "Pirs" (religious divines) are consulted whereas in Chagai, Zhob and Khuzdar it is the Molvi. The Pir and the Moulvi both treat the symptoms of dehydration by giving amulets or other folk religious methods.

Assessment of Hygiene Education Approaches

Hygiene education is lacking in the formal education system of Balochistan. Very basic hygiene (usually related to religious habits) is taught at the primary or mosque school level but most schools are without latrines and many are not served with water. Hygiene may improve with higher levels of education but the high drop-out rate, particularly for girls, means the majority of the rural population receives little hygiene education and even fewer have the knowledge to understand hygiene problems.

The Department of Health has hygiene education as part of their mandate but most of the financial and human resources are devoted to curative treatment. The staff at the local level is scarce and not well trained to give adequate hygiene education. The greatest achievements in hygiene education have come from UNICEF, BIAD, and more recently the Pak-German

Self-Help project.

Since its inception in 1981, BIAD has extended its programme into four areas of the province, reaching 25 clusters with 63 villages and a population of 46,800. BIAD has twelve mobile teams, each consisting of a Community Development Officer, two female para-medics responsible for community health promotion, one sanitarian, and one lady teacher. Health and hygiene promotion are a major component of their work which is delivered one to one to mothers by the female team members. This education has been integrated with the provision of water supply, drainage and latrines.

UNICEF has spent some of its resources on developing a series of health education materials, including visuals on home solution Oral Rehydration Solution and other topics.

2.5 Assessment of ADP Programmes

2.5.1 Resource Allocations Amongst Sub-Sectors

The financial resources available in the sector are discussed in Section 2.3. The purpose of this section is to summarize the implications for future investment planning. These are described separately for PHED, LGRDD, Health, SDP funds and internal financing by local councils.

PHED Development Budget

PHED is in the unusual situation that ADP allocations are increasing rapidly, since the department was bifurcated from the Irrigation Department. Political pressure has swung strongly in favour of water supply schemes and a constant stream of demands is being made by village leaders and politicians.

For the 1989/90 development budget, allocations to PHED have increased 25 percent in real terms, whereas the total provincial ADP has increased only 2 percent. As noted previously in section 6.2.2, PHED has limited capabilities to implement increased development plans. Also the vast majority (80%) of funds are for new schemes, while increasing demands for improvement and rehabilitation of existing schemes are only partially met. Additional funding is required to meet these needs but PHED must also be strengthened to keep pace with the increased burden.

LGRDD Development Budget

LGRDD has a relatively small development budget, given their broad mandate in rural Balochistan. Rural development received an expanding profile during the Sixth Five Year Plan but priorities have shifted, resulting in a stagnation in the level of development funds. This situation can change rapidly with political interventions, such as the MPA Funds and Chief Minister's Fund. Approximately 70 to 75 percent of LGRDD development funds (Rs 50 to 55 million in 1988/89) are channelled through the District and Union Councils via grants. Another 15 percent is granted to Urban Councils. The remainder of funds are allocated to individual schemes and to the Rural Development Academy. Rural water supply schemes are supposed to account for 20 percent of total development expenditures of LGRDD.

The present system of allocations results in a very wide dispersement of funds, with the result that very small finances are available for individual schemes (often Rs. 10,000 to 50,000). This minimizes LGRDD's ability to affect major changes in rural development. The options to resolve this problem are to increase funding through special programmes in the ADP allocations, increase funding through Donors, or increase community financing.

Health Department

The Health Department receives an annual development budget in the range of Rs 100 to 120 million. Virtually all funds are used for the construction of new health facilities. For this reason, the allocation of funds only contribute indirectly to opportunities for hygiene education. Specific efforts will be needed to channel some funding into preventative health care, but the short term prospects of this are dubious given the immense demand for curative facilities such as hospitals, rural health centres, basic health units, etc.

2.5.2 Current Implementation Strategies for Water Supply

The present policies adopted by the Annual Development Programme (ADP) for water supply schemes is to firstly develop the source and secondly to provide water to the villages based on community tanks. The first policy has been adopted to prevent schemes from being constructed before an adequate source is located. In the past, some tubewells were found to be insufficient to meet the design parameters and new sources had to be developed to augment or replace the original source. This resulted in additional costs for developing the new source, possibly the duplication of storage reservoirs, and additional transmission pipes to connect the old and new sources. The second policy was adopted in order to reduce the cost of new schemes, thereby enabling a greater number of schemes to implemented with the limited amount of financial resources. This policy has appeased political wishes but has created some negative ramifications, as discussed below.

Service Standards

The Government of Balochistan has opted to provide piped water supplies to the majority of the rural population. This has been based on the knowledge that most groundwater is quite deep and requires expensive methods to extract, particularly in areas with low population density. The government has now made a compromise by providing only community tanks rather than complete distribution systems. The rationale is that the cost of providing water supply is significantly less which enables PHED to meet the needs of more people each year.

The major result of this policy change has been to discontinue the widespread use of overhead storage reservoirs which were very costly and time consuming to construct. However, this design change does permit relatively simple upgrading to standposts and house connections. At present, the provision of community tanks is an adequate level of service in smaller villages. In time, the larger villages could receive upgraded service but this should be implemented with cost recovery policies. Adequate cost recovery policies and collection mechanisms are not currently in place, therefore the provision of only community tanks is justifiable for the short term.

Investment Strategy

The present ADP for 1989/90 has included 90 ongoing schemes (including 23 schemes that were never completed) that comprise Rs 111 million investment and 147 new schemes that cost Rs 238 million to complete but for which only Rs 81 million is available in the current budget year. This year's plan was formulated by developing a list of desired new schemes in addition to ongoing schemes that still require funding for completion. Funds are first allocated to the ongoing schemes in an attempt to complete them in the current year. This is generally feasible with the exception of the occasional large scheme that may take several years to complete; the majority of PHED schemes can be completed within one or two years. The remaining funds are then allocated to new schemes. However, rather than reducing the number of schemes to suit the availability of resources, the P & D Department opted to maintain virtually the entire list of desired schemes but reduced the amount of funding provided to each scheme for the current year. Thus only 34% of the required funds were allocated to the new schemes, meaning that they will not be completed for two to three years. Assuming that all ongoing and new schemes are completed at a normal rate of implementation, Rs 155 million would be required in the 1990/91 budget. Based on this year's level of total investment (Rs 200 million for rural water supply schemes), only Rs 45 million would be available for new schemes. A decision would be required to:

- reduce the amount of funding to ongoing schemes to enable new schemes to be started (this would stretch the construction periods for ongoing schemes, resulting in dissatisfied beneficiaries and likely higher costs);

- restrict the number of new schemes until the backlog of ongoing schemes is completed; and

- increase the amount of funding to satisfy the desired number of ongoing and new schemes (this solution was adopted for the 1989/90 budget).

A equally important concern is the implication of this investment strategy upon PHED's recurring budget. As discussed in Section 2.3.2, PHED's annual cost of operating water supply schemes is going to increase dramatically and a decision must be made to allocate more financing, reduce the cost of operations (including staffing), increase revenue collection or hand over the responsibility to communities.

Coverage

The present strategy for rural water supply schemes is to increase coverage at the rate of 5% or roughly 225,000 people per annum. For rural areas, the present levels of investment by PHED would increase coverage from 25% in 1989 to 65% by 1998. At present, an additional Rs. 25 million is available from PHED for rehabilitation, extension and improvement and another Rs. 50 million is available for water supply through LGRDD, the Valley Development Project and the Rapid Development Programme. If these funds are properly utilized, the rural coverage of 70 to 75% could be achieved by 1998.

The future rural coverage will be influenced by the allocation of funds between rural and urban schemes. Although urban coverage figures are reasonably high, the quality of service demanded is higher (house connections, higher consumption levels, more continuous service, and better drainage) and substantial investments will still be needed in urban areas for the next two decades. Given the financial resource constraints, this could result in slower progress for rural water supply. At present, the policy favours investment in rural areas by a factor of 3 to 1. It should be noted that other agencies like WASA are making investments strictly in urban areas.

Institutional Capabilities

The implication of these investment decisions is that the development plan is exceeding PHED's capabilities for implementation. This year PHED must develop 211 new sources of which 180 will be based on tubewells. PHED currently operates 7 drilling rigs but due to the difficult terrain, complexity of groundwater aquifers and vast area to be covered, the completion rate has only been 50 producing wells per year. Therefore, PHED will have to rely on other departments or the private sector to develop the other sources. WAPDA and the Irrigation Department have provided drilling services previously but they are reluctant to drill wells for PHED because their rigs are fully deployed. PHED has been reluctant to contract work to the private sector because the quoted rates are reportedly much higher.

Another problem relates to the number of proposed schemes that have to be managed by PHED staff. On average, each Executive Engineer is responsible for 15 to 20 schemes each year. With assistance from two or three Sub-Divisional Officers, the Executive Engineer has to finalize PC-I's, prepare bid documents, review designs and tender documents, award tenders and monitor construction. This is in addition to the supervision of operations, maintenance and repairs for existing water supply schemes (on average there are 35 schemes per Executive Engineer or 13 schemes per Sub-Divisional Officer). The result is that less time can be devoted to each scheme which may lead to implementation problems.

Community Involvement

Traditionally, communities have not been involved in the decision-making or implementation stages of PHED water supply schemes. Since the schemes are to be operated by PHED staff, there has been no attempt to approach the communities regarding operation and maintenance or cost recovery, other than charges and tariffs for house connections. Given the increased rate of implementation and the constraints on PHED staff, it is not possible to foresee more community involvement unless new staffing and implementation methods are accepted within PHED.

2.5.3 Project Selection Criteria for PHED Water Supply Schemes

In order to appreciate the process by which new water supply schemes are selected, it is necessary to understand the approval procedures. Figure 2.16 shows the steps for approval for PHED schemes. In this process, the needs are expressed by the local people (often influential leaders) with varying degrees of political support. If the request receives preliminary approval for consideration, the appropriate PHED staff member (depending upon the size of the scheme) will prepare a feasibility study. For most of the smaller schemes, this includes a field reconnaissance by the Sub-Divisional Officer from that area. Based on this report, the proposal goes up through the departments hierarchy and is eventually passed to the Planning & Development Department. Up to this stage, there has been no macro or district planning criteria applied. The Planning & Development Department has the responsibility to approve new schemes and determine the allocation of funding to ongoing and new schemes. In this manner, they can approve most schemes on the recommendation of PHED but they can also control the amount of funding to each district.

Table 2.31 shows District wise allocation of funding for rural water supply schemes during the 1988/89 and 1989/90 development programmes. Based on the widespread needs for water supply and the need to appease political pressure groups, it would appear that the Planning & Development Department has maintained a reasonably equitable and appropriate allocation (refer to the comparison of percentage share by District in Table 2.31. There are some exceptions such as greater investment in Quetta and Kachhi but these are due to two large projects involving numerous villages. The Districts that appear to have lesser amounts than expected include Zhob, Jafarabad, Khuzdar, Turbat and

Figure.2.16 **PHED SCHEMES-APPROVAL PROCEDURE**

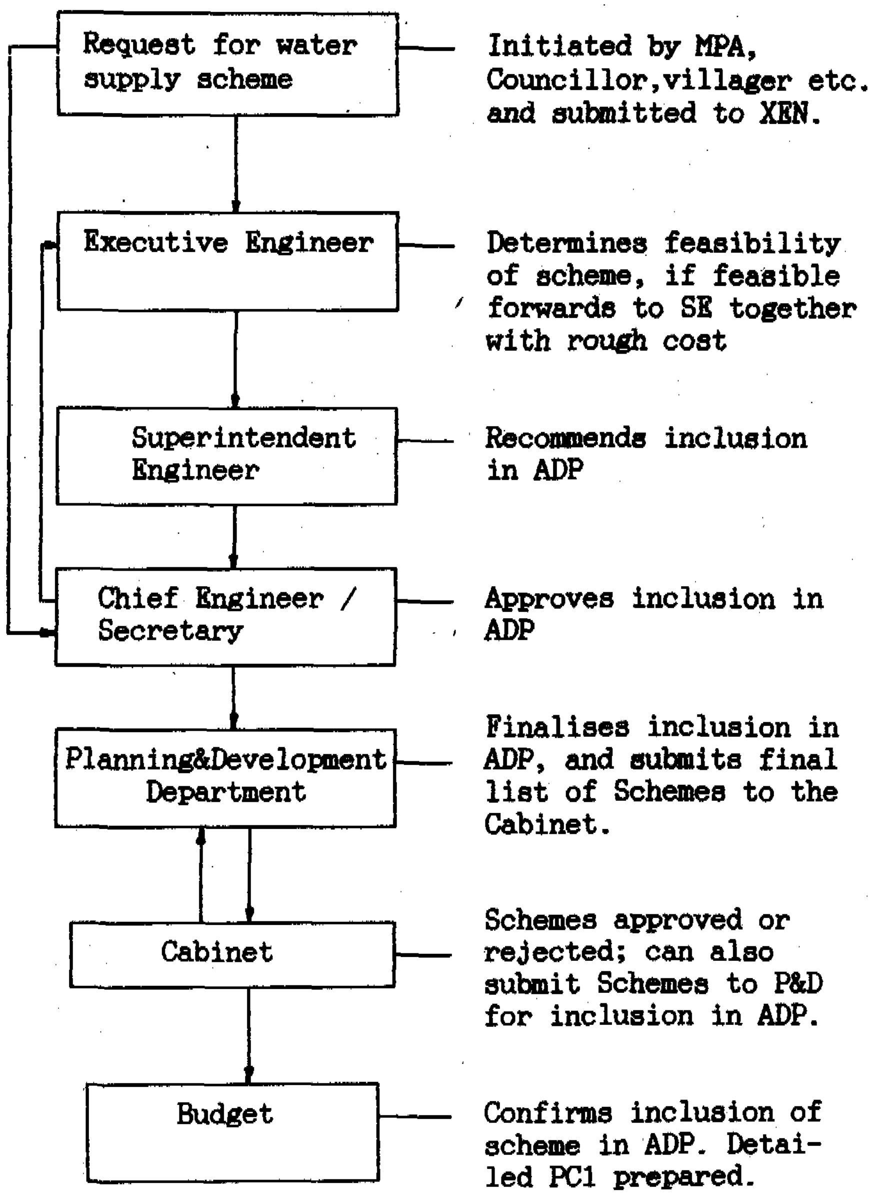


Table 2.31 DISTRICT WISE ALLOCATION FOR PHED SCHEMES DURING 1988-89 AND 1989-90

Districts	Number of Schemes	Total Investment (Rs.million)	Sh.of Total	Share of uncovered population	Share based 50% on popul. 50% on Districts
Quetta	14	24.1	9.7%	0.4%	3.6%
Pishin	24	24.1	9.7%	7.3%	6.7%
Chagai	7	8.9	3.6%	2.6%	4.0%
Loralai	28	25.3	10.2%	10.8%	7.7%
Zhob	12	7.5	3.0%	6.1%	5.3%
Q. Saifullah	12	10.0	4.0%	4.5%	4.5%
Sibi	8	8.8	3.5%	0.8%	3.3%
Ziarat	6	4.1	1.7%	1.1%	2.9%
Kohlu	6	2.5	1.0%	1.8%	3.4%
Dera Bugti	5	4.0	1.6%	3.3%	3.9%
Jaffarabad	7	9.6	3.9%	7.5%	5.6%
Tamboo	12	11.5	4.6%	4.4%	4.4%
Kachhi	8	33.6	13.5%	7.8%	6.0%
Kalat	17	20.9	8.4%	9.7%	7.2%
Khuzdar	8	6.5	2.6%	8.5%	7.3%
Kharan	8	13.8	5.6%	3.3%	4.0%
Lasbella	13	14.2	5.7%	3.9%	4.4%
Turbat	11	9.9	4.0%	9.6%	7.6%
Panjgur	6	6.0	2.4%	5.6%	5.0%
Gwadar	3	2.7	1.1%	1.0%	3.3%
Total	215	248.0	100%	100%	100%

* (excludes block allocations of Rs 45 million for all Districts)

** Funding for water supply in also provided from the valley Development Project (estimated at Rs 10 million communally).

Source: Annual Development Programmes, Planning & Development Department.

Panjgur. These are characterized by large populations but in more remote areas that present development constraints (e.g. lack of good roads and electrification). In Jafarabad, the needs are greater but the solutions are difficult and costly due to the lack of groundwater resources.

Recommendations for Selection Criteria

In Balochistan, the most important criteria is needs which should be based upon the uncovered population per District (in absolute and proportionate terms), the level of existing service (in terms of access, quantity, quality and reliability of supply) and the relative cost of technology options (operating and maintenance costs as well as capital cost should be considered). Other criteria that should influence project selection include the level of economic development (and development potential with the new scheme), cooperation from the beneficiaries (including potential for community participation), availability of other funding sources (via donor agencies or special projects), and political support from all levels.

Using these criteria and based on data collection and field surveys, the consultant has derived the following groupings of priority Districts:

- Very high priority - Panjgur, Zhob, Qilla Saifullah
- High priority - Loralai, Kohlu, Kachhi, Ziarat, Kharan, Jafarabad, Kalat, Khuzdar, Turbat, Chagai, Lasbella
- Medium priority - Dera Bugti, Tamboo, Pishin
- Lower priority - Sibi, Gwadar, Quetta

2.5.4 Political Feasibility

The investment plan and implementation policies must receive specific support from politicians and bureaucrats. Policy decisions that have strong support should proceed quickly, while others may have to be modified and a slower approach taken to bring about changes. Table 2.32

provides a list of issues that were discussed with senior level government officials and politicians. In general, moderate to strong support was found for several key issues including community involvement, institutional strengthening and cost recovery.

Conclusions

These findings indicate strong awareness for sector issues and a recognition that change must take place to improve the implementation of water supply schemes. It is realized that the government must bear a large share of the burden in order to satisfy these basic needs. Political pressure to support the sector financially is very strong. The long term burden on the government is an issue that tends to be ignored by short term objectives, but there is acceptance that changes should be phased in slowly. This provides a suitable mandate for the Investment Strategies proposed in Section 4.

2.5.5 Recurring Budget Implications / Cost Recovery

The issue of recurring budget constraints relate essentially to water supply and only to PHED. LGRDD is not normally involved in the operation and maintenance of water supply schemes as they are small and typically given to the beneficiaries to maintain.

Existing Policies for Operations and Maintenance

PHED has an annual operating budget in the order of Rs 95 million, of which half is for administration costs for 100 officers and 2300 support staff) and half of the cost is for the running and maintenance of water supply schemes (urban and rural).

Table 2.32 **POLITICAL FEASIBILITY OF INITIATIVES**

Key Issues	Government Bureaucracy(Senior)	Politicians
1.Priorities		
. Water Supply	strong support	strong support
. Sanitation and Drainage	little support	little support
. Hygiene	supportive but limited funds	no comment
. Education	strong support	strong support
2.Cost Recovery		
. Capital cost	some support	little support
. O&M cost	strong support	supportive
3.Revenue collection		
. Local councils	little support unless strengthened	no comment
. Line departments	some support	no comment
. Villagers	support for long term	no comment
4.Community participation		
. Planning	strong support	strong support
. Implementation	moderate support	moderate support
. Operations	less support	no comment
5.Institution Strengthening		
. Line departments	strong support	strong support
. Local councils	strong support	strong support
. New agencies	no support	no support
. Village organizations	some support	uncertain

. Training	support(but limited funds)	support
6.Coordination/ Monitoring		
. Provincial	general support	no comment
. District Councils	strongly support	no comment
7.Private sector	little support	no comment
8.Women in Development	general support	general support

Source: Interviews with senior government officials and politicians.

Table 2.33 shows PHED's total expenditures (urban and rural) for operation and maintenance (excluding administration costs) for the last two years in current prices.

PHED has been under increasing pressure to control costs despite increasing demands brought on by the completion of new schemes. PHED now has 400 water supply schemes completed, another 89 schemes are ongoing and another 144 new schemes have been approved this year. At the pace that PHED has been proceeding with new schemes, the expenditure for running and maintenance will be increasing by Rs 10 million each year. Also the burden on maintenance and repair (M&R) is going to increase while existing funding is inadequate to meet the present demands (see rehabilitation requirements in Table 2.2.1). These major repairs may be required more frequently if present funding is inadequate to do proper maintenance. In addition, PHED has been burdened with a mandate to meet increasing demands for water supply without institutional strengthening (staffing, offices, vehicles, and equipment).

<u>Revenues From Water User Charges</u>

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 difficultly 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

Table 2.33 PHED EXPENDITURES ON OPERATIONS AND MAINTENANCE
(Rs million)

	1987/88	1988/89*
Running and Maintenance (R & M) (fuel cost and machinery)	38.1	30.5**
Extension and Improvement (E&I) (upgrading)	5.0	11.5
Maintenance and Repair (M&R) (rehabilitation)	2.0	3.2
Other	3.4	3.9
Total	48.5	49.1

Sources: Finance Department for 1987/88 and PHED estimate for 1988/89.

* The Finance Department made a budget allocation of Rs 103 million for 1988/89, a 17 percent increase over the previous year, but the actual allocation as reported by PHED was virtually unchanged.

** R&M costs for the 1988/89 fiscal year declined from the previous year due to fewer expenditures on maintenance of machinery and equipment.

expenditures. No transfer of funds are made to PHED, yet PHED is expected to meet the cost of operation and maintenance.

Affordability and Willingness to Pay

Field investigations were performed during the months of April and May in order to assess villager's ability and willingness to pay for water supply (and sanitation). 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 is 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 made.

Community Financing

Based on the assessment of PHED's problems with meeting operating and maintenance costs, it is essential that community financing be pursued; otherwise existing schemes being implemented today will not be sustainable. Field investigations have shown some optimism for community financing, despite a poor record of cost recovery. The essential ingredients that are presently missing include:

- a provincial policy stating that all people supplied by piped water systems should contribute to the operating and maintenance costs;

- an effective and efficient collection mechanism to ensure a high rate of recovery;

- a penalty system for customers who do not pay;
- a system where the revenues collected go directly to a fund for payment of operating and maintenance costs incurred within a district or village; and

- political support to implement such a policy.

There are various options for involving communities in the payment of operating and maintenance costs. For villages with a large proportion of house connections (more than a third), it is possible for PHED to collect monthly tariffs of Rs 20 per household. At present, sub-engineers (overseers) are responsible for collection of the monthly water rate. Accounts are handled by a sub-divisional clerk and the sub-divisional officer (SDO) maintains overall control. This network would have to be strengthened by the addition of clerical staff and revenue collectors to ensure a high recovery rate.

Collection of revenues by local councils is not recommended at this time for the following reasons:

- local councils are poorly staffed to enforce revenue collection;

- the revenues collected cannot easily be channelled to an account to offset operation and maintenance costs;

- if revenues are transferred to PHED, there is no incentive for local councils to collect charges; and

- local council members have to appease their constituents, making it difficult to impose penalties for non-payment.

For PHED schemes where the majority of households do not have house connections, the collection of revenues is more difficult. It is recommended that PHED negotiate with the community (preferably a village organization or committee) to reach a collective agreement on contributions to be made. The community would be responsible for collection of water charges from individuals and PHED would receive a lump sum payment each month. Alternatively, the villagers could make payments directly to WAPDA or a fuel company as a credit toward fuel costs. The community could also agree to pay the salaries of the operator, chowkidar and pion, who are usually hired locally. PHED would still have the responsibility for inspection and the cost of major repairs.

Another option would be to contract the operation and maintenance to the private sector. At present, there is little experience with private sector involvement in Balochistan and this initiative would require support. Also, since many communities are unable to finance the entire operation and maintenance costs, some government subsidy would still be required (i.e. PHED).

For small water supply, sanitation and drainage schemes, communities should be required to finance a portion of the capital cost and virtually all of the operating and maintenance costs. There schemes involve simple low-cost technologies which communities can afford and can manage themselves with proper training during implementation.

For some schemes, LGRDD may have to finance the equipment cost (e.g. handpumps) but the community would be responsible for other material and labour inputs, such a digging wells. The community would at all times be responsible for the schemes, including planning, implementation and operation. LGRDD would offer technical support but would not provide financing for operations and maintenance unless major rehabilitation was required.

Conclusions

In view of the low income levels of the rural population. It would not be realistic to expect a contribution towards capital costs, other than in kind by providing voluntary labour for trench digging, and by contributing the land on which the scheme is to be built.

For PHED schemes, some revenue for O & M is collected by town councils (urban areas) and some is collected directly by the PHED staff. Collection is only made for house connections. There are no hard and fast instruction as to how these changes are to be realised, and accounted for; and collection is done on an ad-hoc basis. In view of this amounts of revenue collected for water supply is minuscule (less than 10% of PHED's O&M costs).

During field investigations it was observed that though willingness to pay for water exists in the rural population; due to improper collection mechanism or uniform policy existing. This willingness could not be translated into revenues.

At present no cost recovery mechanism exists for Community Tanks and Stand Post. This is because it is difficult in these circumstances to decide who are users and who are not. More importantly with such schemes it would be virtually impossible to ensure collection by the present means employed for house connection collections. In piped system with private taps it is easier to make contributions obligatory.

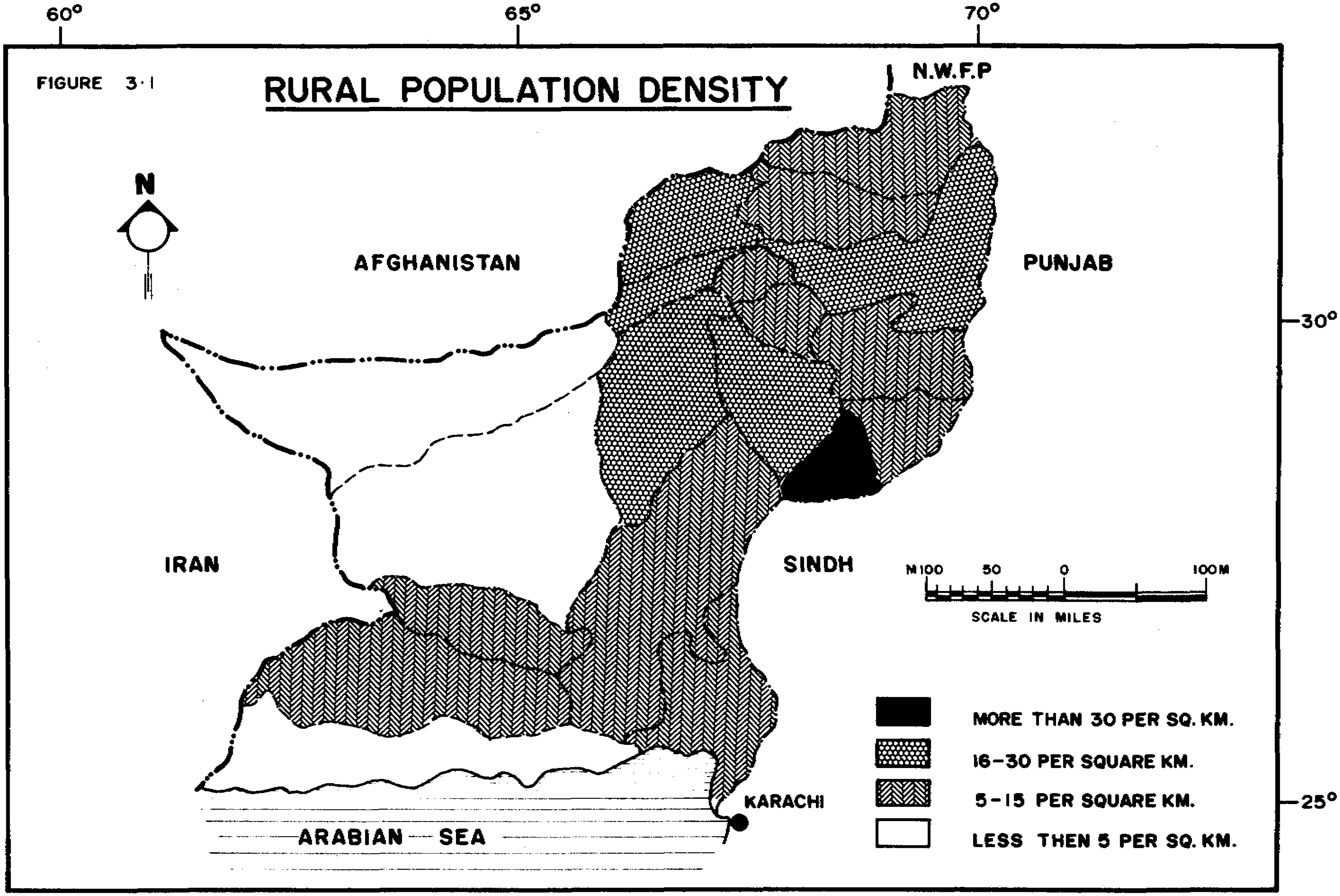
3. POPULATION, DEMAND AND NEEDS

3.1 Population and Settlement Patterns

3.1.1 Rural Population and Trends

Balochistan occupies more than 40% of Pakistan's land area but contains only five percent of the population. In 1981, the population of Balochistan was 4.32 million, of which 84% (3.66 million) was classified as rural. Estimates of today's population are very uncertain due to unknown growth rates and shifting population patterns. These shifts include inter-provincial movements, rural to urban migration, nomadic or seasonal movements, and influx of Afghan refugees.

The overall rural population density of Balochistan is 10.5 persons per square kilometre based on 1981 figures. The area of highest rural density is Nasirabad (Jafarabad and Tamboo Districts) which is an extension of the heavily populated irrigated regions of the Indus plains. Even here the population density (63 persons per square kilometre) is considered low compared to rural areas in the Punjab and Sindh. Moderate rural population density is found in Districts with upland valleys or plateaus where climate is temperate and ecological conditions are more suited to agrarian livelihood. These Districts include Quetta, Pishin, Kachhi, Kalat, and Loralai. Other areas that experience greater extremes in temperature (colder highlands or hotter lowlands) and correspondingly less suitable ecological conditions have low population density (5 to 15 persons per square kilometre). These Districts include Zhob, Sibi, Kohlu, Lasbela, Khuzdar, Turbat, and Panjgur. The remaining Districts -- Chagai, Kharan and Gwadar -- have desert climates and very low rural population density (less than 5 persons per square kilometre). Figure 3.1 shows the distribution of rural population by District.



60°
65°
70°
FIGURE 3·1
RURAL POPULATION DENSITY
N.W.F.P
N
AFGHANISTAN
PUNJAB
30°
IRAN
SINDH
M100 50 0 100M
SCALE IN MILES
MORE THAN 30 PER SQ. KM.
16-30 PER SQUARE KM.
5-15 PER SQUARE KM.
LESS THEN 5 PER SQ. KM.
KARACHI
25°
ARABIAN SEA

FIGURE 3·1

Population Projections

The latest population census was taken in 1981 and these figures are still the basis for planning within the Government of Balochistan. No official estimates have been made for growth by district but a total growth rate of 3.4 % per annum is used by the Planning and Development Department to estimate present population.

For good investment planning, present population estimates for rural areas by district are required. Table 3.1 shows the rural population figures in the 1981 census and estimates for 1988 and 1993 by District and by settlement size (mauza). Since urban population has grown quickly, the rural growth rate is estimated to be 3.1 % in Balochistan. However, in certain Districts, growth has been faster as evident from the previous inter census growth rates. These growth rates must be used cautiously because extremely high growth rates were observed in many Districts. The reason for this is due to errors made during the 1972 census. For example, the 1972 census took place at a time when people were migrating, resulting in under counting and misappropriation. Previous censuses have also shown unrealistic male/female splits which reflect the under reporting of females. It can be assumed that the 1981 census figures are reasonably accurate although some people suspect population counts are now overestimated due to people reporting more family members than actually reside in the households. This uncertainty will not be verified until the next census and only if the census is properly conducted.

The uncertainty of population figures does present some problems for investment planning in terms of estimating the total amount of funding required for the sector. However, the population estimates are sufficient to reveal which districts should receive priority for funding and what order of magnitude costs will be required. In terms of project implementation, population of villages must be assessed in the field because census population figures (already dubious) are only reported at the mauza level, which may encompass an area of 80 square

TABLE 3.1

RURAL POPULATION AND SETTLEMENT PATTERNS

DISTRICT DATA
(Population in thousands)

District Name	Rural Population & Settlements Patterns 1988: Total Rural Population	Total # of Settl.	Population Growth Rate/yr	Total # of Settl.: small 0-500	Total # of Settl.: medium 500-2000	Total # of Settl.: large 2000-5000	Pop in Settlements: small 0-500	Pop in Settlements: medium 500-2000	Pop in Settlements: large 2000-5000	Total Rural Population 1993	Total Rural Population 1998
1.ZHOB	250.1	284	3.8%	183	66	35	45.8	98.8	105.5	301.4	363.2
2.Q. SAIFULLAH	178.4	202	3.6%	130	47	25	32.6	70.5	75.3	212.9	254.1
3.LORALAI	473.7	519	3.5%	330	116	73	82.4	173.8	217.5	562.6	668.2
4.KHOLU AGENCY	77.4	163	1.1%	140	18	5	35.2	26.8	15.4	81.8	86.3
5.DERA BUGTI	131.2	278	3.3%	239	30	9	59.7	45.4	26.1	154.3	181.5
6.KACHHI	317.0	451	1.6%	320	103	28	80.0	154.1	82.9	343.2	371.5
7.ZIARAT	39.2	48	2.8%	29	15	4	7.3	22.7	9.2	45.0	51.7
8.SIBI	72.4	90	0.3%	54	28	8	13.5	40.0	18.9	73.5	74.6
9.JAFARABAD	278.4	214	1.7%	89	78	47	22.3	116.1	140	302.9	329.5
10.TAMBOO	168.7	129	4.8%	54	47	28	13.5	70.3	84.9	213.3	269.6
11.PISHIN	384.8	334	2.0%	185	72	77	46.2	107.0	231.6	424.9	469.1
12.KHARAN	139.3	305	2.4%	255	49	1	63.8	72.7	2.8	156.8	176.6
13.KALAT	422.5	796	4.2%	446	325	25	111.5	243.4	67.6	519.0	637.5
14.KHUZDAR	435.3	951	2.8%	803	140	8	200.7	210.2	24.4	499.8	573.7
15.PANJGUR	225.3	202	5.7%	99	71	32	24.8	106.1	94.4	297.3	392.2
16.TURBAT	459.0	411	4.8%	203	144	64	50.5	216.2	192.3	580.3	733.5
17.GWADAR	75.0	103	1.2%	74	20	9	18.3	29.1	27.6	79.6	84.5
18.LASBELA	173.1	237	1.4%	156	71	10	38.9	105.1	29.1	185.6	198.9
19.QUETTA	96.3	60	0.1%	20	19	21	3.3	28.9	64.1	96.8	97.3
20.CHAGAI	138.1	105	3.3%	41	42	22	10.2	62.3	65.6	162.4	191.1
TOTAL	4,535.2	5882	3.1%	3850	1501	531.0	960.5	1,999.5	1,575.2	5,293.1	6,204.7

(Source : estimates based on '81 Census) kilometres and several villages.

3.1.2 Settlement Sizes and Patterns

Settlement sizes and patterns have a direct influence on the provision of water supply and sanitation services. Balochistan has very low population density and villages tend to be small and isolated from one another. According to the 1981 census, there were 5882 mauzas (census unit containing one or more settlements) located throughout Balochistan. The rural settlements were classified into three sizes:

- **small** - mauzas with less than 500 people;
- **medium** - mauzas with 500 to 2000 people; and
- **large** - mauzas with 2000 to 5000 people.

Only 10% of the mauzas are large but they represent 35% of the rural population; 25% are medium and represent 45% of the rural population; and 65% of the mauzas are small but only account for 20% of the population. The mauza was considered to be a good approximation for clustering of settlements that could potentially be served by a water supply system. However, in the larger Districts like Chagai, this assumption is less accurate because the size of some mauzas can exceed more than 100 square kilometres.

It was estimated that 75% of the rural population covered at present is for large villages, based on an analysis of the size of existing public water supply schemes. This would mean that roughly half of the large villages have water schemes. The remainder was assumed to be in medium sized villages, indicating that only 15% of these villages have coverage. It is estimated that full coverage is achievable for large villages within the planning period but the long term objective will be to provide water supply to the numerous small and medium villages.

3.1.3 Migration Patterns

Migration in Balochistan can be classified into three types:

- nomadic;
- rural to Urban; and recently
- refugees from Afghanistan.

Nomadic Migration

In view of the large arid habitats that are not suitable for cultivation a large share of the population (20 to 30% in some Districts) depend principally on domesticated herds of animals for their livelihood, moving with their flocks to new pastures as necessary. Annual migrations are very important to the economy of some tribes. Local populations and authorities recognise the tribal right to pass along roads and cultivated lands, to draw water and to pasture their flocks on public land. Migratory behaviour of the tribes in the physiographic divisions of the Balochistan (plains, upper highlands, lower highlands and deserts).

In the plains, the majority of the indigenous population is settled, but in times of drought and scarcity the inhabitants are compelled to seek more favoured locations primarily in Sindh. A large influx of Brahvi tribes takes place in October and November from Kalat and Khuzdar. These tribes transverse the Bolan Pass to settle in the Kachhi, Sibi and Nasirabad plains, where they spend their winter, and return to the highlands in spring.

In the upper highland areas, the nomadic habits of the indigenous population have decreased, as land has been made suitable for cultivation by irrigation. Periodic visitors to these areas are the Ghilzai tribes from Afghanistan during the winter months when they graze their flocks, engage in trade or work as labourers.

In the lower highland Districts of Loralai, Sibi and Lasbela the majority of the indigenous population is settled. Whereas in the districts of Kalat and Khuzdar a lot of Brahvi tribes migrate annually during winter taking with them their flocks and their families. The tide of migration from Kalat is entirely towards the east to the plains of Kachhi, Sibi, Nasirabad and Sindh, where the tribesmen go to pasture their flocks; these nomads also engage in crop harvesting for landowners. The route followed is through the Bolan. Whereas from Khuzdar the migration is to Kachhi, Sindh and Lasbela. The nomads return to their homes in spring.

Marris from Kohlu move to Loralai in summer and autumn; Bugties to Nasirabad and Sindh; their nomadism is of a mixed character relating to herding, agriculture and migrant labour. Each of these activities has its own cycle and its own pattern of movement.

Nowhere in Balochistan are the nomadic habits more pronounced than in the desert areas. Very little population is settled permanently. Those who own no land are constantly on the move to find grazing for their cattle. As a rule the nomadic groups confine there wanderings within the Districts (i.e. Kharan and Chagai); but in prolonged periods of drought they wander far afield, even into Sindh.

The tendency to nomadism in Makran is not so pronounced as in some other parts of Balochistan. Internal periodic migration takes place during the date harvest, when the rural population flock to Keech and Panjgur, the principal date growing tracts.

The nomadic migration habits have special implications for planning water supply investments for rural areas. In several areas it was observed that villages were vacated by people that have taken their herds to better pastures. Theoretically, these villages only require water supply for half of the year, which is likely available periodically during the year. Providing a permanent piped water supply is not justified and cannot be maintained properly unless the villagers choose to settle permanently. This would depend upon the adequacy of water supply for their livestock and crops.

A significant portion of the nomads are continuously moving in tents. These people move to areas where water is available for their families and pastures are suitable for their livestock. Many os the nomads have benefitted from the rapid increase in irrigation tubewells; these sources of water have traditionally been available to landless people.

Rural to Urban Migration

Urban centres like Quetta and Karachi attract rural settlers from the interior. The reasons for this migration are generally social and economic, such as employment opportunities and better education. Nowhere is this migration more pronounced than in Makran, where it has been estimated that one in every three families has a male family member working in the Gulf states. Also, many families have moved to Lyari district of Karachi, which has become now a predominantly Baloch area.

The population of Quetta has also grown rapidly during the last two decades, drawing young male adults (and later their family members) into the city from the nearby Districts.

Refugees from Afghanistan

Pakistan has experienced a massive influx of refugees from Afghanistan after the Russian invasion. There are reportedly three million refugees in the border areas of Pakistan; 80% of these are located in the NWFP and about 20% in Balochistan (particularly Districts Quetta, Pishin, Chagai and Zhob). In spite of international aid to relieve Pakistan of bearing the entire burden of caring for the homeless Afghans, the strain on the country's resources nonetheless is enormous.

As the overwhelming majority of the refugees are Pathan tribesman, in Balochistan this has had severe political repercussions on the delicate ethnic balance between Pathan and Baloch. Many knowledgeable observers are agreed that most of the refugees in spite of claims to the contrary will never leave Pakistan.

3.1.4 Socio-economic Characteristics and Implications for the Sector

Economy

Balochistan has an underdeveloped economic base. The economy of rural Balochistan is based on agricultural crops, livestock, mining and to a lesser extent fishing and cottage industries.

Historically, population pressure was minor because the region was arid and lacked potential for an agrarian economy in contrast to the Indus plains. Today, Balochistan has a very small population density compared with other provinces. For the foreseeable future, it would appear that Balochistan's economy will continue to develop as a resource base for the rest of Pakistan. For example, energy exploration and development is a major activity, which is primarily used for supplying gas to other parts of the country. Similarly, Balochistan possesses iron ore and fisheries which have a high demand in the large urban, industrial centres of Pakistan. Even in agriculture, the emphasis is on speciality crops including apples, apricots, peaches, grapes, pomegranates and almonds for markets outside the province.

There is little secondary industry in Balochistan. Outside Quetta, the main activities include construction materials, primary food processing, weaving, and cottage industries including clothing, shoe repair, baskets, and furniture. One exception is the industrial area around Hub in Lasbela District, which benefits from close proximity to Karachi. Unfortunately, most of the spinoff benefits of industrial activities in Hub go to Karachi rather than Balochistan.

Regional Economies and Incomes Levels

Balochistan may be divided into four distinct areas that display economic patterns. The areas are similar to the physiographic regions.

The first region includes the lowland areas of the Indus plains, comprising the districts of Kachhi, Dera Bugti and Nasirabad Division. These areas are characterized by hot, dry climate but they also include irrigated areas that were originally established under the British authority. Today the irrigated zone of Nasirabad accounts for 99% of rice production and 56% of wheat production in the province; therefore, it provides medium levels of income to the rural population. Areas that are not irrigated have very poor economies and low rural incomes (i.e. Kachhi and Dera Bugti).

The second region is the central area of mountains and valleys that include the districts of Pishin, Quetta, Sibi, Ziarat, Loralai, Kalat and Khuzdar. The upland plateau and valleys of this region have a more temperate climate. This corresponds to the limits of the former British controlled area and consequently most of the largest urban centres and the best developed infrastructure is found there. The combination of temperate climate and availability of water in various valleys has led to the development of cash crops including fruit (apples, apricots, peaches, pomegranates), vegetables (potatoes, onions) and other speciality crops (grapes, almonds). Consequently, the rural incomes in this region range from medium to high, the wealthiest being Pishin, Quetta and Loralai.

The third region is the northern mountainous area which comprises the districts of Zhob and Qila Saifullah. This area also possesses a temperate climate but has remained underdeveloped due to the persistence of tribal control. The resulting opposition to new infrastructure and interference from outside bodies combined with limited resource potentially has left this area isolated and the cash crop economy is poorly developed. Therefore, rural incomes are very low.

The fourth region comprises roughly half the province in the southern and western extremities. The region is hot and very arid and as such has the lowest potential for agriculture, except where small pockets of irrigation exist. Nomadic existence is common in this region. On the whole, the rural income levels are very low.

Given the limited agricultural and industrial development in Balochistan, one would anticipate low rural incomes. Table 3.2 shows the income distribution on groups in rural Balochistan. Based on the National Household Income and Expenditure a Survey Of 1984-85, the average income for rural households was Rs. 1400 per month and 47% of rural households were below the national poverty line (Rs. 1000 per month). The average rural incomes in Balochistan are 91% of the national average; this figure would be lower except that a significant number of wealthy landowners and tribal leaders skew the average values.

Ethnic and Linguistic Patterns

The population of Balochistan consists of a mixture of various social, linguistic and ethnic groups. There are three main ethnic groups into which the rural population can be classified:

- Baloch are predominantly in the south-western part of the province and also in the eastern tribal agencies of Kohlu and Dera Bugti:

- Brahvi are found in the central part of the province; and

- Pathans are predominantly in the northern mountainous districts.

There are also some minority groups. Sindhis are found in large proportions in Lasbela and Sibi Districts and Nasirabad Division. Others include Punjabis located in Districts bordering on Punjab Province, and Persians, primarily in Chagai District.

Table 3.3 shows the percentage split of linguistic groups (by mother tongue) for each District. Figure 3.2 shows the spatial patterns of ethnic/linguistic groups. It should be noted that ethnicity (race) does not correspond completely to language, but general patterns are best understood by ignoring these exceptions.

Table 3.2 INCOME DISTRIBUTION IN RURAL BALOCHISTAN 1984 - 85

HOUSEHOLD INCOME (Rs. Per Month)	PRECENTAGE OF HOUSEHOLDS	
	BALOCHISTAN	PAKISTAN
Less than 600	13%	9%
601 - 1000	34%	26%
1001 - 1500	27%	29%
1501 - 2000	12%	17%
2001 - 3000	8%	12%
3001 - 4500	3%	4%
More than 4500	3%	3%
Average Monthly Income	Rs. 1406	Rs. 1638
Index of Monthly Income (Pakistan = 100	91	100
Share of Households Below Poverty Line of Rs. 1000 per month	47%	35%

Source: Household Income and Expenditure Survey, 1984 - 85.

Table 3.3 LINGUISTIC AND SOCIO-POLITICAL PATTERNS

District	Pushto	Balochi	Brahvi	Sindi	Others	Dominant Socio-Political System
	Primary Language Spoken					
	%	%	%	%	%	
Quetta	52	-	39	-	9	Tribal/religious
Pishin	98	-	-	-	2	Tribal/religious
Loralai	74	-	-	-	26	Tribal/religious
Zhob	99	-	-	-	1	Tribal/religious
Q. Saifullah	99	-	-	-	1	Tribal/religious
Chagai	-	58	36	-	6	Tribal
Sibi	60	14	8	18	-	Tribal
Jafarabad	-	44	18	25	13	Tribal/religious
Kachhi	1	41	11	26	21	Tribal/religious
Kohlu	96	-	-	3	1	Tribal
Kalat	3	7	88	-	2	Tribal/religious
Khuzdar	-	36	61	3	-	Tribal
Kharan	-	68	31	-	1	Tribal
Lasbella	-	20	10	63	7	Feudal
Turbat	-	99	-	-	1	Feudal
Gwadar	-	99	-	-	1	Feudal
Panjgur	-	99	-	-	1	Feudal
Dera Bugti	-	99	-	-	1	Tribal
Tamboo	-	40	18	25	7	Feudal
Ziarat	100	-	-	-	-	Tribal/religious

Source: 1987-88 Statistical Yearbook.
Note: Other Languages include Punjabi and Persian.

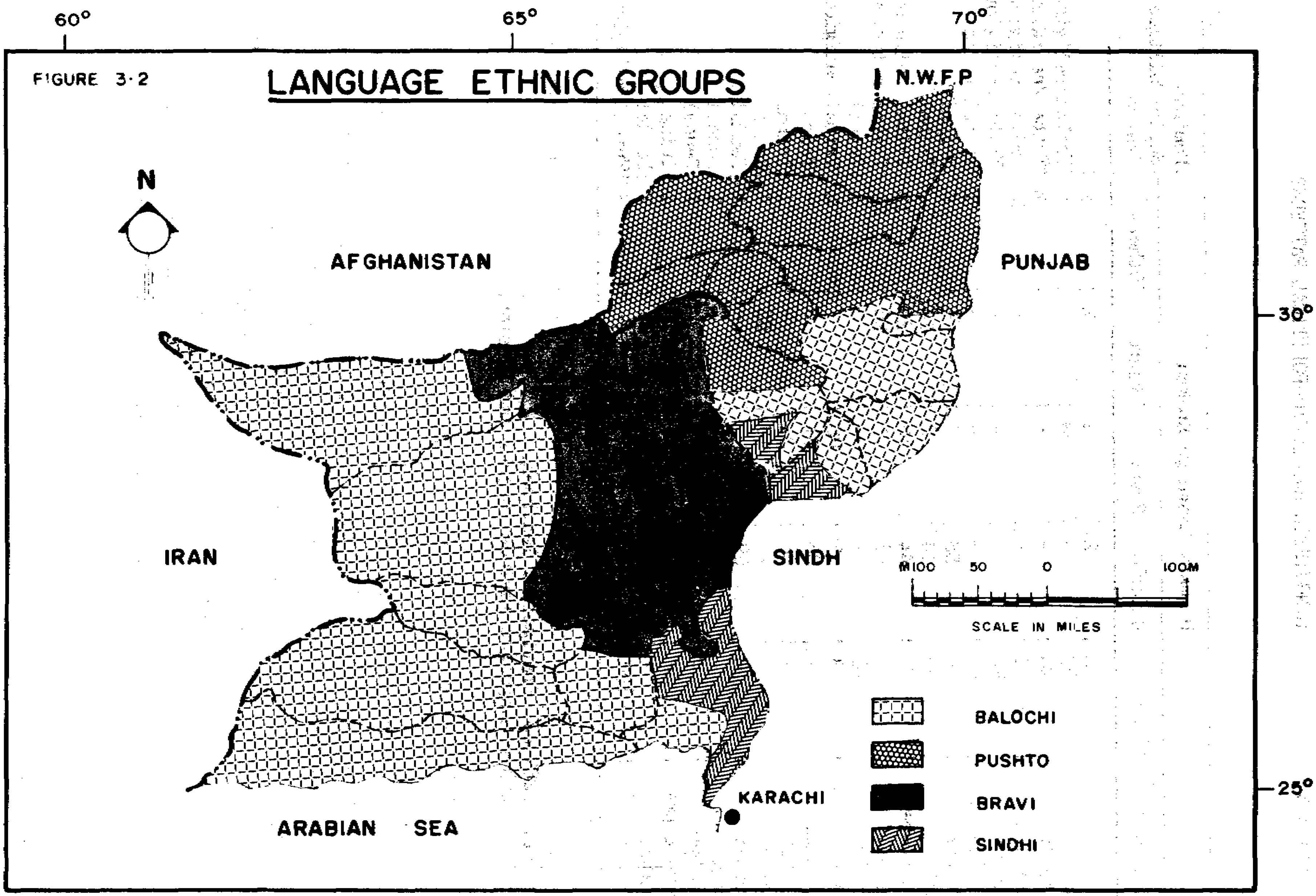


FIGURE 3·2

LANGUAGE ETHNIC GROUPS

FIGURE 3·2

Tribal and Socio-Political Systems

The three main ethnic groups in Balochistan have tribal roots, which are still very strong in most rural areas. In Dera Bugti, Khuzdar, Jafarabad, Kachhi, Tamboo, and Lasbela the tribal system is very strong and the tribal chiefs are very powerful. But in Zhob, Quetta, Loralai, Ziarat, Qila Saifullah, and Pishin, where the population consists primarily of Pathans, the tribal system is not as effective and the tribal chiefs are not as powerful.

The Brahvi and Baloch tribes are socio-political entities organized under leaders of chieftains (Sardars).

In Makran Division, the Baloch society is more democratic and the tribal system is almost non-existent.

At present, the political groups can be classified into three categories of Nationalist, Religious, and Moderate. In Pathan areas, the religious political groups are very powerful. On the other hand the Nationalist Political parties were in majority from Baloch & Brahvi areas. Moderates are mostly found in irrigated farm area's and in urban centres, although in parts of Nasirabad the tribal or feudal system is also strong. Figure 3.3 shows the political groups in Balochistan.

Implications for the Sector

The objective is to increase living conditions in rural areas through the provision of potable water supply, good sanitation/drainage, proper human waste disposal and good hygiene. In some areas, there may be resistance to development in strong tribal or religious areas, particularly the remote areas of Zhob, Dera Bugti, and Kohlu Agency. It desirable to assist the most backward areas but the lack of infrastructure can increase the cost and time of implementing water supply projects and promoting better sanitation and hygiene.

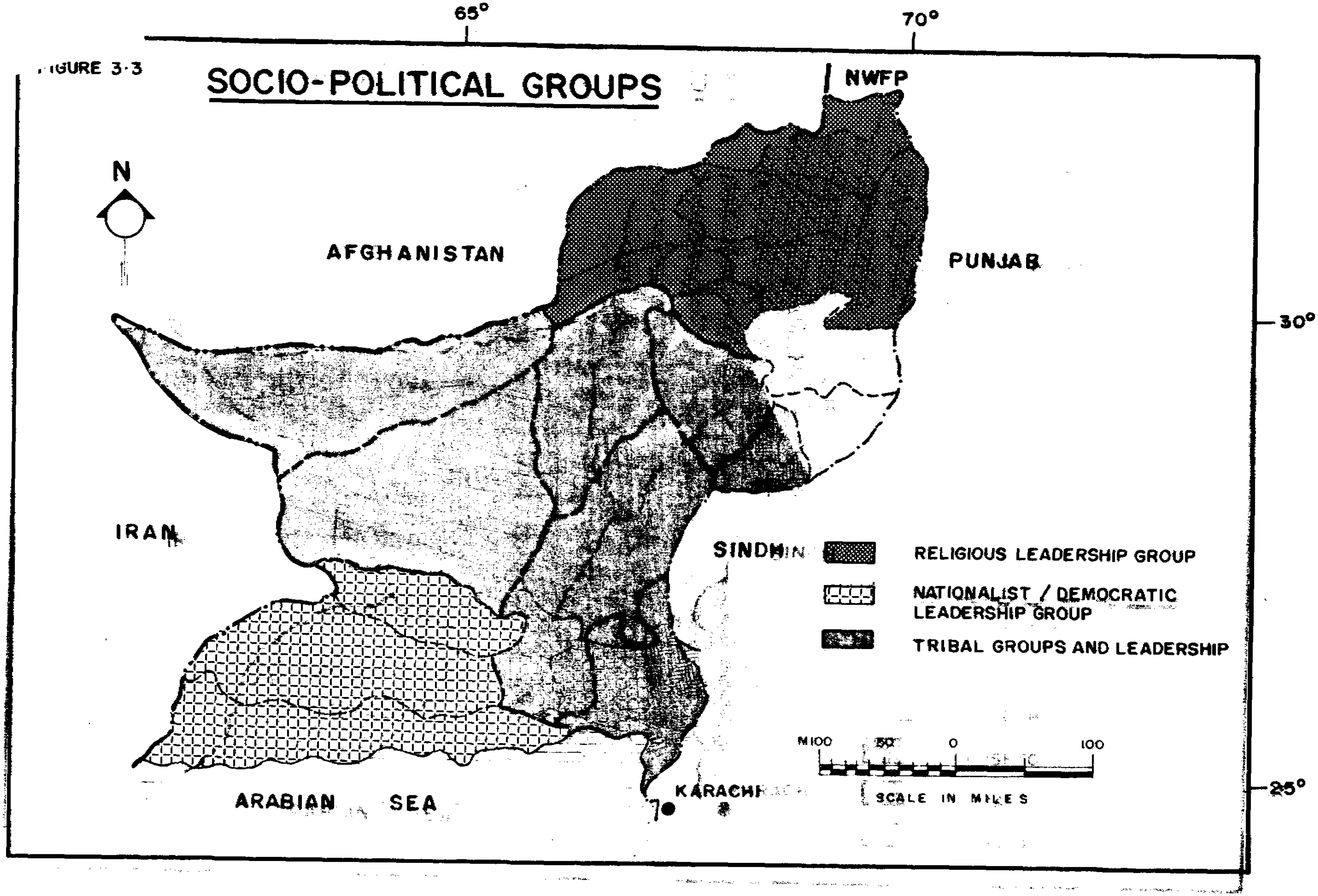


FIGURE 3·3
SOCIO-POLITICAL GROUPS
65°
70°
30°
25°
N
NWFP
AFGHANISTAN
PUNJAB
IRAN
SINDH
ARABIAN SEA
KARACHI
RELIGIOUS LEADERSHIP GROUP
NATIONALIST / DEMOCRATIC LEADERSHIP GROUP
TRIBAL GROUPS AND LEADERSHIP
M100 50 0 100
SCALE IN MILES

FIGURE 3·3

In terms of investment in water supply, the needs are great in most Districts and it is preferable to emphasize development in areas that have good potential for successful implementation and areas that have more potential for economic development. This includes areas like Lasbela, Turbat, Pishin, Kalat, Kachhi, Qila Saifullah, Chagai and Ziarat.

3.2 Needs and Demand

The effective demand for services is calculated by estimating current coverage for a specified level of service. The effective demand equals the unserved population that must still obtain the basic minimum level of service plus demand for higher levels of service expressed by people who are willing to pay for the capital cost of upgrading service.

3.2.1 Water Supply

The estimates of present rural coverage for water supply are 1.1 million (25%). The estimated demand for basic levels of service by 1990 is 3.4 million. This takes into consideration population growth and the completion of PHED schemes presently under construction (in fact a significant number have already been completed since July 1988). Of the total demand, an estimated 50,000 people have water supply schemes that need rehabilitation (not functioning). Therefore, rehabilitation is a concern but will not have a major impact on increasing coverage.

Based on field surveys, it was discerned that a roughly half of the uncovered population (1.8 million people) have on some form of ground water source. Approximately two-thirds would have open wells that are subject to contamination, may be insufficient in quantity during parts of the year, and may be some distance from the village. Others would use karez water which is also contaminated. Only a small proportion (less than 10%) have access to relatively clean water form springs, but these sources are not protected either. It is possible to protect existing sources (springs, open wells and karezes) as a simple solution to increasing the provision of potable water.

It is estimated that as many as 1 million people have access to irrigation water supplies, the majority of which are tubewells with good quality water but no distribution or storage facilities. These private wells are typically available for the convenience of public use and there is some potential for agricultural and domestic uses where quantities are sufficient.

The remainder of the unserved population (700,000) either have no reliable source of water nearby or they use surface water that is highly polluted. These people should receive the highest priority for new water supply schemes.

Of the total unserved population, it is estimated that 30% reside in settlement sizes of more than 1000 for which piped water schemes with mechanized pumps are economically viable. Much of the remaining population (2.3 million) will have to rely on lower cost technologies (i.e. no elaborate distribution systems and less mechanization).

It was commonly observed that many people want service levels above the basic government standards. One group of people may have water supply now but want service upgraded from community tanks to house connections. Others may have adequate water supply from wells or handpumps, but may desire piped water supply. Another group may not have adequate water supply but would be willing to pay for house connections if a piped water supply scheme is installed. No precise estimates of demand could be made because it is difficult to establish the willingness to pay for these services.

In terms of setting priorities, the objective is to increase coverage (benefits) with the least amount of government funding (cost). Any scheme that improves service but does not increase coverage (in the Government's view) should be financed by the beneficiaries. However, in some circumstances, more revenues for operation and maintenance may be derived from people with higher service levels (e.g. house connections). This must also be considered because such schemes may prove to be better long term investments.

3.2.2 Disposal of Human Waste

As discussed in Section 2.2, the estimated coverage in rural Balochistan is barely 5 percent. In this case, coverage has been defined as facilities that provide adequate disposal of human wastes within or adjacent to the household compound. In Balochistan this usually refers to a pour - flush latrine, a VIP latrine or a basic latrine (that includes a pit which can be covered). The latter type is a less satisfactory facility for health reasons but given the low coverage rates and the poor economic standards in Balochistan, this system does represent a low - cost minimum standard. It is also a system that could be modified and upgraded in future and therefore may be suitable interim solution .

The question of demand for services should also consider people's willingness to pay for all or part of the cost of latrines. From field surveys conducted by sociologists, it was observed that people had some awareness about latrines because often a latrine existed nearby, either within a school or owned by the village leader. These people had a desire to own a latrine but did not have any idea of the cost, nor how to install a latrine. A latrine represents a prestige item and therefore actual demand for latrines may be somewhat inflated. It has been observed that men often prefer traditional methods even when a latrine is available. Consequently, the demands for latrines are likely to be much lower than requirements given the lack of knowledge and the fact that beneficiaries must finance all or a significant cost of the latrines.

3.2.3 Sanitation and Drainage

Similarly, requirements for improved sanitary and drainage conditions were evident in all villages but there was no felt need by the people. Most problems could be solved quite simply, so the resources are available to make improvements once an awareness and demand is created. These needs will continue to increase due to population growth, trends for congested development in settlements, and the expanding number of villages now with piped water supply.

3.2.4 Hygiene Education

It is impossible to estimate district by district coverage of hygiene promotion to date. While some health officers acknowledge the need for hygiene education, only some components are now included in the health education mandate. These include those that fall within the domain of the Control of Diarrhoeal Disease (CDD) program, which is a priority. In addition some aspects of hygiene have been included in other programs and activities, including TBA training, schools, the EPI and various rural development projects.

One factor curtailing the promotion of better hygiene has been the correct recognition of the difficulties involved in changing traditional hygiene. Another factor has been the sensitivity of the subject and the messages. It is undoubtedly harder to attract the same level of political support and program resources for better hygiene that, for example, was accorded EPI.

While the need for better hygiene is great, the demand for it from the rural population is minimal. The connections between hygiene and health are not understood and poor hygiene is a large contributor to the high infant mortality rate and heavy burden of illness. Demand can only be created by raising the consciousness of the community about the health implications of their hygiene and about the fact that, with adequate water supplies and proper disposal of human waste, it is within their power to bring illness under some control. This must be an early point in any hygiene education program.

3.3 Proposed Service Standards

3.3.1 Water Supply

In Balochistan, people perceive that only piped water systems represent water supply. This perception may make it difficult for some people to accept alternate technologies, such as community hand pumps.

In villages with more than 1000 people, the basic level of service should be a piped water system, but all efforts should be made to use low cost options (e.g. gravity fed systems, appropriately sized equipment and tanks, etc), particularly to reduce the operating and maintenance burden. People are quite willing to accept piped water supply to community tanks, although they naturally desire yard connections. PHED's new policy is to provide only community tanks, but yard connections could be provided if the community is willing to finance the additional cost.

It is recommended that standposts, if promoted as a higher service level, be carefully implemented with awareness programmes for the users. During field investigations, it was found that wherever standposts were used, there were problems of illegal connections, malfunctioning taps, and drainage problems. Also, standposts do not provide a system conducive to collection of water tariffs. In the short term and given the small size of villages in Balochistan, community tanks can provide water at a convenient distance and pose fewer drainage problems. Where a higher level of service can be paid for, yard connections are recommended for the majority (if not all) of households in the village, so as to prevent illegal connections that may ultimately affect the operation of the distribution system. The distribution system should be designed to accommodate further growth.

In small isolated settlements, the basic level of service should be handpumps, where applicable, or simple pumps on covered wells with some provision for storage (without long transmission lines). Larger mechanized systems should not be promoted unless they serve agricultural needs as well as drinking water. In some cases where water is too distance to pipe, consideration should be given to trucking water to a community tank under private contract.

3.3.2 Human Waste Disposal

The basic service level should be a simple vented pit latrine. Given the backwardness of the rural population, extremely low coverage levels, limited government initiative and low income levels of villagers, there is unlikely to be significant progress made in coverage during the next decade. Nonetheless, the government should support the promotion of latrines as part of a long term strategy to improve living standards and hygiene conditions in rural Balochistan.

3.3.3 Sanitation and Drainage

Wherever water supply schemes are installed, proper attention should be given to sanitation/drainage conditions. It has been recommended that PHED provide a minimum standard of drainage to alleviate potential environmental problems resulting from the water system. Since most schemes will be based on community tanks, the problem of drainage can be solved by proper siting of the tanks and provision of a drainage channel to carry away waste water.

If water distribution systems are installed, it is very important that potential drainage problems be resolved at the time of installation, preferably within the yard (e.g soak-away pits or channelled to vegetable plots) or channelled to simple ditches outside the compound. The important point is that water should not be allowed to collect in depressions to stagnate within the village boundary.

Community drainage systems are far too costly to install in rural villages of Balochistan and they are often ineffective due to low rainfall for flushing and blockages caused by sand and refuse.

3.3.4 Hygiene Education

The following levels of hygiene education service are proposed:

basic service:	during meetings to introduce new schemes: a review of the basic hygiene messages, introduction to hygiene education for TBA and meetings with women's groups;
second level:	school hygiene promotion;
third level:	series of group meetings led by trained and remunerated TBA and teacher;
fourth level:	women receive regular home visits from the trained TBAs.

4. INVESTMENT STRATEGY

4.1. Goals and Objectives

4.1.1 General

For the purposes of investment planning in the Province of Balochistan, it is necessary to think in terms of two broad goals:

- cost-effective and sustainable water supply schemes; and
- improvement in the quality of health and sanitary conditions in rural areas.

These goals are interrelated and planning should be coordinated to achieve maximum benefit for each. The quality of living standards in rural Balochistan are very poor and the ultimate objectives of programmes in the sector should enhance the basic quality of life for the rural population.

In the Seventh Five Year Plan, the Government of Pakistan set the objective of greatly increasing coverage of rural water supply and, to a lesser extent, sanitation. At the National Policy Conference on Rural Water Supply and Sanitation in Islamabad (April 1988), six points were recommended for sector investment guidelines:

- community involvement in planning, implementation and operation, including financing of a part of capital costs and all of operating and maintenance costs;
- integration of water supply, sanitation and hygiene education;
- institutional strengthening and coordination of line departments;

- providing greater strengthening the private sector;

- choosing technologies that are appropriate, affordable and sustainable; and

- providing service levels that reflect the expressed demand of beneficiaries.

4.1.2 Operational

In rural Balochistan, some of these objectives must be flexible. For example, community involvement is a lengthy process which may conflict with the Government's desire to achieve coverage targets quickly. Also, given the lack of coordination between line departments it will not be easy to implement integrated projects in the short term. There are demands for higher service levels but with high cost systems and low cost recovery in Balochistan, the Government has chosen a policy to provide a basic level of service to the rural population. Rather than simply focusing on setting targets, policies must promote schemes that are more cost effective and sustainable.

In Balochistan, the provision of drinking water supply to rural areas has received a high priority from the government; consequently the first objective will be to increase coverage as broadly as possible. In this province, water supply schemes are quite costly due to the scarcity of water resources combined with small dispersed settlement patterns. Given the severe limitations on financial resources, the second main objective must be to utilize funds in a cost effective manner. This could be achieved by improving implementation methods, providing schemes only where the felt needs are greatest, or employing lower cost technologies wherever feasible. Major advances in coverage have been made, particularly in urban areas, but the benefits for the people are not fully realized unless the schemes are functioning properly. Poor management of the schemes can lead to high repair costs which place a continuing burden on public sector financing. Therefore, the third and most important objective is to provide a management system that can guarantee the sustainability of schemes at a low cost, thereby reducing the burden on government and ensuring high quality service to the users.

For hygiene education, limited progress can be expected given the huge task and limited resources. Realistic objectives should include the following:

- raise awareness of rural residents of the importance for health of clean water and proper disposal of human waste; and

- improve household and community hygiene through the widespread adoption of a limited number of important behaviours.

The following section summarizes the main sector constraints and subsequent sections give details of the investment strategy by sub-sector and by key issues in order to achieve the objectives stated above.

4.2 Current Sector Constraints

4.2.1 Planning Procedures

The present procedures for implementing schemes have certain planning deficiencies that reduce the effectiveness of investments in the sector. The following deficiencies have been observed:

- absence of long term master plans for districts;
- lack of community involvement in planning and implementation;
- insufficient feasibility studies; and
- lack of criteria or guidelines for scheme selection.

These problems stem from the lack of staff, time and financial resources to prepare plans in advance of implementation requirements. The present procedures for approval of water supply schemes enables project to begin without proper technical investigations nor involvement of communities in the assessment of needs and decision making process. Each scheme is assessed individually without much concern for broader planning implications. Without planning guidelines and capable staff to conduct proper planning and investigation, schemes are hastily prepared to satisfy political wills and pressure groups which may not reflect the real needs of the people.

4.2.2 Water Resources

In Balochistan, the availability of water resources presents an ongoing challenge for sector planning. The lack of coordinated planning is very evident; there is no long term planning for water resource development and there is poor coordination between departments and agencies involved with water schemes. Combined with increasing private sector involvement in irrigation, some valleys are already experiencing problems of insufficient water to meet demands. The development of drinking water sources does not place as large a demand on resources compared to irrigation but the proper management of water requires closer cooperation in terms of ground water investigation, development and monitoring. This is particularly important because the development of water supply in Balochistan has a major influence on future growth patterns. If the resources cannot support future growth, development should be restricted.

4.2.3 Technology Choice and Cost

Since PHED was established as a separate department, greater responsibility and financial allocations have been given to satisfy the ressing needs of the people. Priority has focused on the completion of new schemes but little time has been allocated to the improvement in designs, investigation of appropriate options and the development of innovative solutions. The staff of PHED are fully preoccupied with implementation and operation of a growing number of water supply schemes. Consequently, virtually all new schemes rely on previous design standards with the result that few improvements have been made to reduce the average cost of schemes.

LGRDD staff have been involved with the implementation of very small water supply schemes but their staff are not technically trained to promote new low cost technologies such as handpumps.

4.2.4 Institutional Limitations

PHED is largely preoccupied with the implementation of new water supply schemes and the development of water sources for these schemes, but it has no cell for planning or conducting detailed technical and needs assessment surveys. Nor does it have staff to liaise closely with the recipient communities during the planning and implementation stages. PHED also lacks some of the equipment and facilities to properly carry out these tasks.

LGRDD has a large number of field staff at on below the District level. However, they are not supported by planning strategies, non do they have the mobility to adequately serve rural areas, with the result that staff are under utilized. Despite this, LGRDD is still lacking key personal at the District level for effective planning and coordination of development activities. Also the technical wing of LGRDD does not have the expertise in a wide range of technologies for water supply, sanitation and drainage. LGRDD does not have female field staff to deal with all the concerns for improvement in the quality of life.

4.2.5 Financial Resource Limitations

PHED has been given adequate financial resources to develop new water supply schemes but they do not have adequate resources allocated for the operation and maintenance of existing and newly completed schemes. Each year the Finance Department determines the recurring budget allocations based on the actual expenditures of the previous year. This figure may be adjusted upwards to account for inflationary increases but sometimes this is not possible due to austerity measures adopted by the Government. Since PHED has been completing schemes at a rapid pace, their O & M budget has been increasing in the order of 10% to 15% each year. By 1991/92 when the ongoing and approved new schemes of the current ADP are completed, PHED's O & M budget will increase from Rs. 53 million to Rs. 75 million (40% increase in two years). These increases put a major burden on recurring budgets which typically increase at the rate of inflation (10%) and recurring budgets tend to be cut in an effort to reduce deficits.

LGRDD has a very little budget allocation for the implementation of water supply schemes. The majority of LGRDD's development budget gets reallocated to District and Union Councils as grant-in-aid for rural projects. Unfortunately, the present system for distributing funds to every local council on an equitable basis (50% allocated equally to each unit and 50% allocated on the basis on population), results in funds being too thinly dispersed. District Councils receive for each scheme on average Rs 80 to 100,000 each and Union Councils receive Rs 5 to 15,000 for each scheme. These amounts are inadequate to undertake worthwhile schemes, with the result that many funds are simply wasted. Other sources of funds have been available through special programs such as the MPA Funds, Chief Minister's Fund or the recently established Rapid Development Program mmc. Unfortunately, the dispersement of these funds are commonly at the discretion of politicians rather than planners from the District level building departments. Also, this system of allocating funds does very little to resolve previous inequities.

Within the ADP, there has been virtually no allocation of funding for the improvement of sanitation, drainage and human waste disposal for rural areas. All of the existing programs, although small, are financed with foreign assistance. For hygiene education, slightly higher priority has been given to upgrade institutional capabilities of the Health Department but most implementation has been carried with the assistance of donors and agencies like UNICEF.

4.2.6 Community Participation

The majority of sector investments are made with little or no community involvement at the planning, implementation or operating stages. PHED schemes are often proposed by influential sardars, local councillors or MPA's. Very little contact is made directly with the beneficiaries regarding their preferences or willingness to contribute to the implementation and operation of the scheme.

LGRDD is much closer to the people but much of their success has been working with District and Union Councillors rather than the communities. One major exception has been the Pak-German Self-Help Program but even there LGRDD staff are not properly qualified to adequately with implement community based development.

Most of the Health and Hygiene programs have been geared to health facilities such as Basic Health Units, Rural Health Centres, Mother and Child Health Clinics and Dispensaries. Thus many programs of immunization and health care rely upon people to visit these facilities. The involvement of people at the community level was achieved by relying on TBAs and occasionally supported by mobile teams of Lady Health Visitors. Only the BIAD program attempted to provide community based hygiene education, and this was appropriately combined with new water supply schemes and the introduction of latrines.

Depending of the type of scheme, the requirement for community involvement will differ, as illustrated in Table 4.1 For each scheme, the degree of community involvement may also vary depending upon the size of scheme, capability of the villagers to organize, complexity of construction and operation, allocation of financial burden, etc. The strategy should be the same for each scheme but some flexibility is required regarding the optimum level of community involvement.

It is clearly evident that many development projects could have been more successful or vastly improved with greater community involvement in decision making and implementation. Despite this knowledge, most implementing agencies are unprepared or lack training to involve the communities in an effective manner.

4.2.7 Cost Recovery

Investments in the water supply sector have increased dramatically to meet the greatest felt needs of the rural population. Unfortunately, this enthusiasm for developing basic physical infrastructure created an atmosphere whereby people accept that the provision of potable water is the Government's responsibility, including operation and maintenance. There has been no attempt to recover the capital costs of public schemes and very limited success with the recover of O & M costs. PHED does collect water tariffs for yard connections but the recovery rate for households with connection is less than 10% because users are reluctant to pay and mechanisms to enforce collection are weak. The BIAD experience has had some successes and failures regarding community payment of O & M costs. The successes reveal that a willingness to pay does exist and that communities are capable of managing their own water supply scheme. The failures have revealed that good service levels must

TABLE 4.1

REQUIREMENTS FOR COMMUNITY INVOLVEMENT

Type of Schemes/Programme

Strategy Component	Large W.S.S	Small W.S.S	Rehabilitated W.S.S	Latrines	Hygiene Education
Awareness	Less Essential	Less Essential	Less Essential	Very Essential	Very Essential
Needs Assessment	Very Essential	Essential	Essential	Less Essential	Less Essential
Willingness to Pay	Very Essential	Essential	Very Essential	Essential	N.A.
Village Organization	Very Essential	Essential	Very Essential	Less Essential	Essential
Agency Coordination	Very Essential	Essential	Essential	Less Essential	Less Essential
Planning	Very Essential	Very Essential	Essential	Less Essential	Essential
Training	Essential	Essential	Essential	Essential	Very Essential
Implementation	Essential	Essential	Essential	Essential	Essential
Ownership	Very Essential	Essential	Essential	Not Essential	Essential

Note: In some cases where community involvement is less essential it may simple reflect that the condition already exists (e.g. awareness).

N.A. - Not Applicable.

be maintained to sustain people's willingness to pay. The BIAD experience has also shown the difficulties that arise from implementing cost recovery policies that are not compatible with existing practices.

4.2.8 Hygiene Education

The following constraints have been identified:

- low levels of health and hygiene education delivered at present;
- limited capacity to deliver health and hygiene information;
- few training opportunities for health educators and limited access to practical experience with more effective approaches to health promotion;
- inadequate resources available to health education units;
- substantial cultural constraints on the presentation of hygiene messages;
- limited resources available for pre-testing of media with target audience (preference to design on a adhoc);
- few rural female educators available and thus limited access to rural women and girls;
- approaches to learning constrained by absence of visual materials and practical tools (consequent over-reliance on lectures);
- over-reliance by health educators on mass media, despite common findings of low effectiveness as a means of information; and

- emphasis of Development of Health staff is primarily curative, not preventive.

4.2.9 Lack of Appropriate Government Policy

The Government of Balochistan has launched a major investment program for rural water supply without developing a policy for the sustainability of these schemes. PHED has been left with the responsibility to operate and maintain these schemes but it will be faced with a very large recurring budget in the near future. The financial burden will reduce the Government's ability to meet its objective of increased coverage to the rural population. Therefore a policy decision is required to either allocate more public funds for the operation of water supply schemes or to encourage more financial contributions from the beneficiaries.

The Government of Balochistan must introduce planning policies and procedures, particularly for the selection of water supply schemes. Naturally any proposed selection criteria would have to be flexible but without any guidelines investment planning is impossible. Also, without any long term planning strategy, decision makers are always preoccupied with meeting short term requirements of politicians and influential leaders.

For real progress to be made in the areas of improved sanitation, drainage, human waste disposal and hygiene, the Government will have to show tangible evidence of their concern. Although it may be difficult to allocate significant funding to these areas in the short term, the Government should be clearly identifying policies for future investment.

4.2.10 Human Resource Limitations

Most of the above mentioned constraints, stem from human resource limitations within the line departments who are implementing schemes and within planning staff at the provincial and district levels. PHED is weak in planning, has no community relations staff and their technical staff could be upgraded for system design, development of groundwater resources, and operation of schemes, including monitoring of tubewells. LGRDD staff are weak in community development and application of new low cost technologies. The Health Department has competent staff but in insufficient numbers to reach the rural population. Using other cadres to deliver hygiene messages means greater reliance on less capable staff.

The Rural Development Academy has been identified as a critical resource centre to enhance the quality of government staff and local leaders with respect to sector development. The Academy has played a very small role in the past due to limited facilities, financing and staff. Progress is already being made to greatly improve facilities, but this must be backed by good instructors and financial support for properly equipping the Academy and conducting courses. At present, very little financial authority resides with the Director of the Academy. This means that virtually all decisions must be made by the Secretary of LGRDD. More responsibility must be given to the Director for the day-to-day operations of the Academy.

Many of the solutions to the above constraints (planning procedures, new low cost technologies, institutional strengthening, community involvement and cost recovery) depend directly or indirectly upon improved human resources. Therefore the success and speed at which proposed investment strategies can be implemented is geared primarily to human resource capabilities.

4.3 Investment Strategy for Water Supply

In general, abrupt policy changes should be avoided because these could adversely affect ongoing projects. In reality, changes to implementation are likely to be phased in slowly, even though policy changes may be made very quickly.

PHED and to a lesser extent LGRDD will continue to play active roles in the sector. It is evident that 1) both departments require some strengthening; 2) greater effort is required to make projects sustainable; and 3) more attention must be placed on sanitation, drainage and hygiene education. This results in one of three options:

- greater financial resources are required to maintain the present level of new schemes and meet other objectives;

- fewer schemes will be constructed to permit greater financial resources for sustainability programmes and for sanitation, drainage and hygiene education; or

- implement lower cost water supply technologies that are more easily sustainable by villagers which would release some resources for new coverage or other objectives.

The last option is the recommended strategy because federal and provincial financial constraints are quite severe. The high priority for water supply makes it difficult to divert resources away from new schemes for investments in sustainability, institutional strengthening, human resource development, hygiene education, and improvements for sanitation, drainage and human waste disposal. The Government must be committed to a more integrated approach to sector development both from the point of policy decisions and from investment levels. If future investments in water supply schemes can focus on more cost effective technologies and can increase the recovery of O & M costs, it will be possible to shift more financial resources out of water supply schemes without reducing targets for increased coverage. Increased community participation should be a key ingredient of the long term investment strategy but not to simply recover an increasing share of PHED's O & M costs. The real reward is that people have less reliance on the public sector for the development and maintenance of water supply schemes.

4.3.1 Institutional Arrangements

The strategy adopted for institutional improvements is to strengthen the capability of existing line departments to implement sustainable schemes. It has been concluded that major institutional changes are not required but strengthening of existing line departments is essential.

Mandate

PHED should be responsible for large water supply schemes (including piped water systems from tubewell sources and water treatment plants). PHED should be responsible for the investigation and development of groundwater resources for drinking water supplies but they should make full use of information and facilities available at WAPDA and should cooperate with other agencies in groundwater management. PHED should also ensure that appropriate drainage is provided for each water supply scheme. In the longer term, PHED may be responsible for larger scale drainage projects for large villages. These objectives are consistent with PHED's present mandate.

LGRDD should be responsible for the implementation of small water supply schemes in rural areas by providing financial and technical support to communities. The LGRDD should also be responsible for the improvement of sanitary and drainage conditions and the promotion of better living standards in general. These are consistent with LGRDD's present mandate also.

The Health Department should be responsible for hygiene education and awareness programmes. Some coordination with the other line departments is essential to enable better extension to rural areas.

The Education Department should play a parallel role in the delivery of hygiene education. A large number of rural children can be reached by improving hygiene messages in the primary school curriculum and by training teachers to deliver the hygiene, messages.

BIAD is a special agency that provides an integrated approach to development in this sector. As the line departments are strengthened and inter-departmental coordination mechanisms improve, BIAD's role can diminish.

WASA is an agency that provides sectoral improvements in urban areas. Their objectives and policies should be compatible with those for the rural sector.

Institutional Strengthening

PHED requires the following institutional improvements:

- improved procedures for planning and for developing better community relations necessary for 1) proper selection of schemes and technology; 2) increasing community involvement in implementation and operation; and 3) improving the recovery of O & M costs;

- improvement in the existing system of collecting water tariffs from users with yard connection, including better administration and enforcement;

- more adequate office facilities, better and equipment and resource materials that will enable PHED to conduct their activities in an efficient manner;

- better supply of equipment and parts to enable effective groundwater investigations and development, including equipment to properly monitor tubewell operations; and

- additional vehicles to permit proper mobility of field staff during planning, implementation and operation.

LGRDD requires institutional strengthening of a different sort:

- enhancing the ability of the Technical Wing to meet new requirements in the sector;

- employment of planners at the district level to assist District Councils in preparing district water plans and developing investment priorities (initially for the water supply, sanitation and health sector);

- increasing the number and quality of female field staff at the district level;

- improved facilities and equipment for the training of departmental staff and local administrators, particularly through the Rural Development Academy but also at decentralized centres; and

- additional vehicles or greater field allowances to improve the mobility of field officers.

The Health Department requires additional Health Educators and support staff to make the Health Education Unit more effective. The number of medical technicians working in preventive care in rural areas must be increased in the future to properly reach the populace. In the short term, hygiene messages should be delivered by existing staff with the

Health Department and other departments. In the long term, these will be opportunities to increase staff to meet these needs.

The Education Department has embarked on an ambitious programme to improve education facilities in rural areas. More attention should focus on the provision of educational materials to deliver messages on health and hygiene to primary school children.

The strategy for strengthening of these departments will be accomplished as follows:

- utilize and retrain existing staff to reorient or upgrade their skills, wherever possible;

- strengthen or create specific cells within line departments for planning and monitoring;

- minimize the need for coordination between line departments but provide a better mechanism for coordination where it is necessary; and

- increase infrastructure and mobilization support to line departments.

Inter-departmental Coordination

In the short term, the strategy should be to minimize the need for inter - departmental links that would severely influence programme success. In the longer term, inter-departmental coordination is essential and should be improved. Possible improvements could be made by:

- improving planning and monitoring of sector development at the provincial level by creating a steering committee consisting of senior officials in each concerned department or agency with is supported by a permeant sub-committee including a staff member from PHED, LGRDD and Health, who have to responsibility for sector monitoring and evaluation;

- improving planning at the district level by creating a new position, with an aim to improve coordination between line departments for project implementation;

- conducting inter-disciplinary workshops at the Rural Development Academy for sectoral issues with participants from all concerned departments; and

- clarification of overlapping mandates and clear procedures for decisions that involve more than one department.

4.3.2 Water Resources Development

The hydrogeologic conditions of Balochistan require proper development and efficient management of groundwater resources. The groundwater resources are limited and swerve mainly rainfall which is meagre and unreliable. For proper planning for the development and management of groundwater resources the following improvements are suggested.

- as there are several departments in Balochistan dealing in groundwater development, coordination between them is essential;

- staff should be trained in modern techniques of groundwater development;

- schemes should be developed on the basis of feasibility studies and investigations such as drilling of test bores and test tubewells, performance of aquifer test, assessment of safe yield, etc(refer to section 2.4.__);

- groundwater resources and tubewells must be monitored; and

- due to limited availability of drilling rigs from WAPDA and other departments, PHED should continue to manage their drilling requirements separately. This will require institutional strengthening of PHED's T & M Division in terms of staffing, training, equipment, vehicles, workshops and tools;

- proper designing and construction of tubewells under supervision of trained staff.

- in the long term, the increased involvement of the private sector should be encouraged, this is likely to be pursued by other departments such as Irrigation, but PHED would benefit from improved capacity rehability and cooperative service in the private sector; and

- many tubewells in Balochistan (mainly Irrigation) required rehabilitation as result of aging or problems related to lack of planning. Thus rehabilitation plan should be developed based on investigation of existing tubewells. This will also apply to drinking water schemes more in the future.

4.3.3 Community Participation

Community involvement can greatly enhance planning, implementation and sustainability of schemes within the sector. There are several components of community involvement:

- community awareness of problems and opportunities;
- assessment of basic needs and demands;
- assessment of affordability and willingness to pay;
- organization of villages;

- creation of an effective link between villagers (organization) and line departments;
- planning for schemes;
- training (technical and managerial);
- implementation assistance; and
- acceptance of responsibility/ownership for operation.

Increasing community participation in the development of schemes requires certain capabilities within the implementing agencies that are often lacking, particularly in engineering dominated departments like PHED.

There are several options to improve this situation:

1) train existing field staff within PHED (this implies Sub-Divisional Officers and Sub-engineers); at present these staff are not qualified for active community participation and their jobs scarcely permit adequate time for this work, therefore existing staff within PHED cannot fill the role of community extension workers, although they should receive some training in community relations since they deal directly with villagers;

2) utilize extension workers in other line departments such as LGRDD development officers; this proposal raises questions of interdepartmental coordination but this appears to be a more feasible solution than employing a new cadres of extension workers within PHED;

3) utilize NGO's to provide the necessary community organization skills because they can devote more time and effort to the communities; unfortunately there is little NGO presence in the rural water supply sector and the question of coordination between NGO's and line departments does not appear workable in the near future; or

4) employment of community development workers within PHED; these would be required in virtually all twenty districts, thereby placing an increased administrative burden on PHED; one advantage is that they would work within the same department as the implementing engineers which permits closer working relationships and develops mutual respect for each others profession.

It is recommended that a combination of options 1 and 2 be pursued during the planning period, because existing staff can be utilized and inter-departmental coordination is minimal. Basically, PHED staff would still be directly involved with the communities and LGRDD staff would provide necessary support to the villagers.

PHED is currently responsible for the provision of most water supply schemes in rural Balochistan. Therefore any attempt to improve sustainability by increasing community involvement must consider PHED's approach to implementation. For water supply, it is not considered necessary for agencies to develop awareness because people are very conscious of these needs. Increased awareness is required regarding the quality of water supplies and the efficient utilization of water.

A more important step in Community participation for the implementation of projects is deciding on the appropriate type of scheme for each village. This procedure can be accomplished quickly but it must involve the community and they must be aware of their options and their responsibilities. It is recommended that PHED should carry out an assessment of needs and demands at the same time that technology options are determined. The community should then be consulted, to establish whether it is willing to accept the basic level as determined by PHED, including the community's acceptance of operation and maintenance responsibilities. If the community is not willing to commit themselves, the PHED should postpone further investigation of the scheme. In some cases, the community may actually desire a higher level of service. Such cases would have to be negotiated between PHED and the community because the community would have to accept greater financial commitments before the scheme could be approved. Before a PC-I is prepared, every proposed scheme should have a contractual agreement that states the communities responsibility for operation and maintenance of the scheme. This could vary from an agreement to pay monthly water tariffs to PHED, or acceptance of all fuel charges, or a completely community run scheme. (More details of implementation are provided in Section 5.6.1).

New schemes will still be implemented under the supervision of PHED but the community should be consulted during detailed design (e.g. sizing and location of community tanks, operation patterns, required drainage facilities, etc), monitoring of construction and selection of staff to operate the scheme. In this way, the community gains a greater sense of ownership and pride in the project, they gain a better understanding of how the system operates, and they play an active role during implementation which should culminate in a document sign by the water Committee that indicates approval of satisfactory scheme completion.

For water supply schemes financed by LGRDD, community involvement will be an integral part of every project. The community should take the lead role in deciding the type of scheme and technology to employ, the design of the scheme, selection of contractors, construction or construction management, and ultimately full responsibility for operation and maintenance of the scheme. LGRDD's role will be to support the community in terms of:

- organizing a village water committee;
- technical advice on options, detailed designs, construction materials and techniques, project management, and operation and maintenance;
- financial assistance, if the scheme meets certain criteria and is ultimately approved in LGRDD's rural development budget (sources

of funds may be secured through local councils but additional funding may be required to implement the desired scheme);

- provision of technical training for civil construction, proper installation of equipment, and operation and maintenance unless otherwise provided by the installer; and

- assistance in coordinating public and private sector agencies involved in scheme implementation, including the approval procedures, selection of contractors, preparation of tenders or contract documents, and warranties for operation.

In some situations, LGRDD may simply have to inform villagers of similar schemes being undertaken in nearby villages. In other cases, LGRDD may have to provide guidance throughout the planning, implementation and operation stages. However, LGRDD would never be financially responsible for the operation and maintenance of schemes, unless under warranty.

4.3.4 Choice of Technology and Cost

The choice of technology for water supply schemes is constrained by physiographic and hydrogeological conditions. Within these limits, the choice of technology depends upon:

- population size and distribution;

- technical capabilities of individuals, or support from the private and public sectors;

- cost of system (capital cost, operation and maintenance cost, and affordability);

- environmental considerations;

- social acceptability; and

- appropriateness of design for local conditions (e.g. using local materials and equipment) which facilitates operation and maintenance.

The strategy for selecting water supply schemes is based on cost effectiveness and sustainability. Where technologies are somewhat complex and costly, such as mechanized tubewells with piped distribution systems, only villages above 1000 people should be considered and it is preferable to achieve higher economies of scale by serving clusters of villages such that one system would serve 2000 to 5000 people. Clusters may not be appropriate unless the following criteria are satisfied:

- villages must be close enough together to avoid excessive water transmission costs;

- the topography should be suitable in terms of the location (elevation) of the tubewell, relative to the villages to be served, otherwise pumping costs may be excessive; and

- the village should share common socio-economic, kinship or ethnic backgrounds that make cooperation between the villages more successful (for decisions on scheme design, construction, operation and maintenance); this should be formalized by the creation of a water committee involving members of all villages.

If these criteria are not met, it may be necessary to develop more than one water supply and distribution system, subject to cost limitations.

Isolated settlements with less than 1000 people or village clusters with less than 1500 people total should not receive piped water systems unless gravity based sources exist (i.e. no mechanized pumping required) or they can be connected to existing systems at low cost. Where feasible, community handpumps would be appropriate because they are simple low cost technologies that can be operated by communities with some formal training in operation and maintenance. Other villages would rely on traditional sources of water such as dug wells or karez but the basic level of service should require the source to be protected against contamination. This would involve the covering of open wells, protection of spring and karez sources, and improvement of open "katcha" (mud) tanks. Handpumps could be installed on many existing dug wells. In some cases it may be feasible to install small pumps on an existing well that would discharge water into a small community tank. This would not be too costly and villagers often have the skills to maintain this size of equipment.

Another option that should be considered is the sharing of existing irrigation water supplies. There are more than 9000 privately operated irrigation wells that already have mechanized pumping. In most cases, people are already taking water from these sources based on traditional arrangements for sharing water. In some areas this agreement could be formalized between the villagers and the landowner, provided the well has adequate capacity to meet future needs. The service level and convenience could be improved by constructing a community tank to supply the villagers needs. The villagers may agree to bear the extra fuel cost for filling the tank each day, otherwise the landowner would be responsible for operation and maintenance. In cases where open wells are used, these could be covered to prevent contamination of drinking water. The capital cost of these improvements could be paid by the government at a cost much lower than installing a complete new water supply. This solution would be appropriate wherever the development potential of additional groundwater resources nearby are limited. The viability of this option would depend upon agreements with landowners but the potential target group is estimated to be nearly one million people, so even limited success would have a major impact.
Table 4.2 shows the recommended basic levels of service for various settlement sizes and technology options.

TABLE 4.2 **RECOMMENDATIONS FOR BASIC LEVELS OF SERVICE**

Water Source	Village of < 1000 People	Village of > 1000 People or Cluster of > 1500
Groundwater	Protected well Handpump	Mechanized pump, transmission & community tank
Spring	Piped to tank	Piped to community tank
Surface water	Treatment	Treatment and distribution
Existing irrigation supply	Protected well & community tank	Not available due to large quality of water demanded
No nearby source	Truck water to community tank	Develop distant source or treat available surface water

For piped water schemes, PHED's present policy is only to provide community tanks. This policy is reasonable in the short term but PHED should consider the provision of distribution systems to larger villages (more than 3000 people) that show good growth potential. Given the present limitations on capital, this is not likely to be feasible until the 8th Five Year Plan.

For larger villages, PHED is justified to provide piped water supplies based on tubewells because the per capita cost is reasonable (Rs 500 to Rs 800) and it provides a level of service that will be necessary as the village grows in size. At present PHED's policy is to only provide community tanks but the systems can be designed to permit future distribution systems and extensions. As distribution systems are introduced in the larger villages, there will be greater need for drainage systems. This is a long term process that should occur as villages expand to become towns. Thus the level of service should increase to be compatible with proposed strategies for towns. Since PHED is responsible for the provision of drinking water to both rural areas and towns, it is recommended that master plans be developed for larger villages that show likelihood of growing into towns.

At present, PHED is developing costly water schemes for villages that are very small or scattered and show limited prospects for rapid growth. In these cases, PHED should seriously consider community handpumps as a low cost and sustainable option. PHED should conduct test bores around the villages proposed for new schemes to determine whether groundwater is available at depths appropriate for handpumps (50 metres). At these depths the Afridev handpump, which is available domestically, can deliver adequate supplies of potable water for 200 to 300 people. In Balochistan small villages should have a number of two handpumps; given the large number of small related villages the average number of people has been estimated at 150 per handpum. PHED should develop tubewells on handpumps boreholes and the pumps could be installed by PHED or private contractors. This is presently being tried by PHED with assistant from UNICEF. If water is not found at suitable depths, PHED can develop the wells further for mechanized pumping. Even the cost of these systems can be reduced with some design improvements as described in Section 2.4.1.

4.3.5 Cost Recovery

The reasons for cost recovery are to reduce the Government's burden for financing new schemes and operating costs, and to increase sustainability, assuming that systems will function better for longer periods of time if operators/owners are responsible and held accountable.

The Government of Baluchistan should be responsible for providing the capital cost for the basic service levels of water supply schemes. Local contributions to capital cost should be encouraged, but are not a prerequisite for approval wherever basic needs have been established. For the operation and maintenance cost, the communities should pay all or most of the cost, subject to affordability. For large water supply schemes, some subsidy may be required but every beneficiary should make regular financial contributions to offset part of the operating and maintenance costs. The community or individuals should be fully responsible for running smaller, low cost schemes such as handpumps, simple drainage systems, etc.

In the short term, three methods of recovering operation and maintenance costs are proposed:

- for existing PHED schemes having customers with yard connections, PHED should improve their system of collecting water tariffs collection and administrative methods), impose penalties for defaulters and unauthorized connections, and increase tariffs to keep in line with inflation of fuel prices and operating salaries, an immediate increase from Rs 20 per household to Rs 30 per household would be justified on the basis of inflation that has already occurred and based on survey results consumers would be willing to accept this increase (see Section 2.2.14);

- for new schemes, PHED should have contractual agreements with the villagers (village committee) regarding the community's contribution to operating and maintenance costs. Since new schemes are to be based on community tanks, it is necessary to deal with the community on a collective basis and to negotiate levels of contribution that are realistic for each scheme depending on the operating cost of the system and people's ability to pay. This policy should also be implemented for existing schemes that are based on community tanks or standposts. Contractual agreements would have to be arranged at an appropriate time (e.g. when repairs or extensions to the system are demanded); and

- for schemes implemented by LGRDD, the responsibility for operation and maintenance will rest solely with the community; LGRDD would be available for technical assistance but not financial assistance.

The ultimate long term objective is two-fold. For large villages that have yard connections, a system of revenue collection should evolve based on household tariffs. Once this system is operational and effective, the responsibility of O & M costs and revenue collection could eventually be turned over to a town council committee when the village achieves such status, and provided the Town Council shows the capability to manage O & M (this has yet to be proven). For smaller villages, the water supply system will be operated more communally.

Ultimately these systems should be fully operated by villagers but technical assistance and subsidies for running mechanized system are required until communities are capable.

4.3.6 Human Resource Development

Human resource development and training are required to support other strategies for institutional strengthening, community involvement, cost recovery and technology improvements. Although human resource development and training requirements tend to be dictated by other project components, there are still some strategies to be considered such as:

- maximizing the utilization of existing facilities and staffing capabilities, whenever feasible;

- minimizing the capital cost and recurring cost implications of training programmes;

- centralizing training programmes where teaching facilities and faculty are limited; and

- decentralizing programmes when extension workers exist and the targeted audience is numerous and widespread; and

- planning for both short term and long term requirements.

The objective is to improve both PHED's and LGRDD's capability to implement water supply schemes, such as improved planning, design, construction techniques, operator training and community relations.

PHED

Human resource development and training programs are required in several areas for existing and new staff:

- developing a training coordinator who would be responsible for establishing a program for operator training and identifying other needs within the technical staff for refresher courses, new technology seminars and community involvement workshops;

- upgrading technical design capabilities to encourage improved systems and expand knowledge to other low cost technologies (handpumps, primary water treatment, etc);

- training a group of community relations officers in project assessment, community negotiations and cost recovery principles;
- training Executive Engineers and Sub-Divisional Officers in new planning and implementation procedures and in community involvement;
- improving the capability of staff in the Electrical & Mechanical Division to test, develop and monitor groundwater resources, including drilling techniques, installation of tubewells and

associated machinery; and

- broadening the knowledge of public health concerns including sanitation, drainage and health and hygiene implications for all staff members.

LGRDD

LGRDD staff require training to implement the broad spectre of sectoral activities. Therefore the training needs for water supply schemes will have some overlap with those for drainage, human waste disposal and hygiene education. The following areas were identified:

- training of development officers for planning and implementation principles and procedures, particularly liaison between the villagers and officials in local government or line departments;

- training of Assistant Engineers and Overseers in low cost technologies, particularly handpumps, to be able to install, supervise and commission new schemes;

- training of mechanical/electrical mechanics as caretaker master trainers to teach and assist village caretakers to operate and maintain their water supply schemes;

- upgrading the skills of Assistant Directors in planning strategies and development of District Plans for the sector, in cooperation with District Councillors; this activity should be supported by a full time District Planner hired by the District Council;

- training for new female Community Hygiene Promoters at the District level (refer to section 4.6);

- increasing awareness of field staff about the needs of women and the potential roles they can play in development, the proposed Community Hygiene Promoters should work closely with Development Officers and planners to increase this awareness;staff member;

- training of Development Officers and Union Council Secretaries in the self-help principles and the creation of community organizations or water committees; and

- awareness programmes for local politicians and administrators regarding public health issues and implementation policies.

4.3.7 Project Selection Criteria

In order to develop District Plans for water schemes, criteria need to be adopted for identifying and selecting projects. Investment decisions should derive the greatest benefit in the most efficient manner in terms of cost, time and human resources. Criteria should be adopted which permit decision makers to approve or reject water supply, sanitation and drainage projects. Without any criteria to judge schemes, decisions will be politically motivated and only the short term needs are likely to be met. The following criteria are recommended:

- establishment of need on the basis of existing water supply, quantity, quality, reliability, and accessibility (cost);

- cost effectiveness of the proposed schemes (per capita cost);

- low operating and maintenance cost;

- systems that have high potential for cost recovery (payment of operating and maintenance cost);

- use of local inputs wherever possible (land, labour, and materials);
- appropriate and simple technology;
- minimum levels of institutional support for construction, operation and maintenance;
- beneficial impact on health status;
- degree of impact on potential for economic development;
- minimum adverse environmental impacts (such as drainage problems);
- systems are socially acceptable; and
- projects that have political support (preferably through the planning process that is proposed).

Table 4.3 shows a summary of the types of technology options proposed and an assessment of how well they satisfy the criteria. Where the above criteria are satisfied, the potential for sustainable systems is very good. For water supply schemes, the best options include community hand pumps, improvement of dug wells, and piped water systems from springs or infiltration galleries which are gravity fed. These require simple, low cost technology and are inexpensive to operate and maintain. Unfortunately, these systems are not possible in areas where groundwater is deep or of poor quality (high salinity). Consequently, tubewells with reservoir storage are often the only option to serve clusters of population in these areas.

TABLE 4.3 **CHOICE OF TECHNOLOGY**

Technology Type	Satisfaction of Investment Criteria
Water Supply Schemes:	
Piped water from tubewell with house connections	Very Good
Piped Water from tubewell with community tanks	Good
Piped water from Spring (gravity) with house connections	Very Good
Piped water from Spring (gravity) with community tanks	Very Good
Community hand pumps-shallow	Excellent
Community hand pumps-deep	Excellent
Improved dug well	Very Good
Piped water from karez with community tank	Good
Slow sand filtration plant for surface water supplying community tanks	Good
Sedimentation tanks and water treatment for surface water supplying community tanks	Good

4.3.8 Involvement of Women

For new water supply schemes, community participation should be an important feature, preferably with the formation of a water committee to negotiate contract agreements with PHED or to take over full ownership and operational responsibilities in the case of LGRDD assisted schemes. Typically these committees will be set up without any female members as it is uncommon for women in Balochistan to participate in decision-making matters. It is more feasible to set up a separate committee for females from the village that could discuss their problems and needs. A senior female representative could then present their concerns to the formal water committee. This procedure has been accepted in District Kachhi for one of the Pak-German projects.

Representation from women should be mandatory for water supply projects because of their large impact upon women's lives. This may simply be a meeting with women in the village during the planning stage when decisions are made; or it may involve full time membership of women on the water committee for operating and maintaining schemes. For LGRDD schemes, a female Community Hygiene Promoter would be utilized to assess women's needs throughout the planning and implementation phases. One of the village women should be designated as a spokesperson for any grievances during operation of the scheme. For PHED schemes, there should be a section of questions in the needs assessment survey to be answered by women in the village. These could be completed with the assistance of LGRDD staff.

In the preparation of District water plans, the female councillors should be encouraged to voice women's concerns and priorities within the sector. LGRDD could assist this process both through the proposed female Community Hygiene Promoters (CHPs) at the district level and through training courses and seminars at the Rural Development Academy directed at councillors regarding public health issues.

4.3.9 Environmental Considerations

Water supply systems must be implemented with proper concern for wastewater drainage that could otherwise present adverse environmental conditions. Since the majority of water supply schemes are to be based on community tanks or handpumps, the problems will be less severe and the solutions are relatively simple. For community tanks, it is recommended that concrete open channels be used to divert wastewater into natural drainage channels away from the village or channelled to a safe distance from the village (500 m) to a location where environmental problems are minimal. A separate trough can be made near the tank to provide water for animals to drink and another area can be provided for women to wash clothes. This should be arranged so that sullage water feeds into the open channels is preferable to the disposal of large quantities of water within household compounds.

In the future, the larger villages will more likely receive water distribution systems with yard connections. This increases usage of water per capita and creates drainage problems throughout the village. Soakaway pits may provide a simple solution in some areas but generally a more sophisticated community drainage and disposal system is required. This problem must be dealt with at the same time that upgraded water service is proposed. At present, the full cost implications of drainage are rarely considered. Consequently, most larger villages with water systems have serious wastewater problems that are not resolved for lack of concern, funding, technical skills or institutional capabilities.

4.3.10 Private Sector Involvement

At present, the private sector in Balochistan is not capable of providing water supply to villagers on a large scale, independent from public schemes. However, the private sector already plays a key role in the implementation of public sector schemes. This is unlikely to

change, for at least the next ten year, because virtually all of the investment in the sector is made by the public sector. The only exception may be handpumps but there are few being installed at present and the public sector should again be the main force behind any handpump program in the near future.

The private sector should be encouraged to expand their presence in the sector as the demand for more individualized services is likely to increase as the level of service improves (e.g. house connections and related drainage facilities). To encourage greater private sector involvement, seminars and courses for artisans could be conducted at the Rural Development Academy. LGRDD Development Officers should identify the availability of local skills and promote their use in villages.

Another area of potential increased private sector involvement is in the drilling of tubewells. At present PHED has limited capacity to manage

the proposed number of development wells. Previously PHED has met their targets by employing drill rigs from other departments. In the future PHED may not be able to rely on other departments to fulfil their needs which means they must either purchase additional rigs or hire work out to the private sector. Since PHED currently has the largest program for developing new tubewells, the private sector should be anxious to make competitive bids for this work. It is recommended that PHED compare the full cost of purchasing and operating new equipment against the cost of hiring some private contractors to augment their drilling program.

4.4 Investment Strategy for Human Waste Disposal

4.4.1 Institutional Arrangements

The Government of Balochistan has no strategy for the provision of human waste disposal facilities for the rural population. The only projects programmes for construction of latrines have been through donor

supported programmes such as BIAD, Pak-German, UNICEF and WASA. Similarly, the Government has no policy for providing latrine facilities in rural institutions (e.g. schools and health centres).

The recommended strategy is to first provide basic facilities in rural institutions as both an urgent need and for promotional/educational purposes. Communal facilities are not recommended. Secondly, using LGRDD staff, the Government should actively promote the construction of household latrines. Latrines should be promoted because they provide adequate means of human waste disposal which prevents contact between humans and faeces. A properly designed latrine will also alleviate smells and related health hazards, provided the latrine is cleaned regularly. LGRDD would offer technical expertise, assistance for villagers to find good masons, training for masons, and financial assistance for demonstration projects.

In rural Balochistan, the need for latrines is considerably less than more densely populated areas and the demands are lower due to low income and education levels. For this reason, promotion should initially focus on teaching proper disposal requirements and hygiene habits, and only then on latrines. Therefore the basic level of service should be to improve existing systems by keeping defecation areas cleaner and promoting hand washing after defecation.

4.4.2 Cost Recovery

For latrines, maximum private contributions should be encouraged for capital costs (depending upon technology choice). Due to the lower level of public sector involvement and simpler requirements for operation, full recovery of operating and maintenance costs is feasible and should be mandatory. Since many rural people find the cost of latrines to be expensive, the wide acceptance of latrines will not occur unless cheaper options are used.

4.4.3 Technology Choice and Cost

The technology choice for latrines involves several criteria:

- low cost of materials and equipment;
- social acceptability;
- sanitary and environmental suitability; and
- low maintenance cost.

The technology options that meet these criteria include the pour-flush latrine, where water is available through yard connections the VIP latrine, where water is not available in suitable quantities. For much of rural Balochistan, simple vented pit latrines would lower the cost and still provide acceptable sanitary disposal. Vented pit latrines are more likely to be required due to lack of convenient access to water for pour - flush latrines. This is consistent with the policy of providing water only at community tanks or handpumps. In the larger villages where water distribution systems are already in place, low cost pour - flush latrines should be favoured based on successful experiences in BIAD.

4.4.4 Private Sector Involvement

The Government has not favoured any programmes to provide financial assistance for the installation of household latrines. The construction of latrines is viewed as the homeowner's responsibility. Therefore the private sector must take the initiative to provide an adequate low cost service. As mentioned above, government assistance will be required to generate increased demand by promoting the use of low cost latrines and to assist the private sector in learning technical and business skills for providing household latrines. Initially, the government (through donor agencies) may subsidize part of the capital cost for demonstration projects but the success of the latrine program would depend upon

complete financing by the beneficiaries. Some masons may be interested in developing credit systems to reduce the capital cost burden for potential customers. This is a longer term initiative that requires further consideration after other programmes are functioning.

4.4.5 Involvement of Women

It is essential to involve women in the human waste disposal programmes because they are perceived as the main beneficiaries and therefore their approval of new habits and designs is essential. The promotion of latrines should also be aimed at men since they decide whether a capital outlay is made. The women should be convinced that better facilities for defecation are desirable because men are largely indifferent to the use of latrines. Survey evidence revealed that women would like to have latrines for convenience and privacy but they did not perceive health benefits. Thus, the promotion of latrines to women should not be very difficult. However, the men should also be convinced that a latrine offers health benefits to the women, children and themselves. Observations of existing practices have shown that men do not accept that latrines should be used by both sexes. Promotion and education should aim to alter these beliefs in order that everyone could benefit from the use of latrines. If men are convinced of the wider benefits of latrines, they are likely to invest money to enhance their lifestyle.

The education of people in better human waste disposal habits and facilities is a difficult task, probably requiring a lot of time with villagers (males and females) to gain their confidence and get them to adopt ideas that require behaviourial changes. Learning through example has a more powerful affect but the initial process often begins slowly. Since LGRDD is to be the lead agency for this programme, they must have female field staff who are from the region in order to have good communication with the village women.

4.5 Investment Strategy for Sanitation and Drainage

4.5.1 Institutional Arrangements

Concrete or pipe drainage systems are too costly for rural villages in Balochistan and this technology is not always appropriate. For this reason, it is recommended that simple, locally constructed drainage schemes be promoted where needed. LGRDD would be the lead agency since the emphasis would be on promotion and organization of the community to implement and manage these schemes. LGRDD would provide technical assistance but little if any financial assistance. In cases where drainage problems are more severe, funds would be obtained through normal channels such as the District or Union Council (i.e. rural development grants).

Large scale drainage schemes implemented by PHED are not recommended for rural areas because they are costly to implement in villages and the benefits are questionable. In areas where topography provides good drainage no major infrastructure is required; where topography is not suitable the simple provision of open drains may create a larger problem unless the wastewater can be properly disposed. In Nasirabad Division where conditions of low gradients and high water tables prevail, the need for drainage is much greater than the rest of Balochistan, but the first priority is still drinking water supply. In villages, it is preferable to provide rudimentary drainage systems which could be constructed by villagers with some technical assistance from LGRDD. These would deliver most of the benefits in a cost effective manner. Also, it would enable improvements to be made immediately without depending upon public sector financing that will be unavailable.

4.5.2 Community Involvement

The community should take the lead role for low cost sanitation and drainage improvements. The community must take the initiative and provide the materials and labour. The role of LGRDD is to facilitate this process by promoting appropriate improvements, educating villagers of the health benefits and providing technical advice regarding ways and means to improve sanitary and drainage conditions in the community. LGRDD staff (i.e. development officers and overseers) need to receive training in simple, effective techniques for improvements and must be capable of motivating and organizing the community. Such improvements could best be implemented at the same time as water supply schemes are being constructed and promotional programmes could be integrated with latrine and hygiene education programmes.

4.5.3 Environmental Concerns

When rudimentary household drainage is provided by villagers, problems inside courtyards tend to be solved to the detriment of the public areas. The proposed improvements should resolve problems in these communal areas but there is still the problem of proper disposal. In some villages, wastewater poses health hazards when it collects in low-lying areas adjacent or even within the village. Proper drainage systems should remove sullage to natural drainage channels, to soakaway pits, to fields where infiltration is quite rapid, or (when the quantity and quality of wastewater makes other options inadequate) to sedimentation ponds at some distance from the village. In the majority of villages, simple options will suffice because most villages will not have water supply distribution systems, and the climatic, topographic and soil conditions generally preclude serious drainage problems.

Poor sanitary conditions also include improper solid waste disposal, which is typically dispersed randomly throughout the village, often blocking drainage channels. When suggestions are devised to improve drainage, attention should also be given to locating solid waste disposal sites at appropriate locations outside the village. The community must ensure that these sites are properly utilized and managed, through burying and burning, to prevent other environmental problems such as infestation of rats. LGRDD staff should give advice to minimize environmental hazards. This will be covered in hygiene education.

4.6 Investment Strategy for Hygiene Education

The strategy for a hygiene education programme is to:

- mobilize relevant government staff that have proper training and time to impart knowledge to others;
- inform villagers through various approaches and media;
- encourage and support good hygiene practices on a continuing basis;

- create awareness in government departments of links between adequate water supply, proper sanitation and health conditions; and

- promote hygiene education from within the community, focusing heavily on information transfer through women.

The key elements of the proposed hygiene education strategy are:

- strengthening of the capacity of Health Education Officers within the DoH to undertake hygiene promotion;

- recruitment of a small number of female Community Hygiene Promoters (CHPs) by LGRDD with Health Technician or Lady Health Visitor training;

- commence community level hygiene promotion as part of the implementation process for new water supply schemes; and

- follow-up hygiene promotion through trained TBAs and primary school teachers within the village.

4.6.1 Institutional Arrangements

The Department of Health should be the lead agency to develop programmes and materials, train TBAs in health education and deliver messages through mass media. In particular, the Health Education Unit must be strengthened, with technical assistance, equipment, staffing and finance. Health Educators will be responsible for the development of hygiene education materials and to assist in the training of LGRDD field staff in hygiene promotion.

The LGRDD will provide a focused delivery of hygiene messages through water supply, sanitation and latrine projects. A new LGRDD Hygiene

Promotion Cell will be established at the district level that will include two female Community Hygiene Promoters (CHPs), the Development Officers, and Secretaries of the Union Councils. Community Hygiene Promoters will work with TBAs and local school teachers in the targeted village. They will rely upon materials developed by the Department of Health and LGRDD field staff will require training in hygiene education procedures for communities.

The Department of Education should have the responsibility of providing hygiene messages and promoting proper hygiene in the school curriculum. New materials should be developed that will facilitate teaching proper hygiene to children. Teachers could also be encouraged to disseminate information amongst adults in the village on a voluntary basis. They have the potential to reach more than 2000 (one-third) of the villages in Balochistan.

4.6.2 Channels of Communication

The primary channel of communication of hygiene education messages will be interpersonal, with limited and careful use of the mass media. The most basic channel of interpersonal communication should be the LGRDD Development Officers who are responsible for the initial introduction of new schemes to the village. They will be accompanied by a female CHP who will work with the women of the community.

The most numerous health workers are the TBAs. Their fee-for-service does not lend itself to a large role in health promotion, although they can play an important role in the hygiene aspects of post natal care. Their widespread presence, however, is a powerful argument for experimenting with them as hygiene promoters with special training and remuneration, in donor supported demonstration projects. The TBA could organized hygiene promotion in their home communities and would be Supported by visit from the LGRDD CHPs during and after project implementation.

Although primary schools are constrained by relatively low enrolments and high drop out rates they are still the single most effective means of reaching the children of a community. This channel will be enhanced by strengthening of the school curriculum on hygiene, the development of school materials, and in-service and pre-service teacher training. To both improve the school infrastructure and provide the capacity to practice hygiene, a water supply should be provided. The question of school latrines is also important and construction can be attempted where there is support from the community for its financing, and assurance from the school that the latrines will be accessible to both pupils and teachers and that it will develop a mechanism to ensure that they are kept clean.

Mass media have a role to play in building general awareness of the importance of hygiene and, perhaps, in the communication of selected specific hygiene messages. With the cooperation of PBC and PTV, a variety of different forms could be used on radio and television, including spots and portrayal in "soap" dramas.

4.6.3 Community Involvement

Hygiene education must reach villagers directly in order to achieve maximum health benefits from investments in hygiene. Good hygiene habits will often require behaviourial changes that are rooted in social, cultural or religious beliefs. The people must have confidence and respect for the person providing hygiene education. This is often more important than a complete understanding of the problem because people with low education levels cannot easily comprehend the complexity of causes of illness. Instead, if they believe that it is more socially acceptable to wash hands after defecation, they will be just as able to practice good hygiene.

The village committees that will manage new water supplies or other sector investments will be expected to provide leadership for the dissemination of information on improved hygiene and support to the adoption of new hygiene behaviours. The importance of community support to new behaviours cannot be under-estimated. Hygiene messages alone will not change behaviour. The combination of new opportunities for better hygiene made possible by improved water supply together with new information from hygiene education and community support and encouragement for better hygiene increase the probability of the desired behaviourial changes.

4.6.4 Involvement of Women in Hygiene

Hygiene education programmes should be directed at women because they are responsible for cleanliness and health problems within the household. Women are responsible for teaching children proper habits and must care for the needs of infants. Women will be reached through a variety of channels, particularly through community women's groups and through home visits by female village level workers during the introductory phase of new water schemes. Where a women's group does not exist, informal meetings should be held with the assistance of the local TBA or another respected member of the community. One important principle of hygiene promotion will be to improve hygiene without increasing the net burden of women's work. In other words, the time saving in easier collection should be sufficient to give women the extra time that higher hygiene requires.

The second line of education will be aimed at the children through the schools. This can help to reinforce the education that women receive, since children interact closely with mothers on these matters. The men are the last to receive hygiene messages but since these will come from within the home, they can be very effective. Mass media can also reinforce these messages and are more likely to be received by men. All these approaches must be implemented in an integrated manner to maximize their effectiveness.

4.6.5 Human Resource Development

The key to hygiene education is the delivery of messages at the village level on an ongoing basis. Many materials and procedures already exist within the Health Department, BIAD and other agencies like UNICEF. Finding qualified staff with the time and devotion to deliver hygiene messages in rural areas has been the critical problem. LGRDD Development Officers can provide a convenient entry point to villages

but they do not presently have the qualifications to deliver hygiene education. The proposed Community Health Promoters would provide this expertise and could work in a coordinated manner with existing LGRDD field staff. Since CHPs will have limited time in each village, it is necessary that an educated or informed person in the village be available to carry on these messages. Two people can normally be approached -- the TBA and the local school teacher (usually male). Both of these people require some training to properly deliver hygiene education but they represent the best solution for a sustainable programme. The training requirements are large and every effort should be made to make them a success. TBAs are already trained by the Departments of Health and Social Welfare; these programmes should be stepped up with appropriate focus on hygiene education. For primary school teachers, the courses at Teachers Training Colleges should have specific hygiene education content which is coordinated with new material and curricula development for the schools.

4.7 Recommended Policy Decisions for the Government of Balochistan

Service Levels

- water supply by community tanks or handpumps; and

- piped water supply to villages greater than 1000 people or village cluster greater than 1500 people.

- sanitation\drainage should be promoted in small villages through a self help approach.

- humane waste disposal will be left to the private sector with limited demonstration projects and promotion; and

- hygiene promotion should be carried out by field staff of various departments particularly during the implementation of water supply schemes.

Community Responsibility

- beneficiaries should contribute to operating and maintenance costs of PHED water supply schemes; and
- PHED would retain overall responsibility for supervision and major repairs to mechanized pipe to water schemes. LGRDD schemes would be owned and operated fully by the community.

Institutional Mandates

- P&D for monitoring evaluation for coordinating sector development;

- Education department to promote hygiene education through primary schools;

- PHED for large villages water supply;

- LGRDD for an integrated approach to sector development in rural areas. Monitor and coordinate sector development at the district level; and

- Health department for setting standards of staff and material used in hygiene promotions.

Targets for Water Supply Coverage

- 45% by 1993 and 70% by 1998; and
- focus to be spread to all sizes of settlements but large settlements should have 100% coverage by 1998.

Project Selection Criteria/Guidelines

- PHED should develop a set of project selection guidelines along the lines suggested in Section 4.3.7.

Formulation of District Plans

- each Districts should prepare five year plans for water supply indicating investment cost, technology options and coverage benefits.

5. STRATEGIC INVESTMENT PLAN

5.1 Review of the Current Investment Plan

5.1.1 Public Sector Development Plan

In the Provincial Budget for the fiscal year 1989/90, an amount of Rs. 344 million has been allocated for rural water supply, sanitation/ drainage, human waste disposal and hygiene education. The source of funds and allocations are as follows:

	1989/90 (Rs. million)	1988/89 (Rs. million)
Annual Development Programme		
. PHED (rural schemes)	239	149
. LGRDD (rural schemes)	12	11
. Rural Development Academy	8	7
. Valley Development*	10	10
. Rapid Development (RDP)	30	0
Donor Assisted Programmes (SDP) (EEC/BIAD,UNICEF,LGRDD/GTZ)	45	10
TOTAL	**344**	**187**

Note: * For tribal Districts (Kohlu and Dera Bugti).
Source: Annual Development Plans, Planning & Development Department.

The 1989/90 budget represents an 84% increase over the expenditures incurred in 1988/89. This increase is largely accounted for by a 60% increase in PHED's allocation for rural water supply, Rs. 30 million for the newly announced Rapid Development Programme (RDP) and the EEC's decision to finance the completion of BIAD Phase II. UNICEF is currently reassessing their commitments for the sector but they anticipate continued involvement in the water supply sector as well as health and hygiene education.

No allocations have been shown for the People's Programme because the Government of Balochistan has not yet agreed to release funds that are not to be dispersed through regular departmental channels.

The investment is divided among the following components:

	Budgeted 1989/90 (Rs. million)	Actual 1988/89 (Rs. million)
Water Supply Schemes		
. PHED (rural only)	233	132
- Ongoing	(84)	(3)
- New	(81)	(99)
- Extension & Improvement	(22)	(25)
- 23 Incomplete schemes	(27)	(0)
- Development of Water Sources	(19)	(5)
. Valley Development	10	10
. LGRDD/Rural Councils/GTZ	13	12
. Rapid Development Programme	30	0
. Completion of BIAD Phase II	35	3
Sanitation/Drainage and Human Waste Disposal		
. EEC/BIAD	3	1
. PHED and LGRDD	2	2
Hygiene Education		
. EEC/BIAD	2	1
. UNICEF	3	3
Institutional Strengthening		
. PHED	5	16
. Rural Development Academy	8	7
TOTAL	**344**	**187**

PHED's development budget is now larger than any other individual sector. This year's programme requires significant funding to complete

67 ongoing schemes that were started the previous year plus an ambitious number (147) of new schemes. In addition, two block allocations were made:

- Rs. 19 million for developing 60 new water sources for future schemes; and

- Rs. 27 million to complete 23 schemes that had not been started for various reasons.

The LGRDD allocations to the sector are virtually unchanged from those of the previous year. All of these funds are provided to the District and Union Councils as grants for implementing development schemes.

The Rapid Development Programme is a new name given to the development funds that are allocated by MPA's. These funds have always been available in one form or another and are considered a regular feature in the future development plans.

The line departments are spending a very small amount of funding on sanitation/drainage, human waste disposal and hygiene education. The Donor programmes include BIAD and UNICEF, but even these funds are limited.

With regards to institutional strengthening, LGRDD is constructing a new Rural Development Academy that will enhance training opportunities for the sector. Roughly Rs. 8 million has been allocated in each of the last three years. This year, Rs. 5 million has been approved for PHED to begin construction of workshop and offices for the Electrical & Mechanical (E&M) Division. In 1988/89, Rs. 16 million was allocated to PHED for purchasing spare parts and equipment for drilling rigs and for vehicles.

5.1.2 Recurring Budget Allocations

In 1988/89, PHED had annual operating expenditures of Rs. 102 million, of which 56% was for administration, 34% was for running and maintenance, 7% was for general repairs, and 3% was for extension and improvements. Based on the share of existing rural to urban population served, it was estimated that 75% of these costs were attributable to rural water supply.

For 1989/90, the Government has sanctioned 412 additional posts within PHED at an annual cost of roughly Rs. 8 million. Most of these new positions are for operators, valvemen, chowkidars and clerical staff to assist the operation of newly completed schemes.

In 1988/89, the Rural Development Wing of LGRDD had total recurring expenditures of Rs. 34 million, of which Rs. 33 million was allocated for departmental administration and Rs. 1 million was allocated to the staffing and operation of the Rural Development Academy. Neither LGRDD nor the rural councils were involved in the operation of water supply schemes.

The Department of Health had recurring expenditures of Rs. 315 million in 1988/89. The expenditures on the Health Education Unit were approximately Rs. 1 million, the majority (80%) of which was for staffing.

The SDP has short term recurring costs included in the development budgets above (e.g. BIAD and Pak-German), with the exception of government staffing costs. The long term operation and administration costs of these projects (if any) will usually become the responsibility of the relevant line department.

The following table shows the recurring expenditures for the rural water supply, sanitation, drainage and hygiene education sector during the previous and current fiscal years:

	Budgeted 1989/90 (Rs. million)	Actual 1988/89 (Rs. million)
PHED Rural Water Supply (75% of total)		
. Running & Maintenance	20	18
. Equipment & Spares for Rigs	4	4
. Maintenance & Repair	5	3
. Extension & Improvement	2	5
. Administration	40	37
Sub-total	71	67
LGRDD		
. Rural Development Academy	1	1
Health Department		
. Hygiene Education	1	1
TOTAL	**73**	**69**

5.2 Proposed Strategic Investment Plan

5.2.1 Investment Plan Strategy

The strategy for developing the investment plan was to:

- identify government policies and targets for the sector and estimate the financial, human and institutional resources required to meet the goals;

- identify available financial resources for the sector;

- determine the degree to which financial and institutional resources represent constraints on meeting the targets;

- within these limitations, reallocate financial resources in a manner that most effectively satisfies investment criteria and is politically viable; and

- identify financial shortfalls that could potentially be met by external donor financing.

The Federal Government has proclaimed national targets of 75% coverage for water supply and 50% coverage for proper human waste disposal by the end of the 7th Five Year Plan and 100% and 75% coverage respectively by the end of the 8th Five Year Plan. Typically, national targets are taken lightly in Balochistan because the local conditions often demand more conservative targets. Nonetheless, the Provincial Government is very serious about meeting demands for water supply and over the last three years a major thrust has occurred, both financially and institutionally. The Provincial Government has not developed five year planning targets for the sector but reasonable provincial targets for water supply are more modest. There are no targets for rural sanitation, drainage, human waste disposal or hygiene education. Despite the great need in these areas, little demand has been expressed and thus low priority has be given.

The assessment of available sector resources revealed that these lower targets for water supply can be achieved. An estimate of 50% by 1993 and 70% to 75% by 1998 is very realistic and would represent impressive progress.

The assessment of resource availability and impacts on coverage has been performed using a computer model to handle various data and assumptions at the District level. However, it is evident that the institutional capacity to implement existing levels of investment is a more serious constraint than financial limitations. As a result, the strategy for the investment plan shifted away from the required funding levels in new schemes and towards requirements for sustainability. This is considered critical because the investment model can generate results from new investments but it does not reveal the quality of investments. Also, attention must be given to existing schemes simply to maintain the present quality of coverage. Therefore, any projections of future coverage levels would be exaggerated without proper attention to institutional strengthening and human resource development.

The conclusion is that a somewhat larger share of funding will be required to better equip and train departmental staff and local officials for improved planning, implementation and operational procedures.

5.2.2 Overview of the Proposed Investment Plan

All costs provided in the remainder of Section 5 are in constant prices (June, 1989). Section 6 assesses the plan in current prices.

The recommended investment in the Sector for the balance of the 7th Five Year Plan is Rs. 1021 million (or roughly Rs. 340 million annually). During this period, it is estimated that Rs. 920 to 940 million would be available to the Government through the Annual Development Programme. The remainder would be derived from sources external to the Province or possibly from existing donor programmes. The European Economic Commission (EEC) funding for BIAD has been excluded because they represent a short term investment to resolve problems of earlier projects. Various possible scenarios have been considered separately in Section 5.4.3.

During the 8th Five Year Plan period, the recommended investment in the Sector is Rs. 1795 million (or roughly Rs. 360 million annually). The expected funding available from the ADP is Rs. 1679 million.

Table 5.1 shows the recommended investment plan by component and implementing agency for the 8 year planning period. In 1990/91, an annual investment of Rs. 343 million is required and by 1997/98 an estimated Rs. 367 million will be needed to satisfy requirements in the sector in line with the proposed strategy. Table 5.2 provides a summary of the investment plan for the two plan periods.

TABLE 5.1

RECOMMENDED CAPITAL INVESTMENT PLANS FOR THE SECTOR

(Rs. million at constant prices -- June 1989)

	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98
PHED Schemes								
Water Supply Schemes	175	177	179	179	182	182	184	184
Rehabilitation	25	25	25	25	20	20	20	20
Extension/Upgrade	5	5	5	9	15	15	23	23
Source Development	30	30	30	30	30	30	33	33
Sanitation/Drainage	2	2	3	3	5	5	5	5
Institutional Aid	15	19	11	11	9	8	8	3
HRD & Training	6	4	2	1	1	1	1	1
Sub-Total	**258**	**262**	**255**	**258**	**262**	**261**	**274**	**269**
LGRDD Schemes								
Water Supply	15	21	29	35	41	41	45	45
Sanitation/Drainage	1	1	1	2	2	2	3	3
Latrine/Hygiene Promotion	0	1	1	1	2	2	2	2
Institutional Aid	5	5	3	3	5	4	3	3
Rural Development Academy	13	7	1	1	2	1	1	1
HRD & Training	6	4	2	2	2	1	1	1
Sub-Total	**40**	**39**	**37**	**44**	**54**	**51**	**55**	**55**
Hygiene Education	3	2	1	1	3	1	1	1
Monitoring (P&D)	2	1	1	1	2	0	0	2
Other ADP Programmes*	40	40	40	40	40	40	40	40
TOTAL	**343**	**344**	**334**	**344**	**361**	**353**	**370**	**367**
Projected Funding**	310	311	317	323	329	336	342	349

* Rapid Development (Rs. 30 million) and Valley Development.

** Assumes 2% growth/yr in ADP funds, existing Donor funds remain constant at Rs.8 million/yr (excludes EEC funds for BIAD water schemes) and Rs. 5 million for the RDA in 1990/91.

TABLE 5.2

SUMMARY OF THE RECOMMENDED STRATEGIC INVESTMENT PLAN

(Rs. million at constant prices -- June 1989)

COMPONENT	7th Five Year Plan		8th Five Year Plan	
	Rs million	Share	Rs million	Share
Water Supply	**776**	**76%**	**1464**	**82%**
- PHED	711	(92%)	1257	(86%)
- LGRDD	65	(8%)	207	(14%)
Institutional Aid & HRD & Training	**103**	**10%**	**75**	**4%**
- PHED	57	(55%)	44	(59%)
- LGRDD	46	(45%)	31	(41%)
Sanitation, HWD & Hygiene Education	**18**	**2%**	**51**	**3%**
Sector Monitoring	**4**	—	**5**	—
Special Programmes	**120**	**12%**	**200**	**11%**
TOTAL INVESTMENT	**1021**	**100%**	**1795**	**100%**

Note: There are only 3 years remaining in the 7th Five Year Plan.

The allocation of funding for the sector by agency is as follows:

- 75% for PHED in 1990/91, declining to 73% by 1997/98;
- 12% for LGRDD in 1990/91, increasing to 13% by 1997/98;
- 1% for the Departments of Health and Education, throughout; and
- 12% to 11% for Special Programmes within the ADP.

In terms of components, 73% will be allocated to water supply schemes in 1990/91 (excluding the Special Programmes); this figure will increase to 83% by 1997/98. In the first year of the plan institutional strengthening and human resource development will account for 13% of expenditures, of which 48% is for enhancing PHED's implementation of water supply schemes and 52% is to improve LGRDD's ability to provide water supply and promote better sanitation/drainage, human waste disposal and hygiene.

The following sections describe the various components of the investment plan and recommended implementation requirements and methods are discussed in Sections 5.5 and 5.6.

5.2.3 New and Ongoing Water Supply Schemes

PHED

For new and ongoing water supply schemes it is recommended that future investment levels for PHED should be held constant at approximately Rs. 200 million/yr for the next five years. In real terms, this is roughly the same level as was allocated for 1989/90 which is considered to be the maximum budget that PHED can presently manage. This is particularly true given increasing emphasis on urban/town water supply schemes. Within five years, PHED should have adequate capabilities to implement modestly larger investment programmes. Table 5.1 shows the recommended investment levels for PHED over the planning periods.

These levels of investment are considered appropriate for several reasons:

- this level of investment will result in rural coverage of 50% by 1993/94 and 72% by 1997/98, which represents considerable and realistic progress;

- significantly higher levels of investment are not realistic given institutional constraints;

- more emphasis is required to improve planning and implementation procedures and to develop expertise in low cost technologies in order to increase the sustainability of systems; and

- the recurring cost implications of proposed schemes already pose a burden and an effort to increase cost recovery is necessary before higher levels of investment are approved.

The proportion of investment for ongoing schemes compared to new schemes will be very high (75% to 80%) in the first year of the plan period in order to complete the long list of schemes started in 1989/90. It is recommended that PHED should strive for a more balanced split to ensure that the majority of schemes are completed within one to two years. Undertaking too many schemes with limited financial resources causes the implementation period to become longer due to delays in the dispersal of funds.

LGRDD

It is recommended that LGRDD should be allocated significantly greater financial resources to implement water supply schemes. The investment levels should increase at a pace that reflects LGRDD's expanded capabilities that have been proposed. In the first year of the programme, LGRDD will only represent 8% of the investment in the new water supply schemes (Rs. 15 million) but by the end of the planning period, LGRDD's share should increase to roughly 15% (Rs. 45 million). At present, the majority of LGRDD schemes can be classified as simple augmentation of traditional systems, such as relining of wells, lining of water channels, construction or improvement of water tanks, etc. Based on the definition of coverage used in this report, these small schemes do not increase coverage because sources are not properly protected. Greater resources should be allocated to water supply schemes that meet basic service levels (such as handpumps or gravity based piped water schemes). Where water is available for limited times, water tanks should be constructed to enhance service levels. Given the present system of dispersing rural development funds through the District and Union Councils, the available funding for individual schemes is very small. These amounts would be adequate for installing handpumps and constructing community tanks. It is recommended that block allocations be made for small water supply schemes that can be dispersed by LGRDD on a project basis rather than administrative lines. District Councils would still authorize the selection of schemes by development district water plan, but the approval of funds would be made by the Joint Directors at the Divisional level. This would permit adequate funding for a smaller number of medium sized schemes.

Technologies and Investment by District

Although the levels of investment should remain relatively constant, there should be noticeable changes to the types of technology used and the agency implementing the projects. In this way, lower cost schemes will enable greater coverage without increasing investment levels. In reality, it is likely that these savings will be offset by the increasing cost of serving smaller, more isolated and more difficult areas that are not presently covered. Nonetheless, without a shift to lower cost technologies, this situation would be much worse. Also, low cost technologies are simpler to operate which means schemes are more sustainable and greater cost recovery of operating and maintenance costs are possible. Table 5.3 shows a proposed scenario for investment in

TABLE 5.3

RECOMMENDED CAPITAL INVESTMENT PLANS FOR NEW WATER SUPPLY SCHEMES

(Rs. million at constant prices -- June 1989)

	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98
PHED Schemes								
Piped water - large*	74	74	74	74	74	74	74	74
Piped water - small*	127	127	127	127	127	127	127	127
Gravity systems	9	9	9	9	9	9	9	9
Handpumps on tubewells	1	3	5	5	8	8	10	10
RDP schemes (large)	20	20	20	20	20	20	20	20
Sub-Total	**231**	**233**	**235**	**235**	**238**	**238**	**240**	**240**
LGRDD Schemes								
Existing schemes**	11	10	8	7	6	5	5	5
Gravity systems	1	2	3	3	5	5	6	6
Simple pumped systems	2	4	8	12	12	12	12	12
Karez improvements	0	2	4	5	7	7	7	7
Community tanks***	0	1	2	3	4	5	5	5
Handpumps on dug wells	1	2	3	3	5	5	6	6
RDP schemes (small)	10	10	10	10	10	10	10	10
Sub-Total	**25**	**31**	**38**	**43**	**49**	**49**	**51**	**51**
TOTAL	**256**	**264**	**273**	**278**	**287**	**287**	**291**	**291**

Notes: The RDP funds have been included because these schemes are likely to be implemented by the line departments.

* Includes cost of source development (Rs. 300,000 per well).

** Existing improvements involve very small schemes implemented by District and Union Councils. They represent minor increases to coverage. For political reasons, these funds are assumed to remain constant.

*** Community tanks would be installed at existing mechanized wells used for irrigation (Refer to Section 2.4.1).

water supply schemes by technology and implementing agency during the investment periods. Table 5.4 summarizes the investments in new water supply schemes by District and projected coverage estimates.

5.2.4 Rehabilitation of Existing Water Supply Schemes

Rehabilitation refers to existing public sector schemes (PHED, BIAD, etc) that are not functioning or operating properly. It does not include LGRDD schemes because those projects are not operated publicly and are very simple technically. Therefore, from an investment viewpoint, LGRDD improvements have been included with the new schemes in Section 5.2.3 above.

Although there are a number of schemes not functioning (13 schemes were noted in Table 2.2.1), the majority of requirements are for schemes that are not operating properly or need upgrading due to population growth. Also, the capital cost required to rehabilitate non-functioning schemes is relatively modest (Rs. 13.5 million), whereas the cost of repairing and upgrading 70 poorly functioning schemes is substantial (Rs. 91.3 million). These needs can be financed out of development funds or recurring expenditures. At present, no funds for rehabilitating water supply schemes have been allocated from the recurring budget because financial austerity measures are being imposed on all line departments. This year's budget is earmarked for improvements to offices and workshops. Consequently, funds must be obtained from the ADP, which this year amounted to Rs. 22 million; this compares with a demand of Rs. 105 million.

It is clear that additional funding will be required for rehabilitation, particularly since future needs are likely to increase as the average age of schemes increases. For the next three years, it is recommended that a total of Rs. 30 million be allocated annually for rehabilitation. This amount would resolve the current demand within three years. Roughly one-third should be provided from the recurring budget for repairs that do not require a PC-I. The remainder (Rs. 20 million) will

TABLE 5.4

INVESTMENT IN WATER SUPPLLY BY DISTRICT AND IMPACT ON COVERAGE

DISTRICTS	INVESTMENT 1990/91 - 1997/98 (Rs million)			NEW POPULATION SERVED (000)			PERCENT COVERAGE	PERCENT COVERAGE
	PHED	LGRDD	TOTAL	PHED	LGRDD	TOTAL	(JUNE 1990)	(JUNE 1998)
QUETTA	10.4	0.0	10.4	13.0	0.0	13.0	92%	100%
PISHIN	154.9	0.0	154.9	221.4	0.0	221.4	52%	80%
CHAGHI	59.0	2.7	61.7	81.6	9.1	90.7	37%	82%
LORALAI	255.3	20.4	275.7	348.3	52.0	400.3	24%	79%
ZHOB	133.2	41.9	175.0	209.6	73.7	283.3	14%	92%
QILA SAIFULLAH	112.0	25.6	137.6	143.8	38.2	182.0	11%	83%
SIBI	13.1	5.5	18.5	16.7	13.8	30.5	85%	100%
ZIARAT	20.7	5.8	26.5	22.2	14.8	37.0	20%	72%
KOHLU	24.6	12.6	37.3	31.1	25.9	57.0	17%	84%
DERA BUGTI	43.6	18.2	61.8	44.7	43.4	88.1	10%	65%
JAFARABAD	153.9	2.7	156.6	170.0	9.0	179.0	87%	60%
TAMBOO	94.8	4.2	99.1	103.3	14.1	117.4	15%	52%
KACHHI	170.5	5.8	176.2	172.4	19.2	191.6	14%	65%
KALAT	260.7	8.1	268.8	243.1	27.1	270.2	30%	61%
KHUZDAR	183.0	25.3	208.3	166.4	61.5	227.9	38%	71%
KHARAN	64.9	7.6	72.5	59.0	25.4	84.4	34%	64%
LASBELLA	76.5	8.6	85.1	85.9	28.7	114.6	32%	79%
TURBAT	227.4	28.4	255.9	252.7	63.2	315.9	34%	69%
PANJGUR	171.6	26.2	197.8	181.8	45.5	227.3	18%	70%
GWADAR	7.4	8.0	15.4	6.7	26.8	33.5	52%	91%
PROVINCIAL TOTAL	2237.5	257.7	2495.2	2573.7	591.4	3165.1	30%	73%

have to be provided from development funds or with external assistance and should be aimed at larger projects requiring repair and extension. At present, the most pressing needs are in the Districts of Quetta, Pishin, Gwadar, Lasbela and Jaffarabad. For the remainder of the 7th Five Year Plan, limited funding would be available for extensions to existing schemes because rehabilitation should receive first priority. In later years, it will be possible to increase the share of funds for extensions to existing schemes (refer to Table 5.1).

For future needs, an increasing annual allocation is required as a greater share of PHED's future investment will be used for augmenting existing systems. At present, allocations on rehabilitation represent only 10% of the annual investment in new schemes. By the end of the 8th Five Year plan, it would be more realistic to budget 20% of funding (Rs. 43 million) for rehabilitation and extension of existing schemes. This would include simple but costly repairs to roughly 30 or 40 schemes each year (5% to 10% of total) and major repairs and extension for another 25 schemes each year (3% to 5% of total). For obvious reasons, it is not possible to estimate the long term needs by District but it is reasonable to assume that those with the greatest number of old schemes will demand more attention, like Districts Quetta, Pishin and Kalat.

5.2.5 Water Resource Development

In the last two years, PHED has allocated specific funds for the development of water sources for future schemes. These costs would normally be included in the cost of constructing new schemes but PHED has wisely adopted a policy of source development first, followed by installation of the water supply system. Although this procedure lengthens the implementation time, it does permit more appropriate designing of systems, provided that well testing is done and that the data is utilized properly for design. It is at this stage that decisions to install handpumps should be made, whenever appropriate (in terms of water depth, amount of water required and level of service demanded).

In the current ADP, a block allocation of Rs. 19 million was approved for PHED to develop 60 water sources. Also, 93 new schemes will require source development and another 58 ongoing schemes still need wells to be drilled because work was not accomplished last year. In total, 211 sources have to be developed of which 180 are to be tubewells. The total cost of this source development is roughly Rs. 50 million.

PHED's typical rate of well production is 50 tubewells a year so it is very doubtful whether they can meet this ambitious target. In the current year, PHED will require assistance from WADPA or the private sector but the availability of rigs is limited. Negotiations are in progress for the purchase of 5 new rotary rigs from the Japanese. This should give PHED adequate capacity to meet their needs in the next decade, particularly since the production rate per rig could be significantly improved with a better maintenance and service network (refer to institutional improvements in Section 5.2.9). The cost of the new rigs is estimated to be Rs. 178.4 million and is pending federal approval. These costs would include:

- on-the-job training by 2 experts for a minimum of 3 months;
- spare parts for 2 years (minimum of 10% of capital cost);
- maintenance equipment and tools;
- training of 2 local mechanics by the rig manufacturer; and
- support vehicles (5 water tankers, 5 station wagons, and 1 truck).

This amount has not been included in the investment plan because it is contingent upon Japanese financing (grant) and agreement with the Federal Government.

Given the present level of investment in new water supply schemes and the number of ongoing schemes that require additional funding, it is unlikely that next year's source development programme will be so ambitious. For example, next year's budget will require approximately Rs. 250 million to complete ongoing schemes, leaving virtually no funds for new schemes unless the budget is increased significantly. In reality, it will take two years to complete the backlog of source development based on PHED's present implementation capacity. Additional funding would only compound this problem. Thereafter, developing 100 new sources each year will be adequate to keep pace with the proposed investment levels. One or two rigs could be dedicated to well testing and installation of handpumps where appropriate. Consequently, PHED should have an annual allocation of Rs. 30 to 33 million for water resource development during the planning period. (Note: a portion of the drilling programme is included in the cost of new schemes; in the investment plan these cost have been separated to reveal the size of the required drilling programme in future years). The allocation of funding by District will naturally correspond to investment in water supply schemes shown in Section 5.2.3.

Additional investments will be required to improve the capability of PHED's E&M Division which is responsible for developing wells. There will also be increased recurring expenditures to operate this division effectively. These have been described in Section 5.2.9.

5.2.6 Sanitation/Drainage

PHED is required to provide proper drainage facilities for each new water supply scheme. Some recommendations for improvement have been made in Section 4.3.8. These costs which typically represent less than 1% of the project cost (especially when community tanks are provided) have been included in the cost of new schemes. Beyond this, PHED has few proposals for separate sanitation/drainage projects in rural areas. It is anticipated that some drainage systems will be necessary for improving existing water supply schemes, particularly in peri-urban settlements that have experienced rapid growth in recent years. By 1997/98, PHED is expected to spend Rs. 5 million on sanitation/drainage in villages around Quetta and in Nasirabad Division.

LGRDD often provides funding through local councils for improvement of drainage, although these are usually for irrigation purposes. Otherwise no public sector funding is allocated for rural sanitation/drainage.

The BIAD and Pak-German water supply projects have experimented with various types of drainage but they are likely to opt for lower cost solutions in the future.

Therefore the main thrust for investment in improved sanitation/drainage will rest with community self-help. To promote this programme, it is recommended that Rs. 2 million be allocated through LGRDD each year for limited financial subsidies (maximum contribution should be 50% of project costs). The main cost of the programme will involve institutional strengthening and human resource development; these have been costed in Sections 5.2.9 and 5.2.10. There will also be recurring cost implications but these overlap with other activities performed by LGRDD staff. These are discussed in Section 5.3.2.

5.2.7 Human Waste Disposal

The Government of Balochistan has only been involved with rural human waste disposal programmes (latrines) through donor assisted projects. BIAD is committed to install some latrines in their project areas. LGRDD is less likely to install many latrines in the forthcoming Pak-German projects because the emphasis is shifting to income generating schemes. Since LGRDD is to take the lead role in the promotion of latrines, a development budget of Rs. 1 to 2 million per year should be provided. At this time, it is not recommended that the government be involved in large scale financing or credit schemes; rather the focus should be on promotion of proper hygiene habits and simple improvements to existing systems. Although the use of latrines would be actively promoted, demonstration programmes should be limited to the provision of facilities in rural health facilities and some schools.

An annual investment of Rs. 1 million is recommended to provide improved coverage by the end of the 8th Five Year Plan. This programme could begin in 3 to 5 Districts and spread to all areas by the end of the planning period. These would be the same Districts where LGRDD will be promoting sanitation/drainage and hygiene education. In the first two years, the recommended Districts include Kachhi, Lasbela, Qila Saifullah, Ziarat and Chagai.

5.2.8 Hygiene Education

Absorptive capacity for hygiene education will be limited in the first few years of the 1990-98 period. There are only 5 Health Education staff in the Health Education Cell with 2 mobile units. They are under-resourced and most of them lack specialised training for hygiene promotion. In addition, Department of Health staff will not generally be available for delivery hygiene education in communities.

With considerable gaps in hygiene education at present, there is significant preparation required before an effective program can be launched. The proposed steps are:

- workshops to exchange experiences in hygiene education in the province and elsewhere in Pakistan; and to develop messages and materials (visual, video, written);

- investigation, as necessary, into existing hygiene beliefs and behaviours, to serve both message development and provide baseline data;

- material development by the Health Education Unit for project activities with production done by the private sector;

- recruitment and training of a new cadre of female Community Hygiene Promoters (CHPs) within LGRDD;

- training courses for selected staff from LGRDD (DOs and CHPs), DoH, Education and staff from other agencies such as NGOs and Women Related Departments;

- demonstration of a basic level of hygiene education provided by DOs and CHPs during the introductory phase of a new water scheme, in a small sample of communities;

- curriculum improvements for primary schools, teacher training colleges, in-house training of DoH staff;

- expanded outreach based on the demonstration of successful methods of hygiene education; and

- monitoring and evaluation of results and impacts of activities.

The introduction of such a programme of hygiene education is beyond the current capacity of either the Health Education Unit or LGRDD with their present resources, skills and priorities. Health Education staff lack the experience and expertise to plan and implement the process outlined above.

The costs for the first three years of a strengthened hygiene education programme are shown in Table 5.1 (Rs 1 million annually). This would produce educational materials that would be available for use throughout the province, particularly by the proposed sanitation and hygiene cell of LGRDD. This would also include the cost of 4 vehicles during the first two years to give Health Educators better mobility in selected areas. The annual recurring expenditures for salaries and allowances of the Health Education Unit would amount to Rs. 1 million, including support staff (see Section 5.3.2). It will be necessary to allocate more recurring funds to the Health Education Unit for employment of new staff and annual costs of preparing and delivering hygiene education materials. Since the hygiene programme will include a limited training programme for TBA's to deliver messages to people in villages, there will be increased annual costs of staffing, travel allowances and training materials.

Costs incurred in the dissemination of selected materials by the broadcast or print media could be met from the USAID social marketing project budget for child survival or a similar source.

Programmes would continue throughout the entire planning period but a detailed evaluation of progress and procedures should be conducted during 1993/94. Success in five districts during 1990-93 would set the stage for expansion to the remaining 15 districts. The experience of the next few years and the increased resources of health education agencies would create the capacity for a wider dispersal of hygiene messages and an increasing role for health education as a component of Primary Health Care.

The primary school component of hygiene education will involve modified course content, development of materials based on the lead from the Health Department, and hygiene education seminars for teachers. The cost for this component would be Rs. 0.5 million and additional recurring expenditures would be minimal.

5.2.9 Institutional Strengthening

This section deals with the cost of institutional requirements to support the above water supply, sanitation/drainage and human waste disposal programmes. Hygiene education is excluded so the focus of this section will be on PHED, LGRDD and P&D Department.

PHED

PHED requires improved capabilities for system design, water resource development, in-house training, revenue collection, planning and community relations. These will involve:

- setting up new or expanding existing cells (Planning and Community Relations cell, Technical Design, Administration/Revenue accounts, Electrical & Mechanical (E&M) Division);

- increasing staff at various positions to keep pace with expanding development and operational activities;
- upgrading office and equipment facilities, particularly for the new planning and community relations cell, design staff, and E&M field operations (development and testing equipment plus proper workshop services);
- supply of spare parts and tools to maintain drilling rigs, machinery and pumping equipment;
- construction of a system of decentralized workshops/warehouses for more efficient maintenance and repair of equipment;
- increasing mobility of field officers to keep pace with staff expansion; and
- providing adequate funding for daily operations to allow staff to properly perform their tasks.

At present, PHED employs 3 to 4 staff for operating water supply schemes -- an operator, 1 or 2 valve men and a chowkidar. It is recommended that for schemes with community tanks and no distribution system, the valve man's job should be performed by the operator. The recommended operating schedule for water supply schemes (6 to 8 hours daily) means that only one shift is required but there should be one villager trained as a helper to cover for the operator when he is absent. Both the helper and the chowkidar should be employed by the village, and eventually more operators should be employed directly by the village, subject to training and certification by PHED. To train these people, 4 operator trainers should be posted within PHED.

By the end of the 8th Five Year Plan, PHED should have a Superintending Engineer for every Division (6 rather than 4), one Executive Engineer for each District (20 rather than 13), and comparable increases in Sub-

Divisional Officers (47 rather than 36) and sub-engineers (140 rather than 108). It is recommended that increases in clerical staff for revenue collection should be very modest because the number of households expected to get water connections in the next five years is very small which means the benefits of increased revenues may not offset the cost of collection.

The Planning and Community Relations cell should initially be staffed with 5 professional and 10 support staff. By the end of the 8th Five Year Plan, there should be a Community Relations Officer for each Division (six); therefore, this cell would have 8 professional staff and 20 support staff. The Technical Design cell should be immediately strengthened with the addition of one senior engineer and two assistant engineers.

The E&M Division already has proposals to increase professional staff from 7 to 18 (refer to Section 2.4.2), corresponding to the planned purchase of 5 new drilling rigs which will nearly double their capacity. These requirements should be closely monitored to ensure that additional staff are well utilized. More attention should be given to requirements for field operations such as the number of drillers and mechanical staff to properly maintain the rigs. At present, drilling crews only operate one shift. This should be increased to two shifts. With the addition of new rigs, operating staff would have to be increased from 16 to 60 (excluding rig coolies). It is also recommended that maintenance workshops be established in Sibi, Turbat, Loralai and Khuzdar at a capital cost of Rs. 12 million. This will entail staff increases and greater equipment facilities but this will be cost effective because these improvements will significantly enhance the productivity of rigs (two to three times the present rate).

Permanent office accommodations are also required for PHED staff, the construction of which would cost Rs. 40 to 50 million. These should be gradually phased in with priority given to facilities for the Chief Engineer and design staff. This facility should also accommodate the proposed Planning and Community Relations cell, a training coordinator and support facilities (e.g. administration, drafting, data management and resource library). PHED presently spends Rs. 2 million annually for the rental of offices.

Mobility is essential for the development, operation and monitoring of water supply schemes in rural Balochistan. New vehicles are required to meet present needs and to satisfy proposed staffing increases. The total cost of vehicles during the planning period should be in the order of Rs. 12 to 13 million.

During the planning period, PHED should develop a capability for water quality testing but it should rely upon existing facilities, services and technicians. The reasons for this include:

- existing facilities are available at WAPDA, the Health Department, WASA (soon to be completed) and a new research facility (Pakistan Council for Research in Water Resources) is proposed;

- PHED have no staffing capabilities to undertake water quality testing and analysis;

- the concern for water quality is not a priority; thus, even with greater knowledge of water quality, it is unlikely that action would be taken to change the situation;

- simple solutions like chlorination are an acceptable means to treat water but no sophisticated testing is required; and

- the majority of schemes are based on tubewells which have reasonably good water quality.

In the longer term, if PHED develops a capability and need for extensive water quality testing, they may then find it necessary to have their own facilities in-house.

LGRDD

LGRDD requires institutional strengthening for their technical wing, planning capabilities at the district level and implementation of projects at the village level. These will involve the following:

- better equipment and resource materials to increase expertise in low cost technologies, particularly by upgrading the Rural Development Academy;

- a water supply and sanitation cell would be created with a project coordinator, a technical advisor, a hygiene educator/sanitarian and a planning coordinator;

- implementation capabilities at the District level should be improved by employing one District Planner and two female Community Hygiene Promoters for each district;

- increasing mobility of field officers to satisfy existing and new requirements; and

- providing adequate funding for daily operations to enable staff to properly perform their tasks.

The Technical Wing of LGRDD only has two assistant engineers under the Deputy Director. It is recommended that one additional assistant engineer be appointed to provide expertise in low cost technologies related to the sector and conduct training programmes for the District level Assistant Engineers and Overseers.

A new cell should be established to promote water supply, sanitation/drainage, latrines and hygiene education. This would be headed by a Project Coordinator who should report to the Director of LGRDD. Under the Project Coordinator would be a Technical Advisor for low cost options, a Hygiene Educator/Sanitarian who would coordinate the training and monitoring of Community Hygiene Promoters, and one Planning Coordinator who would be responsible for training and supervising District Planners. Initially, District Planners and Community Hygiene Promoters would be posted in 3 to 5 Districts and would increase to 10 Districts by 1997/98. Eventually, these staff should be posted in every District.

The Rural Development Academy will be shifting to their new facilities by the end of 1990. The Director of the Academy must have an appropriate level of decision-making powers to manage the day to day operations. Staffing requirements are relatively modest since it involves filling posts that have already been sanctioned. As the Academy becomes more active, further evaluation of staffing requirements will be necessary.

LGRDD presently has inadequate transportation for their field officers which severely limits their effectiveness in rural areas. At the District level, jeeps are only provided for the Assistant Director and the Deputy Commissioner. All field staff must depend upon the availability of these jeeps or use private hire vehicles. One exception is the Self Help Project which has provided jeeps to Development Officers in 9 sub-divisions. The estimated cost of new vehicles is Rs. 11 million which would be phased in during the planning period.

Planning & Development Department

A Steering Committee and a sub-committee have been recommended to coordinate planning, implementation and policy decisions and to permit better monitoring of sector development. The Steering Committee will consist of the Secretaries of PHED, LGRDD and Health and co-opted members may include heads of relevant Government agencies. Three full time staff will be required for the sub-committee which is responsible for monitoring sector development and submitting bi-monthly progress reports to the Steering Committee. This staff should include an Executive Engineer from PHED, an Assistant Director from LGRDD and a District Health Officer. Support staff and office space will be necessary to perform these tasks and maintain proper statistical records. The total cost of institutional improvement would be Rs. 5 million over the 8 year period.

5.2.10 Human Resource Development

Human resource development and training is a major requirement for PHED and LGRDD staff, and for District and Union Councillors. The need will be great in the short term because changes in planning and implementation policies are proposed which demand retraining of existing staff and training for newly created posts. Since the thrust of sector development depends on greater community involvement, it will be necessary to enlighten local officials regarding new procedures and explain the most effective methods for pursuing development objectives. Also, it is important to inform villagers of new opportunities through community meetings conducted by Union Councillors and/or LGRDD staff (Development Officers and Secretary of Union Council).

PHED

A new staff position of grade 17 should be created in 1990/91 for a training coordinator. This person will be responsible for setting up training courses and workshops for upgrading technical expertise of PHED engineers, particularly for low cost technologies (e.g. handpumps), cost saving design modifications, and procedures for tubewell testing and development. In-house seminars on planning and project selection procedures, community involvement, cost recovery and public health issues (sanitation, water quality, hygiene, etc) would be provided. Coordination with the Rural Development Academy should be encouraged. An operator training programme should be set up and implemented in each division, utilizing workshop facilities and existing schemes for demonstration. A course should also be prepared for sub-engineers to explain proper maintenance procedures, including record keeping for tubewell and machinery performance.

The training coordinator should also be responsible for setting up and managing a Human Resource Information System which is essential for assessing staff capabilities, weaknesses and training requirements. Since refresher courses are essential, a system for managing training would help to plan for future needs. The training coordinator could also be responsible for a technical library and resource materials until such time that a dedicated librarian is required.

The cost of establishing the human resource development and training programme over a two year period is estimated to be Rs. 2 million, which is included in the institutional strengthening in Section 5.2.9. The annual operating cost, including staffing, materials, travel allowances, etc, is estimated to be Rs. 1 million. The cost of materials and special training seminars should be financed from the development budget (Rs. 1 million annually), while the remainder should be financed from the recurring budget.

LGRDD

Many of the training requirements for LGRDD staff could be met through the Rural Development Academy, particularly for District Planners, Development Officers, Overseers, and Union Council Secretaries. Courses, seminars and workshops would focus on rural development and planning needs at the District level, community involvement at the village level and methods of promoting integrated sector development. The advantage of the Academy is that courses can be taught to mixed audiences, including several line department staff, local elected officials and selected village members. It also provides a good forum to involve women in training and awareness programmes, discussions of sector issues and ultimately the decision making process.

This year's allocation of Rs. 8 million should be adequate to finish construction and another Rs. 5 million has been proposed for 1990/91 to equip and furnish the Academy. Additional funding in the order of Rs. 15 million is initially required to properly equip the new Academy.

Once the Academy is fully operational (1991), the annual operating cost is estimated to be Rs. 4 to 5 million. This expenditure includes training of local administrators which is not directly related to sector development. However a major thrust of the Academy is expected to be for the water supply and health sectors and the successful operation of the Academy forms an integral part of LGRDD's sectoral development strategy.

LGRDD will also need in-house training programmes for technical staff. This will involve developing expertise in low cost technologies (water supply, sanitation/drainage and latrines) and imparting this knowledge to Assistant Engineers and Overseers. For the handpump projects, expertise will have to be developed for advising on the procurement of appropriate equipment, installation techniques and operator training courses. Since other agencies like WASA, BIAD and Pak-German Self Help are also working to develop similar technologies, workshops could be arranged at the Academy to share experiences. An establishment cost of Rs. 2 million is required to train master trainers and upgrading the knowledge of professional staff. The annual recurring cost of running the in-house training programme would be Rs. 0.5 million.

District and Union Councils

LGRDD would also be responsible for training programmes conducted at the District or Union Council level for elected representatives. The purpose is to strengthen local capabilities in planning and development and to improve coordination of the line departments at the District level. This requires local officials to assume a longer term development perspective rather than only addressing immediate needs which are strongly directed by political motives. LGRDD staff could set up seminars in the local council offices, relying on experiences and materials developed by the Rural Development Academy. The establishment cost is negligible and the annual recurring cost would be Rs. 0.5 million (excluding staffing which is paid out of regular salaries).

5.3 Cost Implications and Rationale For the Proposed Plan

5.3.1 Capital Cost Implications

Table 5.1 summarized the capital investment requirements by department and by cost component for each year of the planning period. The proposed plan has maintained levels of investment in new water supply schemes for PHED and has increased allocations directly through LGRDD. However, the significant changes in the plan result from the need to strengthen institutions and improve the capability of their staff. It also envisages modest but new investment in sanitation/drainage, latrine promotion and hygiene education. In the first three years, 76% of the capital investment is for new, rehabilitated or augmented water supply schemes, 10% is for institutional and human resource development, and 2% is for sanitation/drainage, latrine promotion and hygiene education Another 12% is from special programmes which is likely to be entirely for water supply. During the 8th Five Year Plan, these figures will be 82%, 4%, 3%, and 11% respectively. This shows that the investment levels required to improve the sustainability of systems and implement integrated sector development are significant but not overwhelming in the initial years and very modest levels are required thereafter to maintain this progress.

When compared to the present investment levels, the benefits of the extra investment in institutional strengthening and human resource development are not immediately evident. Some of the benefits to be realized are as follows:

- the new population served by water supply schemes would range from 250,000 to 300,000 each year;

- the population having water schemes rehabilitated would be 60,000 to 70,000 each year;

- enhanced planning, implementation and operating procedures for PHED would benefit people and the simpler technologies provided are more sustainable by the villagers;

- lower cost due to more efficient designs and technologies;
- generation of revenues to offset a substantial part of PHED's operating and maintenance costs;
- design and implementation of low cost technologies through LGRDD would benefit people in smaller villages;
- greater awareness/practice of good hygiene and sanitation habits;
- improved drilling and contracting procedures for tubewells;
- better knowledge of groundwater resources and their implications for existing drinking water supplies and future development; and
- higher quality training institutions and faculty.

The proposed investment levels in PHED are clearly justifiable because small improvements can have large and immediate results. Even by the end of the planning period, PHED will still contribute 82% of the funds to water supply schemes and 80% of the increase in coverage during the planning period. PHED has already begun to implement lower cost technologies (Rs. 800 to 1000 per capita). No major savings are anticipated because lower cost technologies are offset by the increased cost of servicing smaller villages.

For LGRDD, the investment levels appear high compared to the resulting expenditures on water supply schemes and increases in coverage. However, it must be remembered that the amount of funding shown directly through LGRDD (Rs. 15 million in 1990/91 and Rs. 41 million by 1997/98) does not represent the total funding influenced by LGRDD. Indirect involvement includes:

- assisting the implementation of local schemes financed by special funds (such as the Chief Ministers Fund, the Accelerated Development Programme and potentially the Integrated Valley Development Programme);

- LGRDD will provide technical guidance for schemes that are to be partly or wholly community financed (such as dug wells, drainage channels, water tanks, etc);

- LGRDD staff will be important in the coordination of line departments (such as PHED), including formulation of District Plans for the sector;

- LGRDD will play a role in assisting communities to assess their needs and make proposals to PHED for water supply schemes; and
- LGRDD will help to form community organizations or water committees that are the basis for PHED's O&M cost recovery.

Also, in the long term, LGRDD is seen as the only viable option for extending water supply coverage to the very small and isolated settlements that comprise 20 to 25% of Balochistan's rural population. The average per capita cost of providing water to these people can be reduced by developing low cost technologies and encouraged community input through supply of labour and materials. For the proposed investment plan, the shift of resources to low cost technology has a noticeable impact on increased coverage by LGRDD. The average per capita cost of new schemes ranges from Rs.450 to Rs. 550 throughout the planning period.

5.3.2 Recurring Cost Implications

Table 5.5 shows the anticipated recurring cost implications for PHED under the existing situation and with the proposed investment plan. Initially, PHED will have to bear increased recurring costs as new professional staff are to be hired and before new implementation procedures and cost recovery policies have a chance to take affect.

TABLE 5.5

RECURRING COST IMPLICATIONS OF THE PROPOSED INVESTMENT PLAN - PHED

(Rs. million at constant prices -- June 1989)

PHED Expenditures Projected For the Present Situation (end of 1989/90)

	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98
# of existing schemes	450	450	459	450	450	450	450	450
Running & Maintenance	20.5	21.0	21.5	22.0	22.5	23.0	23.5	24.0
Equipment/Spares (rigs)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Extension & Improvement	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Maintenance & Repair	5.0	5.3	5.6	6.0	6.3	6.6	7.0	7.5
Administration	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Total per Year	**72.5**	**73.3**	**74.1**	**75.0**	**75.8**	**76.6**	**77.5**	**78.5**

PHED Incremental Expenditures Projected For the Proposed Investment Plan

	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98
# of new schemes	135	270	400	540	670	800	950	1100
Running & Maintenance	3.6	7.2	10.8	14.4	18.1	21.9	25.7	29.5
Equipment/Spares (rigs)*	0.0	0.0	3.0	5.0	5.0	5.0	5.0	5.0
Extension & Improvement**	7.0	7.0	7.0	9.0	9.0	12.0	12.0	12.0
Maintenance & Repair	1.0	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Administration - Officers	1.1	2.0	2.7	3.2	4.0	4.0	5.2	5.5
- Operators (new schemes)	5.4	11.0	16.8	22.6	28.4	34.7	41.2	47.7
Total per Year	**18.1**	**29.2**	**42.8**	**57.2**	**68.0**	**81.6**	**93.6**	**104.7**
TOTAL RECURRING COST	**91**	**103**	**117**	**132**	**144**	**158**	**171**	**183**
- Annual increase	28%	13%	14%	13%	9%	10%	8%	7%

* Assumes 6 more rigs are purchased by 1991/92 (Japanese grant).
** Recommended level to meet cost of minor rehabilitation.

Source: Department of Finance and Consultant's estimates for new costs.

However, by the end of the planning period, the policy changes will procedures and cost recovery policies have a chance to take affect. provide noticeable benefits. These include:

- a 20% to 25% reduction in running and maintenance cost per capita for new schemes designed with low cost technology improvements;

- savings in the number of operators for new schemes by initially having a helper paid for by the community and later by having communities hire and pay for operators; this would reduce operating and maintenance costs further (refer to Table 5.6);

- improved rate of recovery on water tariffs for yard connections;

- installation of schemes that require minimum or no public sector input for operations (e.g. handpumps and gravity schemes); and

- increased efficiency in water resource development, reducing the need for a major increase in capital equipment and staff.

The cost of the proposed new professional staff would only increase the recurring expenditures by 2% to 3% but would be imperative for improved planning, designs, implementation, cost recovery and sustainability.

The largest increase in the recurring expenditures would stem from the cost of operating new schemes which are proposed by the investment plan (based on holding present levels constant). This would result in annual increases ranging from 13% to 28% in the first four years and 7% to 10% thereafter. This projected scenario would place a major burden on the Provincial Government to finance the operation of water supply schemes. By 1997/98, the estimated recurring budget for PHED (rural sector) would be Rs. 183 million, which would be roughly two-thirds of the ADP.

The solution to this problem is to improve cost recovery by making the beneficiaries responsible for most of the labour component (60%) and

TABLE 5.6

IMPLICATIONS OF COMMUNITY CONTRIBUTIONS TO O&M COSTS FOR WATER SUPPLY

(Rs. million at constant prices -- June 1989)

Present scenario	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98
Running & Maintenance								
- Existing schemes	20.5	21.0	21.5	22.0	22.5	23.0	23.5	24.0
- New schemes	3.6	7.2	10.8	14.4	18.1	21.9	25.7	29.5
Staffing Costs								
- Existing schemes	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
- New schemes	5.4	11.0	16.8	22.6	28.4	34.7	41.2	47.7
Total Cost per Year	**49.5**	**59.2**	**69.1**	**79.0**	**89.0**	**99.6**	**110.4**	**121.2**
Total Revenue Collected	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**

Cost Recovery Scenario	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98
Running & Maintenance								
- Existing (Note 1)	20.5	21.0	21.5	20.9	20.3	19.6	18.8	18.0
- New (Note 2)	3.6	7.2	9.7	13.0	14.5	15.3	15.4	14.8
Staffing Costs								
- Existing (Note 3)	20.0	20.0	20.0	19.0	18.0	17.0	16.0	15.0
- New (Note 4)	5.4	11.0	15.1	18.1	19.9	20.8	20.9	19.1
Total Cost per Year	**49.5**	**59.2**	**66.3**	**71.0**	**72.7**	**72.8**	**71.1**	**66.9**
Total Revenue Collected (Note 5)	**0.5**	**0.5**	**1.8**	**3.2**	**5.0**	**7.2**	**9.7**	**12.6**
TOTAL RECURRING COSTS	**91**	**103**	**114**	**124**	**128**	**131**	**132**	**129**
- Annual Increase	28%	13%	11%	9%	3%	2%	1%	-2%

Notes for Table 5.6

Note 1 - Community contribution to existing schemes will take time and progress slowly. Contributions have been assumed to begin in 1993/94 and increase gradually to 25% by 1997/98.

Note 2 - Community contribution to new schemes can begin earlier and progress faster due to new implementation procedures. Contributions have been assumed to begin in 1992/93 (after pilot projects) and increase steadily to 50% by 1997/98.

Note 3 - For existing schemes, it has been assumed that PHED will to phase out some operating staff in 1993/94 and will have a 25% reduction in operators/valvemen/chowkidars by 1997/98.

Note 4 - For new schemes, communities have been assumed to provide part of the labour requirements beginning in 1992/93 and will eventually account for 60% of labour costs by 1997/98.

Note 5 - For revenue collection, several assumptions have been made:

- the number of rural households with connection is expected to increase moderately from 20,000 (15% of coverage at present) to 50,000 (10% of coverage) by 1997/98;

- there will be a 50% real increase in monthly tariffs (from Rs. 10 to Rs. 20 per household) in 1992/93; and

- the rate of collection will increase steadily from 10% at present to 70% by 1997/98.

half of the running and regular maintenance costs. This cost recovery scenario is presented in Table 5.6. The results would be a recurring expenditures of Rs. 129 million by 1997/98, a 30% reduction that puts a hold on annual increases.

Increased revenue collection from customers with house connections should also be encouraged. Given a modest increase in the number of customers, a 50% increase in tariffs and a dramatic increase in the rate of collection, the revenue generated would only be Rs. 13 million by 1997/98 (these revenues must be deposited with the Revenue Department so cannot be used to directly offset PHED's costs). Consequently, very modest expenditures should be utilized for to improve the collection mechanism, otherwise the costs outweigh the benefits. When larger numbers of households are added, the potential benefits would justify an improved collection system.

Table 5.7 shows the incremental recurring cost implications of the proposed Investment Plan for LGRDD, the Rural Development Academy, Department of Health, Education Department and the Planning & Development Department.

LGRDD

LGRDD has been designated to play a major role in the development of the sector and consequently institutional strengthening has been proposed which has significant recurring costs, ranging from Rs. 2 million in 1990/91 to Rs. 8 million by 1997/98. Most of this relates new staffing requirements including technical and planning professionals at the central level and planners and hygiene promoters at the District level. The existing and new staff at the District level also require greater mobility which translates into fuel costs and travel allowances. In terms of the relative impact, this additional cost would initially represent a 5% increase in the Rural Development recurring budget and a 20% increase by the end of the planning period.

TABLE 5.7

RECURRING COST IMPLICATIONS FOR LGRDD, HEALTH AND EDUCATION

(Rs. million at constant prices -- June 1989)

	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98
LGRDD Administration								
. Technical staff	0.4	0.4	0.5	0.6	0.6	0.6	0.7	0.7
. Field staff	0.4	0.7	0.9	0.9	1.3	1.8	1.9	1.9
. Allowances	0.2	0.3	0.4	0.4	0.5	0.5	0.6	0.6
. Support staff	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
. Operations (POL)	0.6	1.1	1.6	2.2	2.7	3.2	3.7	4.2
Incremental Cost per Year	**1.7**	**2.6**	**3.5**	**4.2**	**5.3**	**6.3**	**7.1**	**7.6**
- % of Current Budget	5%	8%	10%	12%	16%	19%	21%	22%
Rural Development Academy								
. Staffing	0.5	0.5	0.5	0.5	0.7	0.7	0.7	0.7
. Travel allowances	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
. Operations	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5
Incremental Cost per Year	**1.0**	**1.0**	**1.1**	**1.2**	**1.5**	**1.5**	**1.7**	**1.7**
- % of Current Budget	77%	77%	85%	92%	115%	115%	130%	130%
Health Education Unit								
. Staffing	0.2	0.4	0.5	0.8	1.3	1.3	1.3	1.6
. Operations	0.2	0.3	0.3	0.4	0.5	0.5	0.5	0.6
Incremental Cost per Year	**0.4**	**0.7**	**0.8**	**1.2**	**1.8**	**1.8**	**1.8**	**2.2**
- % of Current Budget	70%	140%	165%	240%	360%	360%	360%	440%
Department of Education								
. Hygiene Coordinator	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Planning & Development								
. Sub-Committee	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.8
. Support Staff	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.6
. Operations	0.5	0.5	0.5	0.5	0.9	0.9	0.9	1.2
Incremental Cost per Year	**1.0**	**1.0**	**1.0**	**1.0**	**1.8**	**1.8**	**1.8**	**2.6**
- % of Current Budget	14%	14%	14%	14%	25%	25%	25%	35%

Rural Development Academy

At present, the Rural Development Academy is underutilized but with the completion of the new facilities shortly, the Academy can be more functional. This will mean more than doubling the current operating budget but the amount of funding required is very modest (less than Rs. 2 million per year).

Department of Health

The Health Education Unit is similarly understaffed and underutilized. The proposed plans would increase the number of Health Educators from 6 at present to 20 (male and female) by the end of the 8th Five Year Plan. These officers would also require mobility and support staff. The result is a major strengthening of the Health Education Unit with annual recurring cost increasing from Rs. 0.4 to Rs. 2.2 million by 1997/98. However, the relative impact on the Health Department is minuscule (less than 0.5%).

Education Department

The recurring cost implications for the Education Department are negligible as they only require the employment of a coordinator and support staff for the hygiene education programme.

Planning & Development Department

The cost to be borne by Planning & Development is for a most critical task -- a central monitoring and evaluation sub-committee. Initially 3 senior staff will be appointed from PHED, LGRDD, and the Department of Health. They would require support services for information management and analysis and mobility is essential. This unit would expand gradually to 9 or 10 members that can monitor sector development in every District by 1997/98.

5.4 Alternative Scenario Analyses

5.4.1 Settlement Sizes, Technologies and Cost

An evaluation of the impact of settlement sizes on investment levels for water supply schemes has been performed on the hypothesis that average per capita costs can be reduced by focusing on the most appropriate technology for each village size. For example, handpumps and gravity based schemes provide low cost options in terms of capital inputs and operations and maintenance. Thus, by focusing on smaller villages with simple technologies, the investment cost for increasing water supply coverage can be significantly reduced. Theoretically, these options can reduce costs by 50% compared to existing schemes implemented by PHED. Under closer investigation, it is revealed that institutional capacity to implement these low cost schemes on a wide scale is limited. Also, there are uncertainties regarding physical limitations of water resources that are acceptable for low cost technologies. Consequently, the scenario proposed already incorporates an ambitious shift to smaller settlement sizes and low cost technologies.

A second option is to investigate economies of scale by focusing on piped water schemes in large settlements or clusters of villages. It is estimated that significant economies of scale apply to the types of schemes implemented by PHED because a significant amount of the cost is for transmission of water from the source to the people. In Balochistan, this is very prevalent. If all investment could be focused on large clustered settlements, the average per capita cost would be closer to Rs. 600, 33% less than the present costing levels. However, this scenario is not achievable because PHED has followed a policy of servicing the larger villages first and hence more than half of large settlements are already covered and most will be served by 1993/94. This is owing to the fact that only 35% of the rural population is in settlements greater than 2000 people. Since this figure is based on mauzas, it is fair to say that this includes clusters of villages as well.

5.4.3 Available Resources

Two possible scenarios for resource availability were assessed:

- one is an optimistic scenario whereby all potential funding is available for the sector throughout the planning period, consisting of the People's Programme and an expanded BIAD programme to complete phases III and IV; and

- the other is a pessimistic scenario whereby ADP funding is reduced slightly and funding for water supply is shifted out of the rural sector for urban schemes.

The optimistic scenario assumes the ADP funding increases 2% annually (similar to the base case) but an additional Rs. 30 to 40 million/yr is available from Federal sources and a similar amount is provided for BIAD from the SDP. Over the 8 year planning period, this represents a 34% increase in investment. Under this scenario, the potential rural coverage would be 55% by 1993/94 and 88% by 1997/98. It is evident that as coverage rises above 75%, the emphasis on new investment should shift to increasing standards of existing systems as well as new systems. Therefore, these results only reflect indicative levels of coverage given increased investment levels. Consequently, if new funding sources are available to the sector, they should be used in a more focused manner to upgrade existing service levels, rehabilitate schemes, or focus on specific regions integrated sector development (like BIAD does).

The pessimistic scenario is of greater concern because any reduction in funding will make targets for coverage unachievable. However, there is very real pressure to keep the level of provincial ADPs constant or even reduce them in real terms. Also, in Balochistan there is a great need to improve water supply and sanitation in urban areas. During the last two years, 80% to 85% of PHED's allocations have gone to the rural sector. Owing to the huge investment required for towns, PHED could be forced to increase investment at the expense of rural schemes, particularly since the ADP funding is constrained. In this scenario, the available funding to the sector is assumed to be 75% of the base case. The impact on coverage would be 40% by 1992/93 and 51% by 1997/98. Consequently, acceptable levels of coverage would not be achieved until after the year 2000. In addition, the need for rehabilitating existing schemes would place a heavy burden on PHED to make significant progress on new schemes.

The results of the alternative scenario analysis show how sensitive the rural water supply sector is to realistic occurrences that can alter investment. Balochistan has embarked on an ambitious policy to meet the needs of the rural population. The level of investment is adequate to make impressive progress. However, if funding was to be significantly reduced, the province would lose the opportunity to make vast improvements because population growth and demands from existing systems would absorb most of the future investments.

5.5 Requirements for Implementation

5.5.1 Management of the Sectoral Plan

At the Provincial level a stronger and more effective mechanism is required to coordinate the activities of the various line departments within this sector. Presently to coordinate planning, decisions are made by the Additional Chief Secretary (Development). To reduce the burden on the ACS and to facilitate greater cooperation between line departments, it is recommended that a permanent steering committee be maintained that includes heads of departments and agencies involved in the sector and chaired by the ACS (Development). A sub-committee involving senior staff in the line departments would carry out monitoring and evaluation tasks and would report directly to the Steering Committee.

The following requirements must be met:

- a permanent steering committee should be established;

- District level officers should be responsible for monitoring; and
- the committee should have authority to implement recommendations.

5.5.2 Implementation of Large Water Supply Schemes by PHED

PHED will require the following improvements, modifications or policy changes during the planning period:

- creation of a planning and community relations cell;
- new planning and project selection procedures;
- a policy for cost recovery encompassing all schemes;
- greater expertise for water resource evaluation and development;
- expanded technical design capabilities, including handpumps;
- training field staff for increased community participation;
- improved methods for revenue collection;
- establishment of an in-house training program and a Human Resource Information System (HRIS);
- data management system for operating records of PHED schemes;
- improved office and equipment facilities; and
- additional vehicles to guarantee proper mobility of field staff.

The first two priorities for PHED include the creation of a training programme and the establishment of the Planning and Community Relations cell. These will form the foundation for technical improvements, new implementation procedures, community involvement, cost recovery and operating policies. Support staff, equipment, materials and vehicles will be required at the same time according to the deployment of staff.

At the same time, special concern is required for the Electrical & Mechanical Division to improve drilling capabilities and tubewell development. This would include efforts to decentralize servicing of rigs and maintaining properly stocked and equipped workshops. This should be closely coordinated with technical assistance for the Division to ensure that future needs are identified and planned for.

At some point in time, better office facilities should be provided for the central PHED staff, particularly with the addition of technical and planning staff. Although the first priority is maintaining adequate facilities in each Division, a target for new central office facilities should be resolved by 1992/93. Otherwise, the department will have to be split up into temporary buildings which reduces the efficiency of operations and lowers staff morale. These facilities should be properly provided with technical facilities, drafting equipment, computers, library and clerical needs.

By the 8th Five Year Plan, there will be a need to slowly increase key staffing to manage the growing workload of the department. This recognizes that PHED is still a new department and has not yet reached appropriate sizing in certain areas. For example, it is reasonable to assume by 1998 that each District would have one Executive Engineer and an appropriate number of support staff. On the other hand, PHED will become less involved with the daily operation of schemes, which could potentially relieve the department of large number of support staff (operators, valvemen,patrollers, and chowkidars). The pace at which this can be accomplished depends upon communities accepting greater responsibility for operating schemes.

5.5.3 Implementation of Small Water Supply Schemes by LGRDD

LGRDD will have to undergo the following changes and improvements to strengthen their staffing and implementation capabilities:

- improved training of Development Officers in community development related to sectoral requirements;
- greater technical expertise for field engineers;
- greater responsibility for the Secretary of Union Council to organize communities for development projects;
- education of local politicians regarding sectoral needs;
- hiring staff for two new positions:

  - District Planning Officers

- Female Community Health Promoters

- improved planning procedures at the District level;
- improved coordination of building departments at District level;
- establishment of a Human Resource Information System (HRIS);
- expanded training capabilities at the Rural Development Academy, including proper equipment and learning materials;
- improved training opportunities at the District level;
- increased access to development funds for specified projects; and
- additional vehicles for improved mobility of field staff.

The first priority for LGRDD is the development of human resource capabilities, both through an improved Rural Development Academy and through in-house training of technical staff. Thereafter, institutional requirements should be addressed, including the employment of new staff at key positions (District Planners, Community Health Promoters, and a training coordinator). Being or organization that functions at the village level, LGRDD has a large requirement for field staff but this must be satisfied gradually. Support staff, equipment, materials and vehicles will be required at the same time according to the deployment of staff.

The real success of the LGRDD programme can only be proven in the field. For this reason, LGRDD should start work in some pilot areas to refine procedures and determine staffing strengths and limitations. LGRDD should begin with simple projects that it is already capable of implementing and focus more on the process of community involvement.

5.5.4 Programmes for Sanitation/Drainage and Human Waste Disposal

In addition to water supply schemes, LGRDD will be the lead agency for improvements to sanitation/drainage and human waste disposal in rural areas. Many of the implementation requirements have been dealt with in Section 5.5.3 such as improved training for Development Officers but some others include:

- creation of expertise within the Technical Wing to conceive low cost and simple solutions that can be implemented by villagers;

- utilization of the proposed female Community Hygiene Promoters to support Development Officers and Overseers; and

- training programmes for local artisans to construct simple drainage and latrine facilities.

Two experts would develop appropriate technologies for community implemented sanitation/drainage and simple latrines that can be constructed by local masons/artisans. These advisors would draw upon existing experience in the field (e.g. BIAD, Pak-German, WASA) and would devise solutions for specific project areas where water supply schemes have been installed or are proposed. These ideas and techniques would be passed to Assistant Engineers and Overseers to implement. In addition, promoters would be used to inform villagers of potential opportunities and benefits and to identify the availability and quality of local artisans. Depending upon the needs, artisans could receive informal training by visiting similar projects nearby, that have already been completed by LGRDD.

5.5.5 Hygiene Education Programmes

There are two types of hygiene education programmes proposed. One is through the Health Department staff in coordination with LGRDD, focusing on reaching villagers on a continuous basis through trained TBAs. The other is through the Education Department, delivering hygiene messages to children in primary or mosque schools.

The major requirements for the proposed hygiene education plan are:

acceptance by LGRDD to take on a major role in hygiene education, including responsibility for its introduction among the tasks of the Development Officer while introducing new schemes to communities;

- creation of a Hygiene Promotion Cell within the LGRDD Technical Wing. This would be responsible for hygiene education activities and the development of low cost designs for latrines, drainage and sanitation;

- acceptance by LGRDD to recruit female Community Hygiene Promoters (CHPs) to work with Development Officers in hygiene promotion, particulary through working with the TBA's and together discussing hygiene with women in group meetings;

- acceptance by DoH to take the lead in the detailed design of the hygiene education by the staff of the Health education Unit and assist with training of master trainers; for the first three years of the plan, this would imply that hygiene promotion would become the single largest focus of the HEU's work; and

- acceptance by Department of Education that schools should include a higher emphasis upon hygiene education and promotion of hygienic behaviours.

A summary of the proposed roles for each of the departments in hygiene education is as follows:

Department of Health:

- lead agency for materials and methods development;
- training of CHPs and Development Officers in hygiene promotion;
- advises Department of Education on improvements to primary school curriculum for hygiene and develops materials for use in schools;
- conducts in-service and pre-service training of teachers in hygiene promotion in schools and communities;
- provides training in hygiene promotion to other DoH staff as appropriate to their capacity to promote hygiene during the course of their regular duties;
- training of TBAs in hygiene education; and

- participating with the LGRDD sanitation and hygiene programme to evaluate methods and enhance staffing capabilities.

LGRDD:

- diffusion of hygiene messages through CHPs and DOs to villages, especially through TBAs and women's groups; and
- integration of hygiene promotion with water supply, sanitation, and human waste disposal.

Department of Education:

- diffusion of hygiene messages through primary school teachers to pupils;
- enhanced curriculum on hygiene education at teacher training colleges; and
- teachers encouraged to take on a volunteer role of hygiene promoters in the community.

The detailed steps of the plan are:

1. HEU strengthened by providing training, vehicles, equipment and operating funds.

2. Review of existing hygiene education programmes in Balochistan - lessons learned, outstanding needs etc.

3. Development of basic hygiene messages, with input from medical staff, social science research.

4. Selection from existing materials, adaptation and development of hygiene education materials by LGRDD staff and HEU staff, probably different materials for each ethnic group.

5. Development of training approach and materials by LGRDD staff and HEU staff for training in good education methods.
6. Train existing LGRDD field staff in hygiene appreciation and promotion methods.

7. Train newly recruited female Community Hygiene Promoters in hygiene education messages and methods including the training of TBAs.

8. Commence community hygiene education as part of the introductory process of new schemes, led by CHPs.

9. Train selected staff in other relevant departments (PHED and Education) regarding hygiene issues within their work in the sector; basic hygiene messages; and good teaching methods.

10. Organise appropriate mass media support.

11. Provide input to curriculum, suggestion for content and new materials, of cadres such as Health Technicians, LHVs, engineers, teachers.

12. Monitor and evaluate all activities, adapt materials and approach in light of results and lessons learned.

The significant amount of preparatory work required to investigate hygiene behaviours and possibilities, and the existence of a significant "catch up" population, those who currently have access to improved water supplies, means that this component of the programme could commence independently of other sector investments.

A team of 2 Community Hygiene Promoters to work with the 2 or 3 Development Officers stationed in each District would be able to conduct a basic level of hygiene education in 40 communities each year per team and potentially reach up to 12,000 people.

The hygiene education component will also support the HRD component within PHED and LGRDD by providing the training in hygiene sensitization.

5.5.6 Human Resource Development Requirements

PHED Training

Recognizing that the existing and future staff at PHED will have training requirements within the technical, planning, implementation and operating areas, there is a need for an individual within the department to coordinate a variety of training functions. His task would be to:

- conduct an analysis of the training needs;
- perform a job/occupational analysis of all staff;

- research, collect and catalogue training programmes and literature;
- organize and coordinate the presentation of in-house training courses, seminars/workshops and conferences;
- evaluate trainees and the effectiveness of training programmes;
- assist the Chief Engineer in the trainee selection process; and
- establish and maintain a Human Resource data base.

LGRDD Training

The human resource development and training requirements for LGRDD include:

- special training programmes for new staff positions (District Planner and Community Health Promoters);

- the creation and maintenance of a Human Resource Information System (HRIS) by staff at the Rural Development Academy;

- a training coordinator within the Academy to develop and manage the HRIS and to organize courses for LGRDD staff both at the Academy and in-house;

- designing, developing and implementing new courses for operations and maintenance personnel, Development Officers, Overseers, hand pump caretakers and latrine promotion staff;

- enhanced training for the Academy instructors; and

- upgrading the existing curriculum for local elected officials and administrators.

5.6 Implementation Steps

5.6.1 Small Water Supply Schemes - LGRDD

The principals behind the implementation methods described below are that:

- community resources are used to the extent that is reasonable and possible in provision of water supply;
- the community is fully informed and takes the lead role in decision-making, planning and implementation, supported by LGRDD;
- the relevant LGRDD staff will undergo extensive training in low cost technologies, community organization/involvement and project management/implementation; and
- the community will receive adequate technical assistance and training in project management and operation and maintenance.

The typical range of village size for LGRDD schemes will be between 200 and 1000 people. The technologies will be community handpumps on dug-wells, gravity flow schemes from protected springs, karezes or infiltration galleries, and small mechanized piped water schemes serving community tanks.

Based on available water resources information, district water supply plans will be developed by District Councillors in cooperation with LGRDD staff and the PHED Executive Engineer responsible for that District. The plans will identify needs by geographic area and a list of potential schemes to meet these needs. Given the limitations on financial resources, priorities for investment should be determined for a five year planning period which are based on criteria that are agreed to by District Councils and are compatible with Provincial objectives. These plans would serve as a framework for developing Annual Development Plans. Political pressures for ad hoc selection will not be eliminated but greater justification will be required for deviations from the plan and its criteria, thus making politicians more accountable for their decisions. Villagers require greater confidence that the investment decisions scheduled for future years are carried through, otherwise the present system of demanding immediate action (which only works for the most influential people) will continue. The creation of a new position within LGRDD of a District Planner will help to implement these changes by providing advise based on the assessed needs of the people, not simply political interpretations.

The typical steps in the "project cycle" are shown in Figure 5.1. The proposed methods of implementing LGRDD water supply schemes are not radically different from present practices but they clearly define responsibilities which demand greater capabilities from LGRDD staff and villagers. Institutional responsibilities, staff roles and rationale are discussed below.

Promotion and Information

Promotion for water supply is generally not required in Balochistan because priorities are obvious when shortages of water exist. In areas where water is available but quality is poor, some education is required to convince villagers of the needs. This should only be attempted when low cost solutions are possible and likely to be accepted by the community (e.g. chlorination of water). This is seen as a longer term task that could be performed by LGRDD Development Officers in coordination with a mass media approach conducted by the Health Department.

FIGURE 5.1 **STEPS IN THE PROJECT CYCLE**

**PROMOTION
and
INFORMATION**

REQUEST

**NEEDS ASSESSMENT
and
FEASIBILITY STUDY**

COMMITTEE FORMATION

**SELECTION,
AGREEMENT
and
APPROVAL**

TECHNICAL SURVEY

JOINT PLANNING

DETAILED DESIGN

COMMUNITY TRAINING

CONTRACTOR SELECTION

CONSTRUCTION

HAND-OVER

COST RECOVERY

OPERATION, MAINTENANCE & REPAIRS

**REHABILITATION
and
MAJOR REPAIRS**

In the short term, it is more essential that villagers receive better information about the development opportunities and how to take advantage of them. The Secretaries of the Union Councils should inform village leaders of the opportunities for technical and financial assistance through line departments and the procedures for obtaining assistance. The Union Council members should have direct input to the formulation of the District Water Plan and they should follow these guidelines or propose amendments for approving future schemes.

Request

The community can make its own request direct to the Assistant Director of LGRDD (ADLG) in its district, or may obtain assistance from local politicians or LGRDD Development Officers. If the scheme is compatible with the District Water Plan, the ADLG will arrange for a needs assessment and feasibility study to be conducted by LGRDD field staff.

Needs Assessment and Feasibility Study

The Development Officer, Overseer and Secretary of the Union Council will undertake a needs assessment and survey in the field from which a limited feasibility survey will be prepared. The Sub-engineer will have received training in low cost technologies and can request advice from his senior (Assistant Engineer). The Development Officer will have received training in community organization. The LGRDD field staff will work with the villagers to determine technology options, costs, requirements for implementation, operation and maintenance, and financing options.

Committee Formation

The LGRDD Development Officer is responsible for organizing the community to form a water committee, if required. For schemes that receive funding from government, this should be mandatory and a contract agreement to signed before the scheme can be approved.

Selection, Agreement and Approval

The village committee would be responsible for selecting the proposed option based on the feasibility studies and subject to financing alternatives. An agreement would be drawn up between the village committee and the agency that will be providing technical and financial assistance. This agreement would determine responsibilities for implementation, operation, maintenance and major repairs. For LGRDD schemes, the community would be fully responsible for operation, maintenance and repairs provided proper training and warranties are provided. Approval of financing would follow normal procedures depending upon the agency and amount of funding.

Technical Survey

The Assistant Engineer who will be professionally responsible for technical design and decisions at the district level and the sub-engineer will conduct any necessary technical survey of the area to meet the requirements of detailed design.

Joint Planning

Both the community and LGRDD staff will be responsible for planning the scheme. The community will participate in such decisions as pipe routing, water source selection, land acquisition, and location of handpumps, community tanks, and stand posts.

Detailed Design

If detailed design is necessary, it will be contracted out to consultants. Standardized designs will be developed and promoted by LGRDD technical experts. Consultants will have access to training seminars at the Rural Development Academy in Quetta.

Community Training

LGRDD will establish training capabilities at the district level. The Assistant Engineer will be trained by the Technical Wing experts. In turn, the Assistant Engineer will train and supervise the sub-engineers to impart training to villagers. The village water committee should appoint two persons to be responsible for operation and maintenance -- one would be the caretaker and the other would be a helper. Certain members of the village water committee will receive training in project management and administration from the Development Officer with expert assistance from other LGRDD staff if necessary.

Contractor Selection

Depending upon the source of capital financing, the community and/or LGRDD will select the contractor and accept responsibility for ensuring good quality workmanship.

Construction

In accordance with the agreement, the community will provide labour and materials to the level of its ability. Construction will be supervised by the water committee and the LGRDD engineers according to levels of financing. LGRDD staff would be available in an advisory role even if the scheme were community financed. Payments to contractors would be made according to normal practice.

Hand-over

On completion the scheme will be handed over to the community which will undertake ownership and full responsibility for its up-keep. This will include a certificate of satisfactory completion and operating and maintenance warranties.

Cost Recovery

At present, all LGRDD water supply schemes (whether funded directly or through local councils) are managed by the communities without any financial contributions from the public sector. This policy would continue and villagers would be bound by a contractual agreement. In the case of new technologies approved by LGRDD, LGRDD may provide extended warranties against major repairs. Methods of community financing would include regular contributions to an O&M fund (which are required when O&M costs are sizeable and regular) or payments in times of need (which are viable when O&M costs are minor and irregular).

Operation, Maintenance and Repairs

The village caretaker will be responsible for monitoring and maintenance on a regular basis. For example, if the scheme consists of community handpumps, the caretaker would visit each once a week to undertake preventative maintenance.

Rehabilitation and Major Repairs

Rehabilitation and major repairs will be the responsibility of the community. Therefore, the water committee must be made fully aware of the magnitude and consequences of this responsibility. For similar reasons, only simple schemes with low O&M cost will be supported by LGRDD unless the community shows extraordinary capacity to finance and manage major repairs. Otherwise, if the village cannot pay for the cost of major repairs (after an extended warranty period), public sector funds could only be obtained from the local councils annual budgets which are very limited.

5.6.2 Large Water Supply Schemes - PHED

This section refers to the implementation methods to be employed by the PHED serving rural communities larger than 1000 in population primarily by pumped, stored and piped supplies through community tanks, standposts and house connections.

The objective of the implementation strategy is to enhance the sustainability of water supply schemes by increasing community involvement, responsibility and sense of ownership. The long term need to meet this objective is imperative because the Government will have an increasingly difficult time to finance the entire cost of operating and maintaining schemes. Increasing the communities contributions to operations and maintenance will be accomplished through one of two approaches:

A. monthly tariffs collected by PHED from households with yard connections; or

B. community financing by which water charges are collected and managed within and by the community.

Presently, the efficiency of water charges collection under method A is very low. This is primarily due to lack of incentive for collection, ineffective enforcement and a general reluctance of the consumer to pay government agencies for water. Lack of incentive stems from the fact that collected funds are remitted to the Provincial Treasury. The corresponding allocations of recurrent expenditures to PHED are not directly influenced by collection. Also, the consumers have no reason to improve the rate of payment because funds are allocated to all schemes on the basis of need, not revenue collected.

Method A refers mainly to existing schemes because new schemes are being constructed for community tanks, not yard connections. PHED will have to encourage their staff to follow more rigorous procedures for collection of water tariffs. This should start by meeting with community leaders to discuss the consequences of low cost recovery. They should reassess the number of households benefitting from direct connections (both legal and illegal) and establish the amount of monthly water tariffs that should be collected. Communities should have an acceptable rate of recovery (at least 50%) before any future improvements are made to the existing scheme. It should be noted that all new schemes require financial contributions from all beneficiaries according to the proposed policy. Consequently, the community may decide to arrange their own collection system in order to meet the criteria for future investments. According to the response from communities, PHED may either require new staff to manage an effective revenue collection system, or PHED may have less direct involvement if the community takes over this responsibility.

Method B should apply to all new schemes constructed by PHED, once the proposed cost recovery policy is legislated. Under the new system, the negotiation of responsibilities for O&M will have to be agreed to by the village's water committee before funding can be approved for the scheme. Villagers will be required to bear an increasing share of the O&M costs, subject to predetermined maximum payments (i.e. Rs. 40/household per month). These negotiations are to be completed by the Community Relations Officers in PHED, subject to approval by the Chief Engineer. Since the funds are to be collected by the community water committee, it is advised that payments be made directly by the community for energy purchases or staffing. This would relieve PHED of the responsibility and would make villagers directly accountable for payments. A bank account could be set up in the name of the water committee against which payments would be drawn. PHED would retain responsibility for regular replacement parts and adjustments to ensure that the system is being properly maintained. This provision is required because PHED is ultimately responsible for major repairs. Also, the PHED sub-engineers will have to make regular monthly visits to maintain operating records (e.g. to monitor the tubewell's performance) and to check the condition of equipment and machinery.

Unfortunately, using both methods in the same community with both house connections and community tanks is not possible. In this situation, a decision should be made regarding the size and growth prospects for the community. In prosperous communities with more than 3000 people, it should be the long term policy to upgrade the water supply system to house connections. For this reason, it would be desirable to maintain the existing system of water tariffs knowing that most consumers will be covered. Ultimately, this community may be designated a town and a town council could be given the responsibility to collect water tariffs when they have the capability. For smaller villages that show little prospect for growth, the basic service level should primarily remain community tanks or standposts. Therefore, the community should be encouraged to manage a collective system of payment for O&M.

The community maintenance approach should established as part of PHED procedures by the start of the 8th Five Year Plan. The Community Relations Cell will be responsible for its achieving the necessary negotiations with the community.

Request and Needs Assessment

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. Subsequently, a request for water supply would be made to the District Executive Engineer of PHED. The needs assessment would be conducted by a junior Community Relations Officer at the same time as the technical feasibility study is carried out by the SDO and the Sub-engineer. Here care would have to be taken in assessing the community's needs and willingness to participate and contribute.

Formation of Water Committee and Contract Agreement

After an assessment of the field reports by senior staff, a decision would be made to proceed with further negotiations. A senior Community Relations Officer would assist the community in forming its water committee, joint planning, and coming to an agreement with PHED. An official contract would have be drawn up and agreed to before financing approval can proceed. The contract would specify the delegation of responsibilities including:

- method and schedule for collecting funds to cover local contributions to operations and maintenance costs;

- hiring and payment of the operators and support staff (PHED would always be obligated to provide adequate training and supervision);

- servicing and payment for minor repairs; and

- major maintenance and rehabilitation requirements (these would normally be borne by PHED but some villages could contribute to a fund from which a payment could be made to initiate public funding approval for the scheme).

Hand-over

Once the scheme is handed over, PHED's assistance will continue as determined by the signed agreement. Normally this would involve:

- close monitoring during the start up period to ensure that the scheme is technically sound and that the operator is capable;

- in the case of tubewell based schemes, the Sub-engineer would make monthly visits to supervise/inspect routine maintenance and collect data on the tubewell's performance;

- PHED would be responsible for the regular provision of supplies and parts for routine maintenance;

- PHED would pay for major repairs when required; and

- any disputes regarding operations or collection of revenues would have to be worked out between the water committee members and, when required, the PHED Community Relations Officer.

Operations and Maintenance

For all new schemes, the scheme operator and other staff should be recruited locally. The operators will initially be hired by PHED and trained by an Operator Trainer (4 new staff for the Province). The operator will be responsible for the continued functioning of the scheme under supervision of the Sub-engineer and SDO. Spare parts and supplies will be procured, stocked and supplied by the PHED. The PHED will also be responsible for rehabilitation and major repairs in the long term. Other staff should be employed by the community including the chowkidar and a helper who can stand in for the operator.

Cost Recovery

Cost recovery for operations, maintenance and repair will be an essential feature upon which method B depends. It will be supported by (1) the agreement signed before construction, (2) training in administering cost recovery, (3) creation of a representative water users committee, (4) keeping the funds "within" the community, (5) use of peer pressure in collection, and (6) the underlying need for the water supply to continue functioning (need will be a principal determinant in village selection). The chairman of the committee will be responsible for collecting water charges based on a monthly fee per household. The level of charges and precise method of collection will be determined by the community. These will reflect capacity to pay, overall cost and traditional methods of money collection and management.

5.6.3 Promotion of Sanitation/Drainage and Human Waste Disposal -- LGRDD

LGRDD is the lead agency for sanitation/drainage and human waste disposal programmes. The focus will be on promotion rather than implementation of schemes because there is very little public financing available or proposed for these components. The promotion of sanitation and human waste disposal will be linked directly with water supply implementation and hygiene programmes. The LGRDD field staff consisting of the Development Officer, the Community Hygiene Promoters, the

Overseer and the Secretary of the Union Council will be capable of providing an integrated sector development approach at the village level. They will be supported by advisers within LGRDD at the central level, Assistant Engineers and Planners at the District level and Health Educators at the District or Divisional level.

The role of the LGRDD field officers is to interact with villagers, not only promoting new practices and technologies but also observing the communities demands and needs. Only with this type of feedback can appropriate technologies and methods be developed.

5.6.4 Implementation Procedures for Delivering Hygiene Education

Methods of Achieving Different Levels of Service

Basic service -- During the series of meetings of the introductory phase which plans new water and drainage schemes, the LGRDD Development Officer will explain the health rationale for improvements in potable water quality and quantity to the village men as well as the basic hygiene messages and obtain permission for his female colleagues to meet with the women and girls of the village. Support media will be developed and provided to assist these tasks.

Female Community Hygiene Promoters (CHPs) will accompany the Development Officer on most of these trips and provide a basic introduction to hygiene education for the TBA. Together, they will conduct hygiene education with women's groups and make home visits if time permits. Materials will be left behind with the TBA for her to use on a volunteer basis. For most communities, there appears to be no mechanism for long term sustained support to the TBA after this intensive initial effort.

Second level -- Where a school exists in a community with a new water supply, one or more of the teachers will be provided with educational materials to promote hygiene among pupils and trained in their use by the Development Officer and CHP; pupils of both sexes will be encouraged to share their education with their mothers and sisters at home.

Third level -- In demonstration projects the CHP will initiate discussions on selection of a TBA and teacher in the village to work as a hygiene promoter. They will be trained, supported and remunerated to conduct group meetings.

Women's groups will receive regular discussions on health and hygiene led by trained TBAs, supported by effective teaching aids.

Male membership CBOs will receive similar discussions from the trained male primary school teachers, supported by effective teaching aids, including the need to support adoption by women in their household of better hygiene.

Fourth level -- Women receive regular home visits from the trained TBAs to discuss existing home health and hygiene, and better hygiene practices.

For many small and remote communities only the basic level will be available. Ultimately, the level of service attainable in each community will depend largely on the calibre of human resources available to work on hygiene promotion.

Messages

The aim of hygiene education is to disseminate a limited number of important hygiene messages to a large proportion of rural households in which good hygiene is possible.

The basic hygiene knowledge that all adults and families should know will be developed with care. It is likely to include messages concerning hand washing; disposal of faeces, particulary those of children; diarrhoea; garbage disposal; as well as messages in support of water supply improvements, latrines and drainage. Some of these have already been covered in materials developed in Balochistan. Suggestions for crucial messages can also be based upon guidelines from WHO and UNICEF ("Facts for Life") and local health staff. They must be adapted to the problems, present knowledge, practices and possibilities of rural Balochistan. A example of possible messages is presented in Table 5.8.

Materials

As sets of messages are agreed upon, so materials will be developed. These will be mostly materials designed to support interpersonal communication rather than the passive posters and billboards that are currently emphasised by the HEU. Good materials both increase the effectiveness of verbal communication and ensure message consistency. They will be developed by the LGRDD Cell with the HEU staff in operational workshops that will include field investigation of hygiene problems, drafting of materials, field pre-testing and modification. Materials will include flip charts of visuals, leaflets and other materials designed for illiterates. Where testing indicates that existing materials are effective then these will be utilised.

Coordination of Hygiene Education with Other Programmes

Utilizing transport to villages during the introduction phase of a new scheme offers low cost opportunities to introduce hygiene education. The major tasks of hygiene education must respond to both the sector component proposed and the stage in the implementation process.

As most water supply schemes in Balochistan will provide better access to water and make possible the daily use of higher volumes, the emphasis will be upon exploiting the potential for higher standards of hygiene and the preservation of water quality. Increased water availability will meet a felt need of the community and the health rationale for the scheme is unlikely to require emphasis during discussions with the community.

Similarly, latrines are initially appreciated for the possibility they offer of a more dignified defecation, rather than for their health benefits.

TABLE 5.8 EXAMPLE OF POSSIBLE HYGIENE EDUCATION MESSAGES

FOR FAMILIES

1. Improve and protect your water supply so that your family can use plenty of clean water.

2. Wash hands with water and soap after defecation, after contact with faeces (especially after cleaning the bottom of a baby or child) and before handling food.

3. Build and maintain latrines, use them properly.

4. If you can't build a latrine yet, then bury your faeces and those of your children; children's faeces are more dangerous than an adult's.

5. Breast milk is the most hygienic food for a baby; the only food and drink your baby needs for the first four to six months.

6. Diarrhoea dries out your baby and can kill; give ORS to a child with diarrhoea, continue to breastfeed.

7. Burn or bury household garbage.

8. Cover food from flies - flies carry disease from faeces to food.

9. Wear shoes; some worms enter your children through their feet.

FOR COMMUNITIES

1. Improve and protect your water supply so that your community can use plenty of clean water.

2. Build community drainage systems where pools of waste water are a problem; keep them clear and the water flowing; locate pools away from the village.

3. Design and implement a garbage disposal scheme that removes the village garbage in an environmentally sound manner.

4. Where there is no women's group, call a meeting of community women for them to discuss hygiene with the FHT/ LHV/ school teacher; allow them to receive home visits for this purpose.

Audiences

Within such a process, it will therefore be important that all groups and individuals within a community are reached with the hygiene messages. The male leaders of each community will be expected to organise those sector activities that must operate at the community level, such as drainage, normally as part of the work of the informal CBO. Male household heads will take the responsibility for deciding to invest in a latrine. At the household level, the primary audience are the mothers and girls who bear primary responsibility for all food preparation, water management and child rearing. The final major audience is school children.

Human Resource Development for Hygiene Education

The first stage in training will be of all the HEU staff by the technical assistance of the LGRDD Cell in a series of workshops to first review all experience to date in hygiene education in Balochistan and selected programmes elsewhere in Pakistan. This will be followed by a workshop to review hygiene materials already in use in Balochistan, to conduct field testing of how well they are understood by villagers, particularly women, and their cultural appropriateness. Where necessary, because of problems discovered in the testing or because the project intends to include messages for which materials have not been developed, the workshop will develop new materials. A third workshop will review different methods of health education and develop training materials and approaches to use in training DoH staff and others to improve their teaching skills. The intent of these workshops is not only to develop an effective approach to hygiene education but also to provide HEU staff with the experience of the process of designing an educational approach that they might use with other health problems.

This will be followed by a short seminar for senior DoH staff to introduce them to the hygiene education activities and obtain their involvement and suggestions for how these may be used in the centres.

As one component of the training, LGRDD Development Officers will be informed of the hygiene implications of their work and the changes in hygiene necessary for the health benefits of water supply improvements to be realised. Their preparatory work with communities provide them with opportunities to introduce this to the villagers and prepare them for the later hygiene education activities.

There are a number of NGOs involved in rural development projects, some of which include hygiene promotion. They have gained valuable experience in hygiene promotion and this should be reviewed to draw out lessons. In addition, materials and training courses organised for hygiene promotion should be accessible to their staff and members.

5.7 Donor Programmes to Support the Strategic Investment Plan

There are four reasons to involve Donors in the Investment Plan. Firstly, in Section 5.2.2, the recommended investment levels for the planning period are described and a financial resource gap of roughly Rs. 200 million was identified during the 8 year planning period. Part or all of this gap could be made up by external assistance. Secondly, there are human resource and institutional constraints that must be resolved if effective implementation of the plan is to be possible. The Donor agencies can play a major role in satisfying these needs. Thirdly, there are certain components that may not receive the appropriate level of funding within the plan; this applies specifically to sanitation/ drainage, human waste disposal and hygiene education, and possibly to low cost water supply technologies such as handpumps. The Donor agencies can implement projects on a demonstration basis to determine the viability and suitable approaches for future development. Fourthly, the line departments and agencies involved in the sector are poorly coordinated. A Donor agency often has the ability to command greater cooperation and thereby promote a more integrated approach to sector development.

The following sections describe possible donor involvement in the Provincial Investment Plan. This section is organized by implementing agency and by component.

Donor Assistance for PHED

The proposed investment strategy for PHED requires continued levels of investment in rural water supply schemes based on funding levels that are already committed in the ADP. Therefore, final assistance for water supply schemes from the donors is not a prerequisite. However, significant changes to planning, design, implementation and operating procedures have been recommended but which require time and new expertise to impart. The requirements for implementing new strategies and procedures within PHED were described in Section 5.5.2. The donor agencies could assist with virtually every aspect of institutional and human resource development, including:

- assisting PHED to set up and operationalize the Planning and Community Relations cell to develop improved planning and implementation procedures including a viable approach to community participation, maintenance and cost recovery for water supply;

- reorient staff and develop awareness for factors affecting the sustainability of water supply systems;

- provision of technical expertise and training to improve the Electrical & Mechanical Division's capability for water resource evaluation and development, and rehabilitation of tubewells;

- provision of technical expertise and training to improve designs for water supply schemes, including handpumps and primary water treatment facilities;

- establishment of an in-house training programme and Human Resource Information System (HRIS) in cooperation with a new training coordinator within PHED; and

- setting up a data management system for organizing information on each scheme, its operating characteristics, costing data and revenue collection records (where applicable).

In addition, there are various requirements for equipping PHED that the donor agencies could finance. This list includes:

- vehicles for new staff positions, particularly the proposed Planning & Community Relations cell and the E & M Division;

- proper office accommodations for staff of the Chief Engineer including design engineers and draughtsman, Planning & Community Relations cell staff, a new training coordinator with support facilities (reference library), and administrative staff;

- warehouse/workshops and related equipment and tools in four decentralized locations for the E & M Division (i.e. Sibi, Khuzdar, Turbat and Loralai);

- furnishings for new accommodations and office equipment including computers, reproduction equipment, drafting equipment, etc;

- supplies and spare parts for maintaining water supply schemes and drilling operations;

- equipment for hydrogeological investigations, testing development wells, monitoring tubewells and rehabilitating tubewells; and

- provision of spares for new systems until local suppliers are established to meet demands (e.g. for handpumps, special drill bits, small pumps and motors, etc).

One area where the donor agencies could provide both expertise and investment in schemes is for rehabilitation. PHED has allocated a significant share (9%) of their development budget for the extension and improvement of existing schemes but with added pressure to maintain the pace of new chemes, some needs will go unmet. Schemes that require rehabilitat n offer a unique opportunity to test new strategies for cost recove and community involvement. The donor could select 3 to 5 5.7.1 schemes eac year costing Rs. 5 million/yr plus the cost of expatriate assistance d support equipment. Another Rs. 5 million/yr could be used to upg de 10 schemes from community tanks to standposts and house connection

For water ource development there is ample opportunity for Donor involvemen ith the testing and evaluation of groundwater sources and the develo nt and rehabilitation of tubewells. This involvement could include fi cing of operations, training, supply testing equipment, and parts and ls to maintain the drilling rigs. The recommended investment vel would be Rs. 50 to 60 million over the 8 year period. The recomm led investment costs are detailed in Table 5.9.

Project A

For the h resource development component, the programme would be largely b l in Quetta but testing and evaluation of new technologies, procedure d policies in the field is essential. PHED has a long list of projec and eventually these procedures should be disseminated to all Distr s. Despite this flexibility, it is recommended that the donor ag focus on 2 or 3 Districts close to Quetta, such as Kachhi, Qila Sai h or Chaghi (see Figure 5.2). These Districts have great needs fo ter supply, have good potential for water development in certain s, and are receptive to ideas of increased community involvem

For the bilitation and upgrading of existing schemes the most immediat eds are in Quetta and Pishin Districts. These areas have older s s, the population of villages served is much larger than other a and the income levels of villagers are greater. These charact ics provide good opportunities for providing upgraded service ls.

TABLE 5.9

RECOMMENDED DONOR ASSISTANCE FOR PHED

(Rs. million at constant prices -- June 1989)

COMPONENTS	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98
Institutional Aid								
- Office Accommodations	7.0	10.8	4.8	4.8	4.8	4.8	3.8	0.0
- Office Equipment	2.0	3.2	1.5	2.0	1.5	1.5	2.0	1.5
- Warehouses/Equipment	4.0	4.0	4.0	4.0	0.0	0.0	0.0	0.0
- Vehicles	2.5	1.3	1.3	1.3	2.5	1.3	1.3	1.3
Sub-total	**15.5**	**19.3**	**11.6**	**12.1**	**8.8**	**7.6**	**7.1**	**2.8**
Training								
- E&M Staff	1.8	2.0	1.2	0.4	0.0	0.0	0.0	0.0
- Operations Staff	1.5	0.4	0.4	0.0	0.0	0.0	0.0	0.0
- P&CR Cell Staff	0.5	0.5	0.1	0.1	0.2	0.1	0.0	0.0
- Operators Training	0.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4
- Expatriate Fees	3.0	3.0	2.0	2.0	0.5	0.5	0.5	0.5
Sub-total	**6.8**	**6.3**	**4.1**	**2.9**	**1.1**	**1.0**	**0.9**	**0.9**
Water Supply Schemes								
- Rehabilitation	0.0	2.0	2.0	2.0	0.0	0.0	0.0	0.0
- Extension & Improvement	0.0	2.5	2.5	4.0	4.0	4.0	4.0	4.0
- New Schemes	0.0	3.0	3.0	3.0	3.0	0.0	0.0	0.0
Sub-total	**0.0**	**7.5**	**7.5**	**9.0**	**7.0**	**4.0**	**4.0**	**4.0**
Water Resource Development								
- Equipment & Spares	5.0	5.0	5.0	5.0	5.0	5.0	3.0	3.0
- Development & Rehab.	0.0	5.0	5.0	5.0	5.0	0.0	0.0	0.0
Sub-total	**5.0**	**10.0**	**10.0**	**10.0**	**10.0**	**5.0**	**3.0**	**3.0**
TOTAL	**27.3**	**43.1**	**33.2**	**34.0**	**26.9**	**17.6**	**15.0**	**10.7**

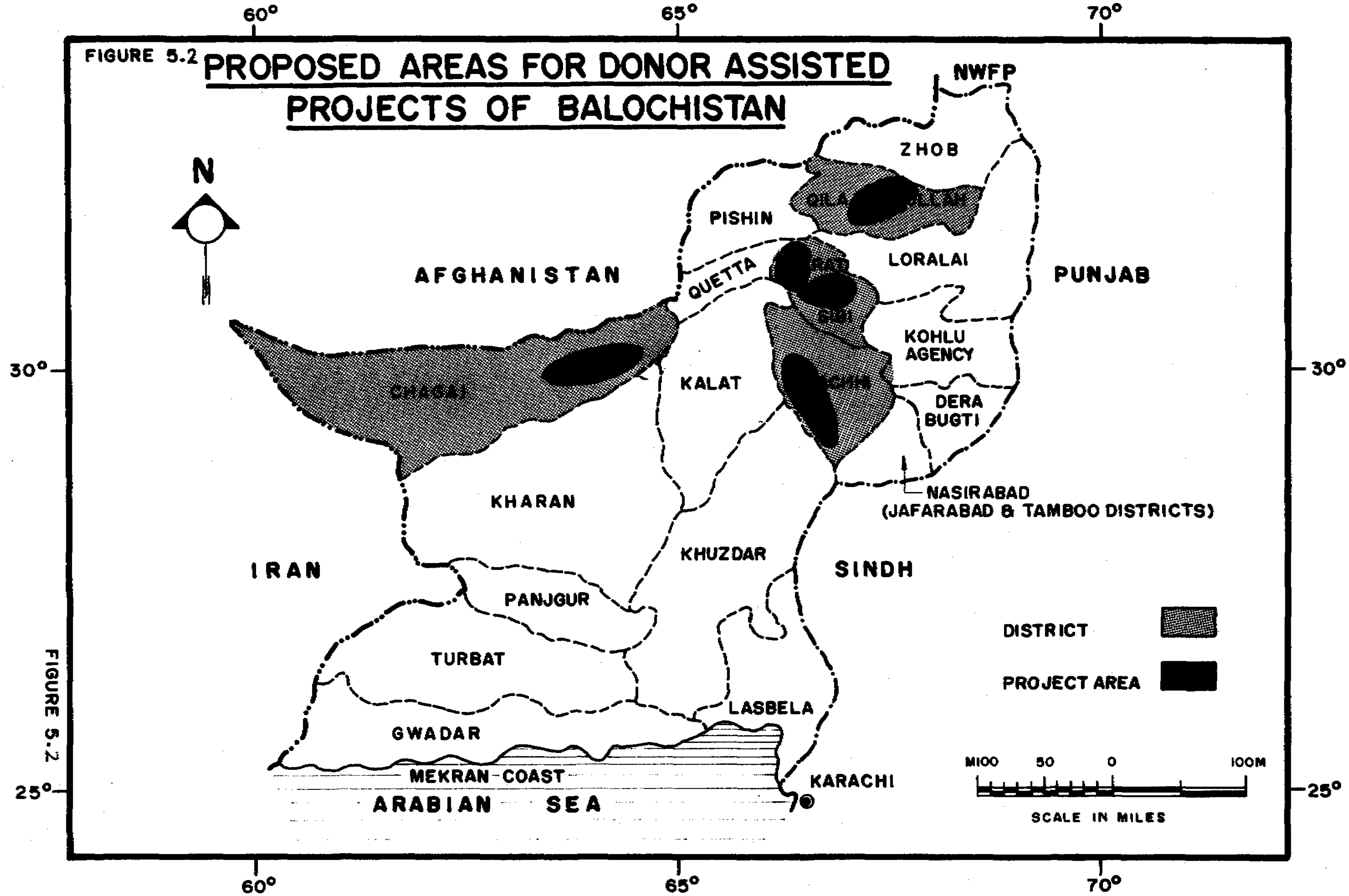


FIGURE 5.2 PROPOSED AREAS FOR DONOR ASSISTED PROJECTS OF BALOCHISTAN

Implementation

Most of the donor assistance (80%) for PHED is in the form of material requirements which could be supplied externally with a minor presence for monitoring and evaluation. On the other hand, the human resource development requires some continuous donor presence in the form of training consultants. This could be managed from outside the department by providing short term consultancy and assistance at various stages. One expatriate would be required to coordinate these activities on a full time basis. For PHED, the majority of the training requirements should be met in the first three years.

The rehabilitation and upgrading of existing schemes would require closer involvement by the donor until the programme is operationalized. Similarly, the installation of handpumps on bore holes would demand greater initiative and technical guidance from the project unit. It should be viewed as more of a demonstration programme so the need for monitoring and evaluation would be more demanding. Also, it must be coordinated with training programmes in community participation and would directly involve the staff of the Planning & Community Relation cell.

Staffing Requirements

There are several different stages of technical assistance that are proposed for PHED. From the donors viewpoint this would require one expatriate full time in the first two years for overall project management and to coordinate the training programmes which would be conducted by short term expatriate or local consultants. The programme would be conditional upon PHED filling the staffing positions indicated in Section 5.5.2, in particular, staff for the Planning & Community Relations cell. In the first year, the requirements are a Chief Planner to set up the cell, then the hiring of three Community Relations Officers plus one engineer with experience in low cost technologies and necessary administrative support staff. For these positions, the people must be technically competent but much of the required experience will be learned during the programme through assistance from consultants. In the second year, 3 to 6 field officers (of Grade 16) should be employed and trained in community relations. This will make the cell operational by the middle of the second year.

Other PHED staff requirements to be filled within the first two years include a training coordinator, a data management expert, and one or two additional design engineers. These will be counterparts to the project staff but are permanent positions within PHED. The E&M Division has adequate staff to receive technical assistance beginning in the first year of the programme. New positions have been proposed and these can be phased in according to the capacity of the in-house training programmes that will be established.

To facilitate the training of system operators for existing and new water supply schemes, it is proposed that PHED recruit 4 technical trainers (Grade 17). They will initially receive a "train the trainer" programme from the expatriate or local technical advisor. Two trainers will have mechanical expertise and two will have electrical expertise. They will be responsible for training system operators and will have to be mobile to reach 150 to 200 operators (new plus some existing) each year.

In other areas of operations, the project team will work with existing PHED staff (e.g. Superintending Engineers, Executive Engineers, and Sub-Divisional Officers).

Human Resource Development

It is proposed through the project that the position of a Training Coordinator (Grade 17) would be established. To assist in the initial operational phase and provide guidance for international training opportunities, an expatriate HRD advisor should be available part time during the first two years.

The project proposes to upgrade professional and sub-professional engineering staff by means of refresher training. Training for these staff will be arranged by the Training Coordinator. Seminars and short courses will be held at the Quetta Polytechnic Institute. For example, professional engineers will attend a 2 to 3 day seminar on low cost water supply designs and equipment as well as design options for sanitation/drainage. Sub-professional engineering personnel (diploma holders) will attend a 10 to 15 day course which will introduce them to the design, construction, operations and maintenance of various water supply and drainage schemes that are applicable to rural areas in Balochistan. Project management and community involvement techniques would be taught in-house or through the Rural Development Academy with donor project assistance.

Funding will be required to support the training programme for the hydrogeological staff as well as drillers and mechanics. In the case the new rigs are purchased from Japan, trainer advisors would be available for the first two months. The project should provide extended training for rigs operators.

Local Cost Implications

In the investment plan, several new staffing positions were recommended for PHED. These additional staffing requirements have been costed in Section 2.3.2 they comprise a key component of the development strategy for the sector. A Donor project could focus on these new staff and would work as counterparts. The cost of materials and supplies, fuel costs and travel allowance for these staff will be paid by the project whenever they working with the Donor.

5.7.2 Donor Assistance for LGRDD

The proposed strategy for LGRDD is to strengthen the departments capability to implement integrated sector development at the village level for small and medium size schemes. The requirements for LGRDD were identified in Section 5.5.3 which focused on institutional aid and human resource development. Given these existing weaknesses, there is a clear role for donor agencies to:

- develop and test procedures for the implementation of integrated low cost water supply and sanitation schemes for small villages;

- improve the training of field officers for community involvement in sector development, particularly the Development Officers;

- enhance the technical capability of LGRDD staff, both at the central level and the District level (low cost technologies for water supply, sanitation/drainage and human waste disposal);

- assist the set up and training of staff for the new sanitation and hygiene promotion cell at the District level, particularly the female Community Hygiene Promoters;

- training a new staff of District Planners to prepare water development plans and coordinate activities in the sector;

- set up a programme for the installation of handpumps on dug wells and protection of existing water sources;

- improve the capability of the Rural Development Academy to develop training programmes government staff and local officials; and

- assist LGRDD to establish a Human Resource Information System to identify existing capabilities and future requirements.

The donors can also assist LGRDD's implementation capabilities by providing vehicles and office equipment for staff in project areas. The Rural Development Academy will need ongoing support in terms of audio and visual equipment, computers, reference materials and supplies.

Once the LGRDD staff are upgraded technically and new staff are functional, the donors would provide some funding of water supply schemes, sanitation/drainage and human waste disposal.

Table 5.10 shows the estimated cost of Donor assistance phased over the 8 year planning period. The total input would amount to Rs. 128 million, including the cost of expatriates (24% of the total cost).

Implementation

Initially, most of the donor input will focus on human resource development with less emphasis on project implementation until the second or third year of the programme. This would require heavy involvement by foreign or local training consultants to train existing and new staff in selected Districts. A project unit could be set up within LGRDD or separately. The advantage of a separate but temporary integrated project unit is that programmes for LGRDD, PHED and Health could be efficiently managed at the same time.

This involvement would gradually shift to project implementation but technical counterparts would be required on ongoing basis and coordinated by a full time project manager.

The donor would also be active with the Rural Development Academy. A proposal already exists for Dutch assistance for the Academy and sector programmes should be mutually beneficial.

Project Areas

The project unit would be based in Quetta but project implementation requires a District level approach. It is recommended that the donor initially start in 2 or 3 Districts (Kachhi, Chaghi or Ziarat) and gradually expand (possibly to Qila Saifullah and the Harnai region of

TABLE 5.10

RECOMMENDED DONOR ASSISTANCE FOR LGRDD

(Rs. million at constant prices -- June 1989)

COMPONENTS	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98
Institutional Aid								
- Office Equipment	1.0	1.5	0.5	0.5	1.5	1.5	0.5	0.5
- Rural Dev. Academy	2.0	2.0	0.5	0.5	0.0	0.0	0.0	0.0
- Vehicles	3.5	5.0	1.0	1.0	5.0	0.0	0.0	0.0
Sub-total	**6.5**	**8.5**	**2.0**	**2.0**	**6.5**	**1.5**	**0.5**	**0.5**
Training								
- Professional Staff	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0
- District Officers	0.9	0.8	0.7	0.7	0.5	0.3	0.3	0.3
- RDA Staff	2.0	2.0	1.0	0.5	0.0	0.0	0.0	0.0
- Caretakers Training	0.0	0.3	0.4	0.4	0.4	0.4	0.4	0.4
- Expatriate Fees	8.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0
- Local Consultants	1.0	1.0	1.5	1.5	1.5	1.5	1.0	1.0
Sub-total	**12.4**	**9.6**	**6.6**	**6.1**	**5.4**	**5.2**	**4.7**	**4.7**
Demonstration Schemes								
- Water Supply	0.0	1.0	2.0	2.0	2.0	3.0	3.0	3.0
- Sanitation/Drainage	0.0	0.5	1.0	1.0	1.0	1.0	0.0	0.0
- Latrines	0.0	0.2	0.5	0.5	0.5	0.5	0.5	0.5
Sub-total	**0.0**	**1.7**	**3.5**	**3.5**	**3.5**	**4.5**	**3.5**	**3.5**
Delay Action/Check Dams	**0.0**	**0.8**	**1.2**	**2.0**	**2.0**	**2.5**	**2.5**	**2.5**
Hygiene Promotion	**2.9**	**2.5**	**2.4**	**0.5**	**0.0**	**0.0**	**0.0**	**0.0**
TOTAL	**21.8**	**23.1**	**15.7**	**14.1**	**17.4**	**13.7**	**11.2**	**11.2**

District Sibi). These Districts have:

- reasonable access to Quetta;
- great need of water supply;
- good options for low cost technologies;
- a variety of socio-economic characteristics;
- a varying degree of administrative capability; and
- communities that expressed willingness for cooperation.

In addition, it is recommended that the project unit should assist LGRDD to set up a parallel programme in one District (i.e. Lasbela) where LGRDD staff would receive training in Quetta but would be responsible for implementing projects on their own. The project unit would be available to monitor and evaluate LGRDD's progress.

Staffing Requirements

The project will essentially be executed by LGRDD staff but in view of present constraints, expatriate and local expertise will be required to develop skills, staff resources, and implementation procedures. The project unit will be staffed by one expatriate senior Planning Advisor/Project Manager and one expatriate Technical Advisor/Trainer. Local consultants will include a Training Coordinator, a Design Engineer/Cost Expert experienced in low cost water supply, sanitation/ drainage and human waste disposal, a female Hygienist, and a Community Development Expert. Support staff will be recruited locally.

The LGRDD counterparts will include an Executive (Design) Engineer, an Assistant Director (Planning), a newly recruited Hygiene Educator and necessary support staff. At least half of their time will be devoted to the project unit and will be based in Quetta. In the first 3 years, the LGRDD staff required within each project District, full time with the project, include one Development Officer, one Overseer, the new District Planner and the two new Community Health Promoters. The Union Council Secretaries in the project areas will be directly involved with the project unit but they will still maintain their regular duties.

Human Resource Development

The integrated project unit will collaborate with the Rural Development Academy in developing suitable training programmes and training materials for LGRDD field staff. LGRDD will also need an in-house programme for technical training of Assistant Engineers and Overseers, with the assistance of an expatriate trainer. The Expatriate will provide a "Train the Trainer" programme to impart skills which enable Sub-Engineers to instruct village caretakers in the operation and maintenance of small water and sanitation/drainage systems. Training programmes should be coordinated by the Academy with assistance from the project unit.

Local Cost Implications

LGRDD would have to bear the cost of staffing recruited for the project. This would range from Rs. 0.3 to 0.5 million annually. All of the field officers in project areas would work as counterparts but would still be performing their regular duties rather than be seconded by to the project. The only possible exception is the Development Officer but this would depend upon the existing workload of potential candidates. The cost of materials and supplies, fuel costs and travel allowance for field staff will be paid by the project.

5.7.3 Donor Programme for Hygiene Education

LGRDD

External assistance is sought to meet the shortfall between the Government's allocation for hygiene education and the costs of the programme. The costs of the hygiene education programme excluding local and expatriate fees amount to Rs. 1.9 million during the first three years (see Table 5.11). Much of the cost includes training, travel allowances and the purchase of 3 vehicles for project staff. Continued funding for this programme would be contingent upon a project evaluation

TABLE 5.11

RECOMMENDED DONOR ASSISTANCE FOR HYGIENE EDUCATION

(Rs. million at constant prices -- June 1989)

DEPT. / COMPONENTS	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98
Department of Health								
- Production Equipment	0.4	0.3	0.0	0.0	0.6	0.0	0.0	0.0
- Vehicles	0.5	0.5	0.0	0.0	0.8	0.0	0.0	0.0
- Material Production	0.5	0.2	0.2	0.2	0.2	0.2	0.3	0.3
- Training	0.6	0.5	0.7	0.6	0.7	0.6	0.8	0.6
Sub-total	**2.0**	**1.5**	**0.9**	**0.8**	**2.3**	**0.8**	**1.1**	**0.9**
Education Department								
- Office Equipment	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0
- Vehicles	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0
- Training	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1
Sub-total	**0.7**	**0.1**	**0.1**	**0.1**	**0.7**	**0.1**	**0.1**	**0.1**
LGRDD								
- Training	0.3	0.2	0.2	0.1	0.1	0.1	0.0	0.0
- Travel Allowances	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
- Vehicles	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-total	**1.1**	**0.4**	**0.4**	**0.3**	**0.3**	**0.3**	**0.2**	**0.2**
Expatriate Fees	**2.0**	**2.0**	**2.0**	**2.0**	**1.0**	**1.0**	**1.0**	**1.0**
Local Consultants	**0.8**	**0.8**	**0.8**	**0.8**	**0.5**	**0.5**	**0.5**	**0.5**
TOTAL	**6.6**	**4.8**	**4.2**	**4.0**	**4.8**	**2.7**	**2.9**	**2.7**

at the end of the year 3 (1992/93).

The primary requirement is for health and hygiene education expertise to implement the programme and develop local skills. Foreign technical assistance could come from the region to build upon the extensive hygiene education experience of other countries. It should also include two well qualified Pakistani social scientists/ educators, experienced in health or non-formal education. These could be based in the LGRDD cell.

If donor support is forthcoming, it is possible that similar projects will be launched in all or most of the other provinces and territories, and in the federal capital. It is envisaged that the staff based in Islamabad will be responsible for liaison with federal agencies such as the Ministries of Health and Education, the National Institute for Health, the Allama Iqbal Open University and with other related national scale projects or agencies. In addition, this team of two will provide support to the provincial teams. There will be a regular exchange of experience among different provinces.

Department of Health

For the Department of Health, the primary impact would be upon the Health Education Unit whose staff would receive refresher courses in hygiene education methods and materials. This would enable Health Educators to assist with implementation and monitoring of LGRDD's Community Hygiene Promoters programme. The integrated project unit for LGRDD would work with the Health Education Unit to develop materials that are appropriate for LGRDD's female promoters, Department of Health staff, and primary school teachers. The Community Health Promoters could then receive training from the Health Education Unit.

In addition to training, donor assistance would provide equipment for material development and production, as well as required supplies. It is proposed that additional Health Educators be recruited, including females. The donor project would finance 4 new vehicles and travel allowances for the time that Health Educators are involved with LGRDD project staff.

The total cost of the donor assistance is estimated as Rs. 2.0 million for year 1, Rs. 1.5 million for year 2 and Rs. 0.9 million in year 3 (see Table 5.11). Continued involvement during the 8th Five Year Plan would have to be reassessed at that time. The local contribution to cost would include the salaries of some new staff for the Health Education Unit, estimated to be Rs. 0.3 million annually. All other project related expenses would be paid by the donor project.

Department of Education

Primary school teachers within the Department of Education would be trained in hygiene education and promotion methods at the Teacher Training Colleges. The integrated project unit, in cooperation with the Department of Health, would assist in the development of curriculum for teachers and for school children. Health Educators could give special course at the Teachers Training Colleges, and remuneration would come from the project funds. Materials developed by the project would be made available for use in all Districts under the Department of Education's initiative and control. The cost of production and distribution of hygiene education materials to primary schools has been included in the costs for the Health Education Unit which is responsible for material development. In villages where LGRDD Community Health Promoters are working, the primary school teachers would receive informal training in the village. Both primary school teachers and village TBAs would receive remuneration of Rs. 50 per month for up to 12 months for imparting hygiene education to the adults in the community. The Community Hygiene Promoters would monitor this programme.

The total cost of the donor assistance is estimated as Rs. .9 million over the first three years combined (see Table 5.13). Continued involvement during the 8th Five Year Plan would have to be reassessed at that time. The only costs to be borne by the Department of Education would be the salary of one person (Grade 17) to coordinate the programme and liaise with the project unit.

5.7.4 Planning and Development Department

The long term success for sector development depends upon the improved coordination between the various line departments and agencies. It has been proposed that the existing Steering Committee that was formulated for the Investment Plan study be retained and supported by a new sub-committee consisting of an Executive Engineer from PHED, a District Health Officer and an Assistant Director of LGRDD. To set up and make this sub-committee functional, it is recommended that the donor project provide advisory assistance during the first three years and provide institutional support. This would include two vehicles, office accommodation and office equipment for effective monitoring and evaluation. The project would also pay field allowances to the three members of the sub-committee for this period.

The total amount of donor assistance is estimated to be Rs. 2 million during these three years (see Table 5.13). The services of an expatriate have not been included in the cost because this task only requires occasional attention which can be combined in the duties of one of the permanent expatriates required for LGRDD. By 1993/94, the staff of the sub-committee should be increased to six members and finally to nine members by the end of the 8th Five Year Plan. This would enable effective monitoring and evaluation of the sector throughout the province. The donor would finance the cost of operationalizing these staff. The total donor contribution during the planning period would be Rs. 5 million. The local contribution would include the salaries of the sub-committee members, their support staff and recurring expenses. This is estimated to be Rs. 0.4 million/yr in the initial year and increasing to Rs. 1.2 million by 1997/98.

5.8 **Proposed Donor Packages**

During the course of the Strategic Investment Plan study, potential donor agencies have been involved in the various Provincial Steering

Committee meetings. During a visit in July 1989, indications of the levels of financial commitments were made to the various Provincial Governments. In Balochistan, the World Bank and the Government of the Netherlands have made preliminary commitments for the rural water supply, sanitation and health sector.

5.8.1 World Bank

Should the Government of Balochistan request, the World Bank is likely to provide assistance in two areas: support to PHED; and support to water resource development and preservation. Support to PHED would focus on improving facilities for project design and implementation. It could also include some limited assistance for rehabilitation and new schemes in selected districts. Water resource development could include support to PHED for parts and equipment, resistivity and field equipment. It could also include support to LGRDD for delay action/ aquifer recharge dams.

Support to the sector would probably form part either of a project to support water and sanitation in the urban sector (16 Townships Project) or of a project supporting the rural water sector in other provinces. The indicated level of investment is US$ 10 to 12 million during the 8 year planning period. This money would be provided as a loan upon request from the Government of Balochistan. At present, the Government of Balochistan is not prepared to meet strict conditionalities that apply to some loans but in the case of the proposed financial assistance, this problem should not arise.

For the World Bank loan, PHED would be the implementing agency. Since most of the assistance is for institutional improvements, the requirement for consultancy services is minor with the exception of monitoring and evaluation. The limited investment in rehabilitation and new schemes could be managed by project staff in the urban water supply sector.

5.8.2 Government of the Netherlands

The Government of the Netherlands has expressed interest to provide financial support to the rural sector that would involve:

- strengthening the coordinating role of the Steering Committee by supporting an integrated project unit for a 4 year period, with an option of extending this period;

- support to line departments (PHED, LGRDD, and Health) with emphasis on training, human resource development and planning;

- strengthening district capacities for planning, evaluation, and community training support;

- hygiene education programmes in selected Districts;

- implementation of small village water supply and low cost sanitation schemes in selected Districts; and

- pilot project concerning piped supplies and drainage schemes.

The project would be executed by the existing institutions and staff with technical and planning assistance from the integrated project unit. There would be continuous expatriate presence within the project unit, to be based in Quetta. The project focus on 3 or 4 Districts that are easily accessible from Quetta.

The indicative level of investment for 4 years is between US$ 4 to 6 million (Rs. 80 to 120 million). This funding would be provided as a grant. A similar level of investment is possible for the next 4 years but no commitment would be made until year 3 of the proposed project. These funds are in additional to a separate proposal for assistance to the Rural Development Academy of approximately US$ 1.7 million (Rs. 34 million) during a 4 year period beginning in 1990/91.

5.8.3 Comparison with the Proposed Donor Assistance

The donor assistance identified in Section 5.7 amounted to Rs. 207 million over the 8 year planning period, compared with preliminary commitments of Rs. 280 to 360 million from the World Bank and the Government of the Netherlands, and potentially Rs. 360 to 480 million if the Dutch extend their involvement for another 4 years.

The breakdown by component suggests that the investments by these two agencies are complimentary, both in terms of financing component and implementation requirements (e.g. the project unit set up by the Dutch would benefit from the proposed World Bank investment and vice versa.

Table 5.12 shows a potential scenario for the donor packages. The World Bank would have package amounting to Rs. 200 million over the 8 year planning period of which:

- 42% would be for institutional aid;
- 22% would be for water supply schemes;
- 28% would be for water resource development; and
- 8% would be for small delay action dams implemented by LGRDD.

The Dutch would have a package amounting to Rs. 175 million over the planning period (assuming funding would be extended for the last four years. In the first four years, the amount of funding would be Rs. 108 million. The share by component over the entire period is:

- 45% for training (14% for PHED and 31% for LGRDD);
- 22% for institutional assistance;
- 9% for water supply schemes (pilot projects);
- 4% for sanitation/drainage and latrines (demonstration); and
- 20% for hygiene promotion (integrated programme).

TABLE 5.12

POTENTIAL DONOR PACKAGES FOR ASSISTANCE TO THE SECTOR

(Rs. million at constant prices -- June 1989)

	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98
World Bank								
Institutional Aid - PHED	15	19	12	12	9	8	7	3
Water Supply - PHED	0	8	8	9	7	4	4	4
Water Resource Development	5	10	10	10	10	5	3	3
Delay Action Dams - LGRDD	0	1	1	2	2	3	3	3
Sub-Total	20	38	31	33	28	20	17	13
Government of Netherlands								
Training - PHED	7	6	4	3	1	1	1	1
Training - LGRDD	12	10	7	6	5	5	5	5
Institutional Aid - LGRDD	7	9	2	2	7	2	1	1
Institutional Aid - P&D	2	1	1	1	2	0	0	0
Water Supply - LGRDD	0	1	2	2	2	3	3	3
Hygiene Education	7	5	4	4	6	3	3	3
Sanitation/Drainage	0	1	1	1	1	1	1	1
Sub-Total	35	33	21	19	24	15	14	14
TOTAL DONOR ASSISTANCE	55	71	52	52	52	35	31	27

The total cost of expatriate service would be approximately Rs. 55 million, or 15% of the total cost of the programmes. The major share would be borne by the Dutch because their package involves mainly human resource development, either directly through training programmes or indirectly through demonstration projects and promotion of hygiene.

6. FINANCING

6.1 Capital Cost Financing

6.1.1 Introduction

There are expected to be three main sources of capital funds for the sector:

- the Annual Development Programme of the Provincial Government with allocations for the Sector made from the funds set aside in the development programmes and executed primarily through PHED and LGRDD;

- the Special Development Programme for larger projects involving donor assistance, such as BIAD, the Pak-German Self Help Project and future agreements; and

- the beneficiary community's participation in the programme, by meeting a portion of the recurring costs and in some cases part of the capital costs, for instance costs of connections into the distribution network.

6.1.2 Annual Development Programme (ADP)

Analysis of the sector resources in Section 2 showed that the entire ADP of the Provincial Government was financed by the Federal Government through a combination of grants and loans. Therefore, the availability of funds for the ADP will be affected by the resource position of the Federal Government.

The Federal Government, however, faces a severe resource constraint, which is likely to persist throughout the period covered under this Investment Plan. Given the level of autonomy that the Government of

Balochistan has regarding the allocation of ADP funding, it is anticipated that water supply will receive major priority during the planning period and that annual funding will increase at a real rate of 2%.

6.1.3 Special Development Programme

With the exception of BIAD, the amount of funding for the sector for the rural water supply, sanitation and health sector has been quite small. This could change given the emphasis on integrated development, such as the proposed Integrated Valley Development Programme. In recent years there have been substantial increases in the amount of local funding (federal) within the SDP and some of the proposed projects are anticipating 100% local financing. These are mainly for large scale projects so the rural areas would only benefit indirectly (e.g. Kachhi Plain water supply or the Akra Kaur Dam).

6.1.4 Community Participation

Although the demand for water supply is strong throughout Balochistan, there has been limited community involvement in the financing of the capital costs of water supply schemes, other than in the form of land and payments for house connections from the distribution lines. For the capital cost estimates it is assumed that communities will continue to provide land and possibly unskilled labour for water schemes and for small scale sanitation/drainage schemes on a self help basis.

6.1.5 Expected Allocations from Available Resources

Based on the above discussion it is estimated that annual investments of Rs. 310 million (in constant 1989/90 prices) for 1990/91 will increase to Rs. 350 million by 1997/98. The sub-sector allocations have been discussed in depth in Section 5.

The anticipated level of investment will result in rural water supply coverage increasing from 25% at present to 70% to 75% by 1997/98.

Although estimates of future coverage are crude, it is evident that the existing levels of investment in new water supply schemes are sufficient. On the contrary, the issue is one of institutional capacity to implement this programme and the quality and sustainability of new schemes. Thus the proposed investment plan has focused on institutional strengthening and human resource development to improve the implementation of new projects and the operation of existing schemes.

The financial implications of the sectoral investment plan are summarised in Table 6.1. The costs have been presented in constant value in Table 6.1a (similar to Section 5) and in current prices in Table 6.1b. In real terms the Plan requires a total outlay of Rs. 1021 million in real terms (nominally Rs. 1148 million) during the Seventh Plan and an additional Rs. 1795 million during the Eighth Plan (Rs. 2387 million in nominal terms).

Slightly more than 90% of the investment will be for water supply including source development (9%), new water supply schemes (51% by PHED, 10% by LGRDD and 11% from Special Programmes) and rehabilitation, upgrading and extension of existing schemes(10%). Very small but significant funding (compared to current expenditures) will be allocated to sanitation/drainage (1.6%) and to hygiene education (0.9%). The remainder of the investment (6.7% or Rs. 187 million in constant prices) will be made for institutional strengthening and human resource development to enhance sustainability in the sector. This is roughly equivalent to one year of PHED's investment in new rural water supply schemes.

6.1.6 New Donor Assistance

In Section 5.7, the recommended components for donor investment were identified and in Section 5.8 a possible scenario of donor packages was presented based on preliminary financial commitments that have been indicated by the World Bank and by the Government of Netherlands. A sum of Rs. 200 million has estimated for World Bank financing (low interest long term loans) and Rs. 175 million from the Government of Netherlands,

TABLE 6.1a RECOMMENDED ALLOCATION OF INVESTMENT TO PLAN COMPONENTS

COMPONENT	Allocation in Rs.(millions) Constant Prices									
	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	Total	Percent
Water supply schemes - PHED	175.0	177.0	179.0	179.0	182.0	182.0	184.0	184.0	1442.0	51.2%
Rehabilitation, extension & upgrading water supply - PHED	30.0	30.0	30.0	34.0	35.0	35.0	43.0	43.0	280.0	9.9%
Source Development - PHED	30.0	30.0	30.0	30.0	30.0	30.0	33.0	33.0	246.0	8.7%
Water supply schemes - LGRDD	15.0	21.0	29.0	35.0	41.0	41.0	45.0	45.0	272.0	9.7%
Special Programmes - (Water)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	320.0	11.4%
Sanitation & Drainage - Total	3.0	3.0	4.0	5.0	7.0	7.0	8.0	8.0	45.0	1.6%
Institutional Aid - PHED	15.0	19.0	11.0	11.0	9.0	8.0	8.0	3.0	84.0	3.0%
Institutional Aid - LGRDD	5.0	5.0	3.0	3.0	5.0	4.0	3.0	3.0	31.0	1.1%
Institutional Aid - RDA	13.0	7.0	1.0	1.0	2.0	1.0	1.0	1.0	27.0	1.0%
HRD & Training - PHED	6.0	4.0	2.0	1.0	1.0	1.0	1.0	1.0	17.0	0.6%
HRD & Training - LGRDD	6.0	4.0	2.0	2.0	2.0	1.0	1.0	1.0	19.0	0.7%
Hygiene Education - Total	3.0	3.0	2.0	2.0	5.0	3.0	3.0	3.0	24.0	0.9%
Monitoring	2.0	1.0	1.0	1.0	2.0	0.0	0.0	2.0	9.0	0.3%
TOTAL INVESTMENT	343.0	344.0	334.0	344.0	361.0	353.0	370.0	367.0	2816.0	100.0%

TABLE 6.1b RECOMMENDED ALLOCATION OF INVESTMENT TO PLAN COMPONENTS

COMPONENT	Allocation in Rs.(millions) Current Prices									
	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	Total	Percent
Water supply schemes - PHED	187.3	198.9	211.2	221.7	233.3	241.5	252.7	261.5	1808.0	51.2%
Rehabilitation, extension & upgrading water supply - PHED	32.1	33.7	35.4	42.1	44.9	46.4	59.1	61.1	354.8	10.0%
Source Development - PHED	32.1	33.7	35.4	37.2	38.5	39.8	45.3	46.9	308.8	8.7%
Water supply schemes - LGRDD	16.1	23.6	34.2	43.4	52.6	54.4	61.8	64.0	349.9	9.9%
Special Programmes - (Water)	42.8	44.9	47.2	49.5	51.3	53.1	54.9	56.9	400.6	11.3%
Sanitation & Drainage - Total	3.2	3.4	4.7	6.2	9.0	9.3	11.0	11.4	58.1	1.6%
Institutional Aid - PHED	16.1	21.3	13.0	13.6	11.5	10.6	11.0	4.3	101.4	2.9%
Institutional Aid - LGRDD	5.4	5.6	3.5	3.7	6.4	5.3	4.1	4.3	38.3	1.1%
Institutional Aid - RDA	13.9	7.9	1.2	1.2	2.6	1.3	1.4	1.4	30.9	0.9%
HRD & Training - PHED	6.4	4.5	2.4	1.2	1.3	1.3	1.4	1.4	19.9	0.6%
HRD & Training - LGRDD	6.4	4.5	2.4	2.5	2.6	1.3	1.4	1.4	22.4	0.6%
Hygiene Education - Total	3.2	3.4	2.4	2.5	6.4	4.0	4.1	4.3	30.2	0.9%
Monitoring	2.1	1.1	1.2	1.2	2.6	0.0	0.0	2.8	11.1	0.3%
TOTAL INVESTMENT	367.0	386.5	394.0	426.1	462.8	468.4	508.1	521.6	3534.6	100.0%

which would be in the form of a grant. The investment components and schedules for the donor assistance are shown in constant prices in Table 6.2a (World Bank) and Table 6.3a (Government of Netherlands) and in current prices in Tables 6.2b and 6.3b, respectively.

	In Constant Prices	In Current Prices
WORLD BANK ASSISTANCE		
Foreign Currency Costs	Rs. 65.0 million	Rs. 75.0 million
Local Currency Costs	Rs. 135.0 million	Rs. 165.9 million
DUTCH ASSISTANCE		
Foreign Currency Costs	Rs. 73.0 million	Rs. 135.6 million
Local Currency Costs	Rs. 102.0 million	Rs. 125.4 million

For the World Bank project, the foreign component would include the purchase of vehicles, equipment and tools for drilling rigs operations and for certain office equipment. For the Dutch project, 70% of the foreign component includes expatriate fees (Rs. 50 to 55 million) and the balance includes equipment and vehicles.

The donor agencies typically finance 100% of the foreign cost and up to 80% of the local costs (excluding local taxes). It has been assumed that the amounts indicated in Table 6.2 and Table 6.3 reflect the entire donor contribution. Therefore an additional contribution of Rs. 90 to 100 million would be anticipated from local resources. In Balochistan, this component would be made available from the local share of the Special Development Programme. Assuming an average annual requirement of Rs. 12 million, this compares with Rs. 650 million that was allocated to the SDP for 1989/90 from local (federal) funds. Consequently, the proposed donor assistance would not pose any major problems for local financing.

TABLE 6.2a POTENTIAL ALLOCATION OF DONOR INVESTMENT TO PLAN COMPONENTS - BY WORLD BANK

COMPONENT	Allocation in Rs.(millions) Constant Prices									
	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	Total	Percent
Water supply schemes - PHED		3.0	3.0	3.0	3.0				12.0	6.0%
Rehabilitation, extension & upgrading water supply - PHED		5.0	5.0	6.0	4.0	4.0	4.0	4.0	32.0	16.0%
Source Development - PHED	5.0	10.0	10.0	10.0	10.0	5.0	3.0	3.0	56.0	28.0%
Water supply schemes - LGRDD		1.0	1.0	2.0	2.0	3.0	3.0	3.0	15.0	7.5%
Special Programmes - (Water)									0.0	0.0%
Sanitation & Drainage - Total									0.0	0.0%
Institutional Aid - PHED	15.0	19.0	12.0	12.0	9.0	8.0	7.0	3.0	85.0	42.5%
Institutional Aid - LGRDD									0.0	0.0%
Institutional Aid - RDA									0.0	0.0%
HRD & Training - PHED									0.0	0.0%
HRD & Training - LGRDD									0.0	0.0%
Hygiene Education - Total									0.0	0.0%
Monitoring									0.0	0.0%
TOTAL INVESTMENT	20.0	38.0	31.0	33.0	28.0	20.0	17.0	13.0	200.0	100.0%

TABLE 6.2b POTENTIAL ALLOCATION OF DONOR INVESTMENT TO PLAN COMPONENTS - BY WORLD BANK

COMPONENT	Allocation in Rs.(millions) Current Prices									
	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	Total	Percent
Water supply schemes - PHED		3.4	3.5	3.7	3.8				14.5	6.0%
Rehabilitation, extension & upgrading water supply - PHED		5.6	5.9	7.4	5.1	5.3	5.5	5.7	40.6	16.8%
Source Development - PHED	5.2	11.0	11.4	11.9	12.3	6.1	3.8	4.0	65.8	27.3%
Water supply schemes - LGRDD		1.1	1.2	2.5	2.6	4.0	4.1	4.3	19.7	8.2%
Special Programmes - (Water)									0.0	0.0%
Sanitation & Drainage - Total									0.0	0.0%
Institutional Aid - PHED	15.9	21.1	13.9	14.5	11.2	10.4	9.4	4.1	100.4	41.7%
Institutional Aid - LGRDD									0.0	0.0%
Institutional Aid - RDA									0.0	0.0%
HRD & Training - PHED									0.0	0.0%
HRD & Training - LGRDD									0.0	0.0%
Hygiene Education - Total									0.0	0.0%
Monitoring									0.0	0.0%
TOTAL INVESTMENT	21.0	42.2	35.9	40.0	35.1	25.9	22.8	18.0	240.9	100.0%

TABLE 6.3a POTENTIAL ALLOCATION OF DONOR INVESTMENT TO PLAN COMPONENTS - BY GOV. OF NETHERLANDS

COMPONENT	Allocation in Rs.(millions) Constant Prices									
	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	Total	Percent
Water supply schemes - PHED									0.0	0.0%
Rehabilitation, extension & upgrading water supply - PHED									0.0	0.0%
Source Development - PHED									0.0	0.0%
Water supply schemes - LGRDD		1.0	2.0	2.0	2.0	3.0	3.0	3.0	16.0	9.1%
Special Programmes - (Water)									0.0	0.0%
Sanitation & Drainage - Total		1.0	1.0	1.0	1.0	1.0	1.0	1.0	7.0	4.0%
Institutional Aid - PHED									0.0	0.0%
Institutional Aid - LGRDD	5.0	7.0	2.0	2.0	7.0	2.0	1.0	1.0	27.0	15.4%
Institutional Aid - RDA	2.0	2.0							4.0	2.3%
HRD & Training - PHED	7.0	6.0	4.0	3.0	1.0	1.0	1.0	1.0	24.0	13.7%
HRD & Training - LGRDD	12.0	10.0	7.0	6.0	5.0	5.0	5.0	5.0	55.0	31.4%
Hygiene Education - Total	7.0	5.0	4.0	4.0	6.0	3.0	3.0	3.0	35.0	20.0%
Monitoring	2.0	1.0	1.0	1.0	2.0				7.0	4.0%
TOTAL INVESTMENT	35.0	33.0	21.0	19.0	24.0	15.0	14.0	14.0	175.0	100.0%

TABLE 6.3b POTENTIAL ALLOCATION OF DONOR INVESTMENT TO PLAN COMPONENTS - BY GOV. OF NETHERLANDS

COMPONENT	Allocation in Rs.(millions) Current Prices									
	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	Total	Percent
Water supply schemes - PHED									0.0	0.0%
Rehabilitation, extension & upgrading water supply - PHED									0.0	0.0%
Source Development - PHED									0.0	0.0%
Water supply schemes - LGRDD		1.1	2.4	2.5	2.6	4.0	4.1	4.3	20.9	10.0%
Special Programmes - (Water)									0.0	0.0%
Sanitation & Drainage - Total		1.1	1.2	1.2	1.3	1.3	1.4	1.4	8.9	4.3%
Institutional Aid - PHED									0.0	0.0%
Institutional Aid - LGRDD	5.2	7.6	2.3	2.4	8.5	2.7	1.4	1.4	31.5	15.1%
Institutional Aid - RDA	2.1	2.2							4.3	2.1%
HRD & Training - PHED	7.4	6.6	4.6	3.6	1.2	1.3	1.3	1.4	27.3	13.1%
HRD & Training - LGRDD	12.7	11.0	8.0	7.2	6.1	6.5	6.7	6.9	65.0	31.1%
Hygiene Education - Total	7.5	5.6	4.7	5.0	7.7	4.0	4.1	4.3	42.8	20.5%
Monitoring	2.1	1.1	1.2	1.2	2.5				8.1	3.9%
TOTAL INVESTMENT	37.0	36.3	24.3	23.0	29.9	19.7	19.0	19.7	208.9	100.0%