

Pakistan

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

National Executive Summary
of the
Strategic Provincial Investment Plans

November, 1989

Wardrop - Acres
Cowater International
NESPAK

Strategic Provincial Investment Plans for Rural Water Supply, Sanitation and Health

National Executive Summary

Contents

Abbreviations and Acronyms	iii
List of Tables	iv
1. Introduction	1
2. The Sector	2
2.1 Scope of the Sector	2
2.2 Background	2
2.2.1 Physiographic Features	2
2.2.2 Water Resources	3
2.2.3 Health Status	4
2.3 Sector Institutions	4
2.3.1 Federal Government	4
2.3.2 Planning and Development Departments (P&D)	5
2.3.3 Public Health Engineering Departments (PHED)	5
2.3.4 Local Government and Rural Development Departments (LGRDD)	6
2.3.5 Health Departments	6
2.3.6 Education Departments	7
2.3.7 Local Governments	7
2.3.8 Donor Agencies	7
2.3.9 Private Sector	7
2.3.10 Village-based Organizations	9
2.3.11 Non-Governmental Organizations (NGOs)	9
2.4 Sector Financing	10
2.4.1 Macro Resources Availability	10
2.4.2 Sector Resources Availability	13
2.4.3 Donor Resources	16
2.4.4 Community Financing	16
2.5 Current Situation of the Sector	16
2.5.1 Current Situation of Water Supply	16
2.5.2 Current Situation of Human Waste Disposal	18
2.5.3 Current Situation of Drainage	19
2.5.4 Current Situation of Hygiene Education	19
2.6 Assessment of Present Programs	20
2.6.1 Technology	20
2.6.2 Sustainability	20

2.6.3	Economics	21
2.6.4	Supporting Activities	21
3.	Population and Demand	22
3.1	Population Projections	22
3.2	Demand for Services	22
3.2.1	Demand for Water Supply	22
3.2.2	Demand for Human Waste Disposal	23
3.2.3	Demand for Drainage	23
3.3	Service Levels	24
3.3.1	Water Supply Service Level	24
3.3.2	Human Waste Disposal Service Level	24
3.3.3	Drainage Service Level	24
3.3.4	Hygiene Education Level	24
4.	Investment Strategy	26
4.1	General Goal	26
4.2	Policy Guidelines	26
4.3	Investment Strategies	26
5.	Investment Plans	31
5.1	Overview of Plan Components and Size	31
5.1.1	AJK Investment Plan	31
5.1.2	NA Investment Plan	33
5.1.3	Balochistan Investment Plan	34
5.1.4	NWFP Investment Plan	34
5.1.5	Punjab Investment Plan	35
5.1.6	Sindh Investment Plan	36
5.2	Beneficiaries	36
5.3	Policy Implications for Government	37
5.3.1	Funding Allocation	37
5.3.2	Scheme Approval Procedures	38
6.	Financing	39
6.1	Capital Cost Financing	39
6.2	Cost Recovery	40
6.3	Donor Assistance Requirements	41
6.4	Donor Project Proposals	42
6.4.1	Donor Project Proposals for AJK	42
6.4.2	Donor Project Proposals for NA	42
6.4.3	Donor Project Proposals for Balochistan	42
6.4.4	Donor Project Proposals for NWFP	43
6.4.5	Donor Project Proposals for Punjab	44
6.4.6	Donor Project Proposals for Sindh	44

Abbreviations and Acronyms

ADP	Annual Development Programme
AJK	Azad Jammu & Kashmir
BIAD	Balochistan Integrated Area Development
CDA	Cholistan Development Authority
CIDA	Canadian International Development Agency
DC	District Council
EEC	European Economic Commission
GTZ	German Agency for Technical Assistance, Federal Republic of Germany
HE	hygiene education
LBRDD	Local Bodies and Rural Development Department, Northern Areas
LGD	Local Government Department, Sindh
LGRDD	Local Government and Rural Development Department
LHV	lady health visitor
KfW	Reconstruction Loan Corporation, Federal Republic of Germany
NA	Northern Areas
NGO	non-governmental organization
NWFP	North-West Frontier Province
O&M	operation & maintenance
ODA	Overseas Development Administration, UK
P&D	Planning and Development Department
PHED	Public Health Engineering Department
PWD	Public Works Department
PWP	People's Works Program
RDD	Rural Development Department
SAZDA	Sindh Arid Zone Development Authority
SDP	Special Development Program
TBA	traditional birth attendant (<i>dai</i>)
UC	Union Council
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
WAPDA	Water and Power Development Authority

List of Tables

Table 1 : Examples of Donor Agencies Involved in the Sector	8
Table 2 : Real ADP Expenditures	11
Table 3 : Real Sectoral ADP Expenditures	12
Table 4 : Nominal and Real Administration and Services Recurrent Expenditures ..	13
Table 5 : Historical Sector Resource Availability in Regions	14
Table 6 : Estimated 1988 Rural Water Supply Coverage	17
Table 7 : Projected Rural Population ('000)	22
Table 8 : Proposed Water Supply Service Levels	25
Table 9 : Suggested Institutional Arrangements for Sector Investment	28
Table 10 : Capital Costs of the Investment Plans	32
Table 11 : Analysis of Capital Cost of the Investment Plans	33
Table 12 : Incremental Recurrent Costs Resulting from Investment Plans	33
Table 13 : Water Supply Coverage by the Investment Plans	37

1. Introduction

The Government of Pakistan has undertaken expansion of coverage of water supply, human waste disposal and drainage services in its rural areas. The Seventh Five-Year Plan set the target of water supply and drainage coverage of the rural population at 75% and 30%, respectively, to be achieved by 1993.

A review of the sector was carried out by a World Bank and CIDA Mission in 1987. In its report¹, the Mission suggested implementation strategies and recommendations aimed at improving the effectiveness of the sector and outlined an agenda for action.

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 policy and strategy for future investments in the sector.

This activity was established through an agreement between the Government of Pakistan, the World Bank and CIDA to prepare Strategic Investment Plans and Projects for each province, Northern Areas and Azad Jammu & Kashmir. The Plans cover the balance of the 7th Five-Year Plan (ending 1993) and the 8th Five-Year Plan (1993-1998). The basic objectives behind these Plans are:

- *efficient utilization of available resources to provide basic services to the rural population;*
- *provision of socially acceptable and financially affordable technologies which offer sustained benefits;*
- *reduction of Government's burden in operation and maintenance of installed systems by improving cost recovery and involving the community in these tasks;*
- *enhancement of system effectiveness by providing hygiene education for proper use of installed systems and health improvements; and*
- *improvement of the status of women and promotion of a more active role of local communities in sector development.*

This document summarizes the Strategic Provincial Investment Plans prepared in July/August 1989. As such, it does not reflect changes incorporated into the preparation of specific projects during September/October 1989.

¹ *Pakistan rural water, health and sanitation sector review*, The World Bank, Washington D.C., 1988.

2. The Sector

2.1 Scope of the Sector

- **Water supply:** the provision of water achieving certain levels of quality, quantity and convenience.
- **Human Waste Disposal:** the disposal of human excreta in hygienic and esthetic ways by means of latrines to prevent disease transmission.
- **Drainage:** the evacuation of greywater (non-fecal wastewaters such as those generated from bathing, clothes washing, food preparation, etc.) through open or closed channels, and in some cases treatment by waste stabilization ponds.
- **Hygiene education:** the introduction of personal and community hygiene concepts and practices which help maximize the benefits of improvements in water supply, human waste disposal and drainage.

2.2 Background

2.2.1 Physiographic Features

The variety of its landscapes divides Pakistan into six physical regions: the Northern High Mountainous region, the Western Low Mountainous region, the Balochistan Plateau, the Potwar Uplands, the Punjab Plain, and the Sindh Plain. The Northern high region consists of a series of high mountain ranges (with 35 peaks over 24,000 ft or 7,315m) which separate Pakistan from China, Russia and Afghanistan.²

The Western low mountains cover a large portion of the North-West Frontier Province and shows numerous scarps, small plateaus and patches of alluvial basins which afford little cultivation.

The Balochistan Plateau has an average altitude of 2,000 ft (610m), and is dominated by mountains, plateaus and basins. The mountains are carved off by innumerable channels which contain water only after rains. However, very little water reaches the basins at their feet. In the north-eastern portion, the two Zhob and Bolan Rivers and their tributaries form two alluvial basins: Loralai and Quetta, which together produce a major portion of Balochistan's crops and fruits.

² *Pakistan 1986 - An Official Handbook*, Ministry of Information and Broadcasting, Government of Pakistan, Islamabad.

The Potwar Uplands (or the Potwar Plateau) lie to the south of the northern mountains and is flanked to the west by Indus and to the east by Jhelum River. This 1,000-2,000 ft (305-610m) upland is a typical 'bad land' with denuded and broken terrain. Two seasonal streams, Haro and Soan Rivers, flow from east to west and drain into the Indus. Rivers and hill torrents in this area have cut deep valleys and are of little use for irrigation. Agriculture is thus dependent almost entirely on rainfall of 380-510 mm/year and on small dams built in the catchments areas of streams.

The Province of Punjab comprises most of the Punjab Plain. It is the product of Indus River and its five eastern tributaries. The entire Plain is extensively irrigated.

The Sindh Plain covers most of the Province of Sindh and stretches between the Punjab Plain and the Arabian Sea. The Indus River flows here as a single river. The plain is the heart of the Indus Valley Civilization dating back five thousand years.

2.2.2 Water Resources

There are wide variations in rainfall from one region of Pakistan to another. Except for the southern slopes of the Himalayas and the sub-mountainous tract which have an annual rainfall between 750 to 1,270 mm (3-50 in.), the country is extremely arid. Balochistan is the driest part with an average annual rainfall of 210mm (8 in.). On the southern ranges of the Himalayas, the average yearly precipitation is 1,270mm (50 in.), while under the lee of these mountains (Gilgit and Baltistan) annual rainfall is hardly above 160mm (6 in.). In the plains the overall average annual rainfall is 250mm (10 in.). Rainfall also occurs from western cyclonic disturbances originating in the Mediterranean. It is appreciable in the western mountains and the immediate forelying areas, where it ranges from 270 to 760 mm (10.5-30 in.) annually.

Surface Water. The 2,900-km long Indus River and its six major tributaries drain an area of 960,000 km² and provide a significant permanent source of surface water. Thanks to an extensive system of canals and barrages, traditional floods have largely been controlled and irrigation extensively developed. Two minor river systems drain the Cacao Plains and the coastal streams west of Karachi. These are characterised by scarce rainfall and high evaporation rates.

Ground Water. In the Indus Valley Plains and areas close to the rivers in the Valleys of Peshawar, Mardan, Bannu and Kohat ample reserves of fresh water can be found through hand-augured wells, usually within 50 feet from the ground surface. Elsewhere, there are thin fresh water lenses which can be tapped if carefully drilled and developed. Access to groundwater is limited in the Potwar and the Balochistan Plateaus, except in those areas close to the rivers and streams.

Water Resources Development.

The Punjab and Sindh Plains have extensive water canal networks. The Punjab network has been greatly expanded and improved in recent years by the construction of link-canals, dams and barrages. The Tarbela Dam on the Indus River and the Mangla Dam on the Jhelum River have water storage capacities of 11.1 million acre-ft (13,700 million m³) and 5.55 million acre-ft (6,850 million m³), respectively. However, the extensive development

of irrigation has caused waterlogging and salinization problems which render about 100,000 acres of land unproductive each year. Salinity control and reclamation projects are attempting to ameliorate these problems.

In the Sindh Plain an elaborate canal system, starting at the Sukkur Barrage, the Upper Sindh Barrage at Guddu and Lower Sindh Barrage at Hyderabad, irrigate over 10 million acres accounting for about 40% of Pakistan's irrigated land. However, the southern part of the Sindh Plain is one of the worst hit areas for waterlogging and salinization.

Irrigation canals are an important source of water for the rural communities in the irrigation canal command zones. Of the Indus Basin's central 200,000 km², 70% is cultivable and 50% is under irrigation served by 50,000 km of canals.

2.2.3 Health Status

In general, the health status in the country is still poor. Infant and young child mortality rates are high at 160 per 1000 live births. Life expectancy at birth, estimated at 55 for men and 54 for women (1983), also indicates low health status when compared with other countries in the region with similar GNP. The largest cause of deaths among young children is diarrhea dehydration, which accounts for about 45% of all young child deaths. The situation could be significantly improved by increasing provision of safe water supply, adequate excreta disposal, drainage and hygiene improvements.

2.3 Sector Institutions

2.3.1 Federal Government

Federal Ministry of Planning and Development. One of the Ministry functions is to act as the Secretariat of the Planning Commission. This Commission prepares the various Five-Year Plans and the Ministry implements these through the Federal Government's Annual Development Programs. An important function of the Ministry is to approve all projects and plans with a value exceeding Rs 30 million.

The Physical Planning & Housing Section is responsible for processing applications for projects in water supply and sanitation. The Health Section is responsible for projects dealing with preventive health care including hygiene education.

Federal Ministry of Local Government and Rural Development. The Ministry has two wings: Local Government and Rural Development. Its functions include coordination among the provinces, establishment of a data base on local government finances, operation of training institutes, and supervision of special projects in rural development. The Rural Development Wing has recently established the Development Engineering Cell which overlaps responsibilities with the provincial line departments. The Planning Section of this Wing is responsible for preparing guidelines and plans for the Rural Works Programs in cooperation with the provinces.

Water and Power Development Authority (WAPDA). WAPDA is an autonomous body under the federal Ministry of Water and Power. It is of interest to the sector for two main reasons: (i) it has expertise for conducting groundwater exploration, and (ii) it provides

power connections to schemes built by PHEDs. Adequate numbers of professional staff, such as hydrogeologists and hydrologists, are also available to the sector (Punjab PHED relies on WAPDA for their groundwater expertise). WAPDA's water resource database could be used in developing drinking water supplies.

2.3.2 Planning and Development Departments (P&D)³

The Planning and Development Departments are responsible for the planning and coordination of economic and social development in the provinces/areas, including foreign aid and technical assistance. They prepare the annual development programmes (ADP) budgets specifying sectoral and sub-sectoral allocations, and assist the Provincial Governments in setting provincial development priorities including regional and sectoral priorities while keeping in view national development priorities. They also monitor and review development projects.

2.3.3 Public Health Engineering Departments (PHED)⁴

PHEDs are the main provincial implementing agencies of the sector. Being set up initially to provide services in urban areas, more recently the PHEDs have moved into the rural areas, where they usually focus on medium and large settlements. Also, they tend heavily towards water supply while paying little attention to excreta disposal and drainage. The PHEDs such as in Balochistan have begun to implement low-cost appropriate technologies. Even though no major savings are anticipated because low-cost technologies are offset by the increased cost of servicing smaller villages, this has extended the services to remote settlements so that equity is better achieved.

In principle, once the PHEDs complete construction they turn over the facilities to local Councils; they are not formally responsible for system maintenance and revenue collection. However, PHEDs have had to increasingly take on O&M functions as most local councils and communities are unwilling to assume these responsibilities.

The PHEDs have extensive technical expertise and physical resources: Balochistan PHED has 2,400 staff (including non-professional staff such as drivers and guards), and Sind PHED has a staff of about 1,300 professional and support personnel. PHEDs receive large provincial ADP allocations. For example, Balochistan PHED received in 1989-90 the largest share of the provincial ADP amounting to Rs 270 million. The Punjab PHED handles one of the largest ADP allocations in the Province: 15% (Rs 1,125 million) of the Provincial ADP in 1988/89.

Despite their commendable achievements in design and installation, PHEDs share common weaknesses in limited cost recovery, in difficulties in operating and maintaining schemes once built, and in monitoring and evaluation.

³ Also called *Planning and Development Cell* in Northern Areas.

⁴ In Northern Areas and AJK, the agency is known as the *Public Health Engineering Circle*.

2.3.4 Local Government and Rural Development Departments (LGRDD)⁵

'Local Government' refers to the supervision and coordination of the functions of District Councils and Union Councils. 'Rural Development' is concerned with technical support to Town Committees, Municipal Corporations as well as local Councils. This involves basic services in public works (drinking water supply, tanks, ponds), community health (vaccination), drainage (public drains and waste disposal), and education (institutional grants and subsidies). The size of LGRDDs can be shown by their expenditures: Rs 181.5 million in 1989-90 in Punjab; or their staff numbers: 551 in Balochistan and 1,295 in NWFP.

LGRDDs are community-oriented. Their staff are usually present at various levels of government, illustrating their outreach capability. In most provinces and areas they work through community management and project implementation at the village level. On the other hand, LGRDDs usually lack technical skills especially for projects providing higher service levels. This is chiefly due to the fact that LGRDD engineering staff are few in number and are required to provide multi-disciplinary services over a wide variety of infrastructure which do not allow them to develop in-depth skills.

2.3.5 Health Departments

The Health Departments are responsible for providing preventive and curative health care. There are significant variations in the levels of service available in rural areas. Rural health is served by some 2,300 Basic Health Units, each of which is manned by a qualified medical officer and para-medical staff. It is planned that, by the end of the decade, every Union Council will have a Basic Health Unit, the majority of which will be headed by a doctor. There are about 400 Rural Health Centres, each is staffed with three medical officers, usually one of whom is a lady doctor. These Rural Health Centres act as referral points for Basic Health Units and provide a higher level of service. Posting women medical staff in rural areas is difficult, for example, of the sanctioned positions for lady health visitors in Punjab only 61% are filled. This percentage is lower in other provinces.

Activities of the Health Departments that are relevant to the sector include control of diarrheal diseases, maternal and child health care, and training of traditional birth attendants (TBAs) who serve as mechanisms for reaching the village level. However, preliminary results of an extensive evaluation caution that program standards may not have been achieved in the training of TBAs. Despite rural health outreach efforts, field surveys found that rural residents continue to rely primarily on non-governmental facilities rather than those of the Health Services.

⁵ In Sind there are two separate Departments: *Rural Development* and *Local Government*. In Northern Areas, the equivalent agency is the *Local Bodies & Rural Development Department* (LBRDD). In AJK and other provinces, there are single Departments of *Rural Development & Local Government*.

2.3.6 Education Departments

At present, the Education Departments have not been directly involved in sector activities. However, they should play a more significant role in the future. For example, most schools lack water and human waste disposal facilities, a situation which would be ameliorated through the Investment Plan. The Education Departments role should focus on hygiene education.

2.3.7 Local Governments

District Councils. The size of the electoral unit for each District Councillor is approximately 50,000 inhabitants. On the average, each District Council covers 215,000 people in Balochistan to 1,330,000 people in Punjab. The general responsibilities of the DCs in the sector are disbursement of ADP funds for approved projects, promotion of proper excreta disposal and public health, prevention and control of infectious diseases, and provision of construction, repair and maintenance of water supply and drainage works. In many Districts, the DCs are well-established institutions that have undertaken a significant amount of work in the sector. However, their capacity to assume a major role in larger-scale schemes is limited.

Union Councils. This is the lowest level in the two-tier local government. The size of the electoral unit for each Union Councillor is approximately 1,000 inhabitants, and the average of the Union Council is from 10 villages (21,000 people) in Sindh to 18 villages (14,000 people) in Balochistan. The responsibilities of UCs in this sector include: sanitation and maintenance of cleanliness of the area, provision and maintenance of water facilities, prevention of contamination of water sources, and regulation on the use of water sources and facilities. The UCs have very limited financial and administrative capabilities. At the present, they are not in a position to act as executing agencies for major undertakings in local infrastructure development.

2.3.8 Donor Agencies

Donor agencies normally work with provincial agencies. UNICEF is making the largest contributions to this sector. Examples are given in Table 1.

2.3.9 Private Sector

In rural areas of the country where relatively abundant groundwater supplies are available, the private sector has played an important role in the provision of water supply facilities at the household level. The private sector is usually involved in small-scale undertakings such as constructing household latrines, sinking private wells, and installing handpumps. At a more sophisticated level, the private sector serve as consultants and contractors in building schemes for Government departments and in providing repair services. Most substantial contractors are registered with, and work for PHEDs. The private sector also includes manufacturers of equipment and local plumbers, mechanics and masons.

The private sector has been most active in the sinking of wells and installation of handpumps. It is estimated that there are currently over 23 million people served by handpumps in Pakistan. The marketing and maintenance of handpumps is entirely in the hands of the private sector. In Sindh, there appears to be adequate manufacturing capacity to meet the needs of the sector. Many of these firms have spare capacity to meet additional demands.

Table 1 : Examples of Donor Agencies Involved in the Sector

Region	Donor	Value, Period	Activity
AJK	UNICEF	Rs 48.2M, 1983-90	water supply, excreta disposal, hygiene education
NA	UNICEF	Rs 17.59M, 1981-87	Community-Based Services Program: water supply, excreta disposal, drainage, training
Balochistan	GTZ	Dm 6M	Pak-German Self-help Programme
	UNICEF/EEC	(n.a.)	Balochistan Integrated Area Development (BIAD)
	USAID	Rs 22M, 1984-89	Water infrastructure
NWFP	EEC	US\$ 12.47M, 1989-93	rural integrated development including water supply
	KfW	(n.a.)	water supply, sanitation and hygiene
	Netherlands	US\$ 5.1M, 1985-89	groundwater inventory
	UNICEF	(n.a.)	water supply, excreta disposal, assistance to Sanitation Division
	UNICEF	US\$ 3.2M, 1989-93	integrated water supply, excreta disposal and hygiene education
Punjab	GTZ	(n.a.)	groundwater exploration
	UNICEF	(n.a.)	integrated water supply, sanitation and hygiene education.
Sindh	CIDA	US\$ 17M, 1987-94	TBA's training program, construction of water pipelines and drainage facilities
	KfW/GTZ	(n.a.)	groundwater exploration
	ODA	(n.a.)	technical assistance to Sindh Arid Zone Development Authority
	UNICEF	US\$ 21.5M, 1988-92	support to Health Services, assistance to PHED, assistance to RDD, pilot projects on water supply & excreta disposal
National	WHO	(n.a.)	Advisory services

(n.a.) : not available

Rural water supply and drainage schemes, due to their small scale, have often been awarded to small contractors. For this reason, many large contractors, while having more resources have little experience with village water supply and drainage. On the other hand, most small contractors lack financial, equipment and other technical resources to fulfil

satisfactorily assignments as demonstrated by frequent poor quality of construction and delays in implementation.

Although there is a need for training local artisans in the private sector to improve their workmanship, there are potential problems with the introduction of such training programs. Artisans may be reluctant to attend training programs because they do not perceive the need to be trained, the training may be costly either through the cost of training or through revenue loss, and because motivation is not high. The standards of artisans could be raised by introducing some certification or licensing requirements on artisans, but Government agencies do not favor such interventions because of the implied cost of enforcement and increased responsibility.

2.3.10 Village-based Organizations

These organizations consist of: (i) leadership groups of the traditional village hierarchy; (ii) community-based groups which are created spontaneously in response to specific needs and are often short-lived; and (iii) project committees which are connected to government-assisted projects such as roads, schools and water supplies.

Leader groups commonly have strong ties with the local councils. Examples are the *Jirga* in AJK, *Biraderi* in Punjab, and *Vader* in Sindh. Many of them are the most educated in the community and hence form an upper social strata and play an important role in leadership. They represent a significant human resource and can be a starting point for development projects in the community. Community-based groups often assume the task of collecting and managing funds to deal with ad-hoc needs. Some groups have extended lives due to the nature of their objectives and the individuals involved. These may register with the Government and become entitled for Government support. Another type of community-based organization is the *panchayat*, which is a basic structure for conflict resolution. Its members are therefore chosen for their seniority, experience, impartiality and knowledge. The *panchayat* can be called upon to adjudicate on socio-economic matters such as water rights and land disputes.

Throughout rural communities there exists a strong element of village-based organizations which have strong potential to take active and responsible roles in project implementation and system O&M. Many of these organizations have long-term experience with self-help activities which are relevant to the concept of system sustainability in this sector. For example, in Punjab community-based groups have been most successful in promoting community self-financing for development projects. On the other hand, these groups lack broad-base representation which could adversely affect the provision of services to the lower-income and less influential groups in the community.

2.3.11 Non-Governmental Organizations (NGOs)

There are about 250 NGOs registered in Balochistan, 300 in NWFP, 250 in Sindh, and 2,200 in Punjab. Most of these NGOs are urban-based, very few have effective activities in rural areas and, among those do, even fewer are involved in this sector. Thus, the impact of provincial NGOs on rural sector activities is minimal. However, despite generalized constraints such as lack of expertise and resources, some NGOs have been successfully involved in various activities such as training health workers and birth

attendants and provision of basic water supply and human waste disposal facilities. In Sindh some NGOs have gained valuable experience in hygiene promotion, and this should be reviewed to draw up on lessons. NGOs require greater levels of technical and financial support if their roles in the sector are to be expanded.

2.4 Sector Financing

2.4.1 Macro Resources Availability

The resource position of the public sector at the national level has significantly deteriorated during the last few years. Domestic resource mobilization has been constrained by a relatively inelastic and narrow tax base. At the same time, expenditures on various recurring costs like defence, debt servicing, general administration, subsidies, etc. have risen rapidly. In addition, recurring deficits of the provinces have considerably widened, requiring more subventions and grants-in-aid from the Federal Government. The consequence has been that the ADP expenditure has become more dependent upon the flow of external sources which, in turn, increases requirements for debt financing.

Table 2 presents the ADP expenditures at constant prices of 1987/88 during the Fifth and Sixth Five-Year Plan periods and the first fiscal year (1988/89) of the on-going Seventh Five-Year Plan. Based on the recent Federal budget, a projection has been made of the real ADP for the next fiscal year 1989/90. As shown in Table 2, real ADP expenditures of the Federal Government remained more or less constant during the Fifth Plan, but showed some growth during the Sixth Plan. Provincial ADPs grew throughout the last decade, culminating with large increases between 1985/86 and 1987/88.

In recent years, inflation and the tightening of the resource situation have led to a cut back in development allocations. At the Federal level, it is expected that current real ADP expenditure will decline by about 2% from the previous year. Provincial development expenditures are likely to fall dramatically, by almost 23%. The only component of the ADP which is likely to increase significantly is the Special Development Program.

In fact, there has been a noticeable change in Federal Government priorities which has led to a precipitous decline in provincial ADPs from the peak level. Instead, the Federal Government has launched the People's Works Program, which involves allocations for rural development including water supply.

Indications from the Federal budget of 1989/90 are that the recently established pattern in real ADP expenditures will continue. The Federal ADP could decline further in real terms by about 3% per year, and the Provincial ADP expenditures by an equivalent percentage. The prospects for the remaining years of the Seventh Plan (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. Unless a dramatic breakthrough is achieved in making the tax base more broad-based and buoyant, the overall development program in the public sector will decrease in real terms.

Table 2 : Real ADP Expenditures
(At constant prices of 1987/88, in Rs thousand million)¹

Fiscal Year	National	Provincial	Special Development Program	People's Works Program	Total
<i>Fifth Plan</i>					
1978/79	29.4	7.2	-	-	36.6
1979/80	26.9	5.3	-	-	32.2
1980/01	29.8	6.4	-	-	36.2
1981/82	30.1	8.0	-	-	38.1
1982/83	29.7	8.3	0.2	-	38.2
<i>Sixth Plan</i>					
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
<i>Seventh Plan</i>					
1988/89	33.4	11.2	3.4	-	48.0
1989/90 ⁵	32.4	10.8	3.1	2.5	48.8

¹ ADP expenditures at current prices have been converted into constant prices by applying the implicit GDP deflator for gross domestic capital formation.

⁵ Budget

Sources: - *Pakistan Economic Survey, 1988/89*, Economic Advisers' Wing, Ministry of Finance, Government of Pakistan
- *Budget in Brief, 1989/90*, Ministry of Finance, Government of Pakistan

Not only will it be difficult to sustain real ADP at its present level, but pressures on development funds will increase as limits to growth are attained due to bottlenecks in physical infrastructure. As shown in Table 3, the need for physical infrastructure has caused larger allocations to be made to the energy and transport/communications sectors. At the same time, cutbacks are seen in sectors like physical planning & housing and rural development both of which are related to water supply, excreta disposal and drainage.

Resource constraints confronted by the Government also have bearing on recurrent expenditures. The last two Federal budgets have included an economy drive in current expenditures by Government departments. Table 4 indicates the trend in real recurring expenditures on general administration, social, economic and community services (including PHEDs) by the Federal and Provincial governments. These expenditures grew rapidly up to 1986/87. However, this was followed by an attempt to contain the increase in recent years.

Real recurrent expenditures in 1988/89 by both levels of Government on administration and on the operation and maintenance of publicly-provided services are likely to fall below the level in 1986/87, and those in 1989/90 are likely to be reduced even further. The pressure on provincial governments 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 funds (revenues from divisible pool of taxes plus non-obligatory grants) to the provinces at the nominal level of 1988/89.

Table 3 : Real Sectoral ADP Expenditures
(At constant prices of 1987/88, in Rs thousand million)

Fiscal Year	Energy	Transportation & Communications	Physical Planning & Housing	Rural Development	Others	Total
<i>Fifth Plan</i>						
1978/79	5.2	7.2	2.7	0.4	21.1	36.6
1979/80	4.8	5.7	2.1	0.3	19.3	32.2
1980/01	5.3	6.9	2.7	0.6	20.7	36.2
1981/82	6.3	7.5	2.6	1.0	19.9	37.3
1982/83	7.2	7.5	2.8	1.3	19.4	38.2
<i>Sixth Plan</i>						
1983/84	6.5	6.3	3.3	1.2	19.5	36.8
1984/85	9.6	6.6	3.3	1.2	20.0	40.7
1985/86	9.5	7.3	3.3	1.0	22.1	43.2
1986/87	11.5	6.4	4.8	2.2	23.7	48.6
1987/88	13.1	5.1	5.6	2.7	23.3	49.8
<i>Seventh Plan</i>						
1988/89	12.8	7.1	3.7	1.9	22.5	48.0
1989/90	13.8	n.a.	n.a.	n.a.	n.a.	48.8

Sources: - *Pakistan Economic Survey, 1988/89*, Economic Advisers' Wing, Ministry of Finance, Government of Pakistan

- *Budget in Brief, 1989/90*, Ministry of Finance, Government of Pakistan

n.a. : not available

The economy drive on recurring expenditures implies that the ability of Provincial line departments (including PHEDs and LGRDDs/LBRDD) to expand their human resource pools to undertake new initiatives will be limited in the next few years. In addition, there will be strong pressures to limit operation and maintenance expenditures on the existing schemes. 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 more serious cost recovery with escalation in service fees and improvements in revenue collection mechanisms.

To summarize, the scenario in the foreseeable future will be:

- no growth or only modest growth in the public sector ADP;
- a larger share of development spending by the Federal Government;
- higher priority being given to investments in physical infrastructure;
- lower real allocations for the social sectors, including rural water supply and excreta disposal;

- more financing responsibility particularly in operation and maintenance costs being shifted from the government to the community if reductions in Government recurring costs are to be compensated for; and
- higher requirements for donor assistance in order to fulfil the sector targets.

Table 4 : Nominal and Real Administration and Services Recurrent Expenditures*
(in Rs thousand million)

Fiscal Year	National		Provincial	
	Current Prices	Constant Prices	Current Prices	Constant Prices
<i>Sixth Plan</i>				
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	21.2	22.8	24.0	25.9
1987/88	18.0	18.0	27.5	27.5
<i>Seventh Plan</i>				
1988/89	21.6	19.8	27.8 [§]	25.5 [§]
1989/90	23.1 [¶]	19.3	n.a.	n.a.

* The nominal expenditures have been converted into real expenditures by applying the implicit GDP deflator for the public administration and defense sector in the National Income accounts.

[§] Budget estimate

[¶] Including cost of 5% salary increase for employees up to BPS-16.

Sources: - *Pakistan Economic Survey, 1988/89*, Economic Advisers' Wing, Ministry of Finance, Government of Pakistan
 - *Budget in Brief, 1989/90*, Ministry of Finance, Government of Pakistan
 - *Budget Speech*, National Minister of State for Finance, 3 June 1989

2.4.2 Sector Resources Availability

Resources for sectoral investment in the regions come from a variety of sources ranging from the Federal Government allocations to the locally-generated funds of the District Councils, donor assistance for specific projects, and the beneficiary communities themselves. However, information on community financing is not complete in all regions.

Grants from the Federal Government are made from the Special Development Programs announced from time to time either for backward areas (such as the Balochistan Special Development Program), or for specific purposes (such as the former Five-Point Program or the current People's Works Program). Allocations by the Provinces are made from the Annual Development Program funds to be implemented through line departments (PHEDs, LGRDDs/LBRDD), and special agencies such as SAZDA and BIAD.

In addition, there are Provincial Governments grant funds to local bodies through the ADP as grants-in-aid or as counterpart matching grants a part of which is used to finance implementation of schemes in the sector. Some of the more well-off Councils also spend

money on the sector out of their own resources. Details of such expenditures are not fully available.

Historical availability of funds for the sector is shown in Table 5. It should be noted that this Table shows large portions only, but not 100%, of the expenditures in the sector as complete data are not available. Also excluded from Table 5 are donor assistance funds. It can be seen from Table 5 that, excluding NA, expenditures for the sector from provincial ADPs have risen from below Rs 500 million at the start of the Sixth Five-Year Plan to about Rs 1,600 million at the end of this Plan. Despite current resource constraints, budgets for the sector total Rs 2,070 million in 1989/90, indicating the Governments commitment to sector development.

Table 5 : Historical Sector Resource Availability in Regions
(at current prices, million Rs)

Fiscal Year	AJK (1)	NA (2)	Bal'n. (3)	NWFP (4)	Punjab (5)	Sindh (6)	National (7)
<i>Fifth Plan</i>							
1978/79	3.1	n.a.	n.a.	51.3	47.0	n.a.	101.4
1979/80	2.7	n.a.	n.a.	57.5	80.3	n.a.	140.5
1980/81	2.4	n.a.	n.a.	64.0	107.7	n.a.	174.1
1981/82	4.9	n.a.	n.a.	82.0	115.2	n.a.	202.1
1982/83	2.8	n.a.	n.a.	92.8	170.7	n.a.	266.3
<i>Sixth Plan</i>							
1983/84	8.3	n.a.	93.2	87.6	218.0	40.5	477.6
1984/85	11.9	n.a.	96.2	79.6	203.5	59.0	450.2
1985/86	17.6	n.a.	148.4	105.9	255.6	80.2	607.7
1986/87	29.5	n.a.	160.0	156.6	315.0	219.9	881.0
1987/88	33.9	n.a.	234.2	183.2	905.0	242.7	1,599.0
<i>Seventh Plan</i>							
1988/89	32.0	106.1	273.3	155.5	1,125.9	377.8	2,071.6
1989/90	36.0	n.a.	355.2	152.3	940.0	324.6	1,808.1
Rs per rural capita in 1988/89	14.9	-	60.3	11.3	28.6	29.4	28.2

Notes

n.a. not available

- (1) Allocation figures which were more or less fully utilized. Included are: ADP funds through LGRDD, community matching grants through LGRDD, Integrated Rural Water Supply & Sanitation Program funds of LGRDD, and AJK Prime Minister's special allocations.
- (3) ADP expenditures of PHED and LGRDD, actual figures up to 1986/87, budget figure for 1988-90. PHED figures include urban schemes but rural water supply generally accounts for 75% of its expenditures.
- (4,5) ADP expenditures of PHED in the sector up to 1987/88, allocations during 1988-90.
- (6) Including expenditures by PHED/RDD, SAZDA, SDP, and Councils.
- (7) Excluding data on NA, Sindh and Balochistan which are not available.

Nationwide, there has been spent about Rs 28 available for sector development in 1988/89 fiscal year for each rural person. As expected, the per capita availability varies from region to another, with the lowest amount of Rs 11 in NWFP and the highest of Rs 60 in Balochistan. The overall current situation and prospects for sector resource availability at the provincial level are summarized below.

AJK. Sources of funding other than ADP include matching grant contributions by communities, donor assistance by UNICEF, and special allocations by the Prime Minister of AJK. In real terms, the all-time peak in sector resource availability was attained in 1987/88, when it reached 43.1 Rs million for both water supply and excreta disposal. Overall availability in real terms for rural water supply is expected to be lower by about 6% in 1989/90. A more or less constant sector resource availability is projected up to 1992/93. While the matching grant may slightly increase, the possible phasing out of UNICEF involvement beyond this year will lead to a significant fall in availability by about 12%.

Northern Areas. In addition to the ADP, the provision of development funds to NA is through the SDP funds, small amounts of donor funding channelled through NGOs, and donor-funded development projects. Overall, the total ADP allocations for NA reveals the trends of (i) very little growth in the public sector funding in real terms and (ii) a growing resource gap. The total investments in the sector in recent years have remained at 25-36% of total ADP allocations. The current investment level in the sector is Rs 106.1 million.

Balochistan. The Government of Balochistan depends upon the Federal Government for 100% of its development budget. For this reason, financial trends at the national level will have a direct bearing on the provincial budget. On the other hand, Balochistan is unique in its political status and the recognition it receives as an underdeveloped region. Historical trends confirm that Balochistan has managed to expand its development programs and still permit increases in the recurring budget. The addition of the Special Development Program has ensured that Balochistan has a higher amount of development funds relative to the national trends.

NWFP. In recent years approximately 6% of the Provincial ADP was spent in water supply and drainage, and this indicates that the sector has been accorded a fairly high priority. The rate of utilization of ADP allocations by PHED has been very high, generally approaching 100%. This testifies to the ability of PHED to increase its implementation rate fast enough to absorb large increases in allocations. The expenditure in 1989/90 is expected to be lower by 29% in relation to the 1987/88 level.

Punjab. In 1989/90, as a consequence of macro financial constraints, the nominal budget allocation is down by about 9%. This actually implies a cut in the real allocation of about 19%. It is unlikely that the resource position will alter dramatically in the next few years, and may be worse. In the foreseeable future, real sector resource availability is projected to remain the same as the 1989/90 allocation (Rs 940 million at July 1989 prices).

Sindh. Besides the ADP allocations, other sources of funding for the sector in Sindh are matching grant contributions by DCs, and investment by both DCs and UCs out of their own resources. The availability of resources for the sector in the foreseeable future is expected to be a constant amount of the 1989/90 level (about 325 Rs million).

2.4.3 Donor Resources

During the fiscal years 1984 to 1988, Pakistan received assistance commitments from foreign donors of US\$ 2,400 million annually. The rate of disbursement averaged US\$ 1,300 million annually between 1983 and 1987, and increased to US\$ 1,800 million in 1988. Of the total commitments made during the past few years, 82% have been targeted to four sectors of agriculture, industry, water/power, and transport/communications. The outstanding commitments to Pakistan beyond 1988 total US\$ 5,500 million, of which US\$ 1,400 million in the form of grants, US\$ 2,400 million in concessional loans, and the balance of US\$ 1,700 billion in non-concessional loans.

Overall, donor assistance has been offered not for comprehensive development of the sector *per se*, but specifically for individual projects for the sector. Some examples have been given in Table 1 (page 8).

2.4.4 Community Financing

Willingness to pay for water has been found in most regions. As has been stated before, there are no complete data on the exact magnitude of community financing. However, the significance of community financing may be gauged from various encouraging facts. Institutional mechanisms for collecting matching grants from the community have been established in AJK, Northern Areas, and Punjab. In AJK households contribute up to 35% of the water supply construction costs and finance entirely O&M costs. In Northern Areas, the market value of the community contribution in the capital cost of water supply schemes was more than 50% of UNICEF's share. In Punjab, a system of matching grants was started in 1981/82. It implements projects at the local level with more than 50% community participation in the form of cash, land, labor and material. Some villages here have also constructed open drains through self-financed schemes.

Surveys also found a high percentage (as high as 83% in AJK, most responses in Sindh) of rural population willing to pay a water fee of around Rs 20 per month per household.

2.5 Current Situation of the Sector

2.5.1 Current Situation of Water Supply

Approximately 30 million of people in rural Pakistan, or 41% of the rural population, are receiving water supply services of various degrees of quality from good to tolerable (Table 6).

AJK. Three technologies which the LGRDD is using are gravity-fed water supply, dug wells, and community handpumps. Unfortunately, due to the pressure of widespread demands for water supplies, funds are splintered among Union Councils, so that resources are divided among too many schemes. As a result, schemes can often take six to eight years to complete with only a few houses being added each year. This results in schemes costing almost five times as much as they should. Also due to the dispersion of resource only minimum supervision is possible, leading to sub-standard construction.

Table 6 : Estimated 1988 Rural Water Supply Coverage

Region	% Rural population	Population covered, '000
AJK	41	886
NA	9	61
Balochistan	22	998
NWFP	54	7,508
Punjab	38	15,037
Sindh	46	5,907
	-----	-----
Total	41	30,397

Northern Areas. The similarity of settlement patterns and physiographic features throughout NA enables water to be supplied through gravity-fed water schemes. Field surveys indicate that approximately 50% of the reported completed schemes in visited villages are in need of rehabilitation.

Balochistan. This Province faces certain problems in rural water supplies due to its desert-like climate, the conditions of low incomes and poor infrastructure, and a dispersed population. A significant portion of the rural population (20%) has access to water from irrigation schemes for which the quality and quantity is relatively adequate, although reliability and convenience may be less so. Another 12% have access to gravity sources which are largely unprotected. Roughly 30% of the rural population get water from open wells, and the remaining rely upon canals, rivers or ponds whose water quality is considered unacceptable. Water supply technologies in use consist of groundwater pumping with overhead service reservoirs, community tanks, handpumps or house connections, supplies from traditional irrigation canals (the *karez*), spring source gravity-fed systems, and infiltration galleries and slow sand filtration for surface water.

NWFP. In the northern zone of NWFP, surface water is abundant in the form of springs, rivers and snow-melt water. Here, surface water is the source of drinking water for approximately 72% of PHED schemes. In the central Peshawar valley, groundwater is normally available and is used in 89% of the rural water supply schemes in this area. In the arid south, both groundwater and surface water sources are normally scarce.

Most of the surface and groundwater available is sweet water, with the exception of brackish water zones in D.I. Khan, Bannu and Karak. Overall in the settled Districts, water sources are divided evenly between groundwater sources (53%) and groundwater sources (47%). Approximately 80% of water supply schemes in the northern Districts utilize surface water as the source and infiltration galleries or channels for tapping water. The central Peshawar valley mainly utilizes tubewells to withdraw groundwater.

PHED schemes provide a coverage of 50% and, together with LGRDD projects and private sector initiatives, the total coverage is estimated at 59%.

Punjab. Overall, 64% of the total rural population have access to improved water supplies, of which household-owned and installed handpumps provide water to 52%. However, 50% of the private sector handpumps and mechanized tubewells pumps are considered to be contaminated, resulting in an actual coverage of 38%. Handpump manufacture, retail distribution, installation and repair is conducted almost exclusively in the private domain. PHEDs schemes currently cover 12% of the total rural population, but repairs and extensions to existing schemes could increase this figure to approximately 15.4%.

Sindh. The main sources of water used by rural households in Sindh are handpumps (38%), followed by canals, ponds and streams (33%), dug wells, and piped supplies (9%). Handpumps are almost exclusively used in sweet water zone of barrage areas, whereas surface waters are used as water sources in brackish water zones of irrigated areas and hand-dug wells are main water sources in arid areas. By the end of June 1988, among 225 schemes reported to have been completed 140 systems have been commissioned, but many of them require rehabilitation. A further 298 schemes are under construction. From field testing it was found that almost all handpumps and piped water supplies produce water of unacceptable bacteriological quality.

2.5.2 Current Situation of Human Waste Disposal

The current coverage of adequate excreta disposal in all regions is extremely low, due to the cost of latrines, traditional defecation practices, and the lack of felt-need from the people and consequently weak promotion effort for latrine programs from Government agencies. Another significant factor is common villagers' perception towards latrines being unaffordable and having elaborate construction requirements. Due to severe lack of adequate excreta disposal facilities, males and children use open fields for defecation, whereas women use open surface latrines within the house or wait for darkness to go to the field especially in areas where the land is barren and does not offer any privacy during the day.

AJK. A UNICEF-supported LGRDD program is currently promoting latrine construction in AJK. Demonstration latrines are constructed in key institutions at the *markaz* (police) headquarters, schools and health units. Communities are asked to construct latrines as prerequisites before water supplies are built. However, the success of this program has been limited due to the above stated reasons.

Northern Areas. The only project that has implemented excreta disposal facilities is the UNICEF-supported Community-Based Services Program, which built 120 demonstration latrines in public places and gives technical assistance to build 880 less costly units in households. Communal pit latrines are used in Baltistan, and the excreta from the pits (not fully decomposed) are used as manure in the fields.

Balochistan. The estimated current coverage of excreta disposal is barely 5%, most were installed by donor agencies. Existing latrines types include the VIP, pour-flush, and the simple deep pit latrine.

NWFP. A survey as reported by Union Councils suggested the existing human waste disposal coverage of the order of 3%. The PHED has created a Sanitation Division through which latrines are promoted. Sanitation projects consist primarily of installing double-pit

latrines in schools and VIP or pour-flush latrines in houses. The latrine building program has been completed in most of the schools, and costs are totally borne by the government. 2,600 latrines have been installed in houses, with a major share (63-81%) of the installation costs borne by the householders.

Punjab. Latrines are not commonly used in Punjab. Pit latrines and other dry latrines are not favored due to their smell problems. Pour-flush latrines are more popular, but are still unaffordable to many rural people and are therefore not widespread in use. Surveys indicate that in villages that lack a water supply to houses and a drainage system, a low average coverage of 5% to 10% of houses was observed. In villages with water house connections and drainage, the coverage increases to an average of 15% to 25%.

Sindh. There are few rural households that have adequate facility for excreta disposal. The percentage of households having latrines in surveyed villages varies from 1% to 9%, with an average of 4%. The majority of latrines are of pit type, but pour-flush latrines are also used.

2.5.3 Current Situation of Drainage

Drainage of used water is not as much of a problem in the State of Northern Areas as it is in the southern parts of the country. Most villages in NA are located on steep slopes. Any drainage problems which do exist are localized to near the water distribution points.

In other regions such as in the Punjab's and Sindh's irrigated areas, drains are usually of open type, lined or unlined, made of brick or cement, and run along one or both sides of the street. The current coverage of drainage is very low, as low as 5% in Sindh and 1% in NWFP. In Punjab and Sindh, PHEDs are common implementing agencies for drainage, sometimes with some inputs from LGRDDs, Union Councils and the community. The drains flow either into a dry stream bed (*nullah*) like in AJK, ponds, irrigation canals, or into a Salinity Control and Reclamation Project (SCARP) Drain like in Punjab. The pond effluent may be used for irrigation. Most drains are blocked with garbage and dirt, some have completely failed due to lack of maintenance, and others even carry fresh human excreta from toilets or effluents from septic tanks. Ponds at the end of the drainage systems are often unkept and sources of mosquitoes and malodors.

2.5.4 Current Situation of Hygiene Education

There are no effective hygiene education programs covering a significant population number in Pakistan. There are a number of initiatives underway, but no consistent methodology has been adopted and no sustained effort maintained. Either hygiene education materials (such as posters, pamphlets and radio and TV programs) are produced by Government agencies in a moderate number without pre-testing and follow-up, or smaller numbers of materials are produced by a few donor agencies and NGOs with pre-testing and follow-up but with limited coverage.

The consensus among agencies is that women should be the primary audience for hygiene education, but cultural and social constraints make it difficult to reach them. Hygiene education is neither a popular felt-need, nor a field in which options attractive to villagers have been formulated so far.

2.6 Assessment of Present Programs

2.6.1 Technology

Seldom is there integration of water supply, excreta disposal, drainage and hygiene education components in sector projects. Projects have typically been exclusively oriented to water supply. The main reason for little interest in components other than water supply is lack of felt-need and willingness to pay by the community. On the other hand, drainage has recently begun to receive higher development allocation in Punjab and Sindh.

Due to inadequate feasibility study, many existing schemes were not designed properly: either they have insufficient capacity (like piped water systems in AJK), do not meet engineering design criteria for proper functioning, or were over-designed (like water schemes in Punjab).

Despite numerous constraints, the rural water supply component in Pakistan has showed some strengths. The first is the linkage between drinking water supply and irrigation. This could be pursued further. For example, it has been suggested that an ancient technology (the *Karez*) of underground tunnels for lateral transfer of water used for irrigation in Balochistan be used for providing low-cost drinking water. The second strength is related to the private sector's initiatives in areas where Government agencies cannot fulfil the needs. Another strength is the agencies' capability in making full use of large increases in allocation in the 1980's for fast development of the sector.

2.6.2 Sustainability

Efforts have been focused in design and construction but relatively little attention has been given to operation and maintenance. Insufficient consideration has been attached to efficient utilization of investments already made as Government agencies are under constant pressure to expand coverage. Coupled with this is the fact that participation of communities in the planning, design and construction of publicly-provided sector schemes is low (virtually nil in most provincial water schemes). Consequently, a rather high percentage of implemented schemes are not supported by the community and not functioning to their full extent. Much of the intended beneficial impact from water supply is lost due to the lack of hygiene education and the inadequate emphasis on proper defecation practices and disposal of human wastes.

Most District Councils and communities are reluctant to accept responsibility for the installed systems because of their limited administrative capability and the difficulty encountered in collecting revenues. In Punjab, Sindh and NWFP, even those communities having given to PHED a commitment to take over the scheme have often failed to do so. Thus, PHEDs have to continue shouldering the burden of O&M, hindering their effort in further sector development. Political pressure also requires PHEDs to provide O&M services much beyond their obligation of initial operation.

A few communities that have accepted their systems from PHED have not been able to keep these system operating. They failed because they were ill-prepared to assume the task and had insufficient training and assistance during the transitional stage. There is lack of

suitable institutional support through which a community can acquire administrative and technical assistance for O&M.

2.6.3 Economics

While the willingness to pay is low for drainage and human excreta disposal, it is usually high for water supply. Although water itself may be considered to be free by some villages, the transport of water is generally viewed as a rightful cost to the user. This is reflected by the increased willingness of people in Punjab and Balochistan to pay a water tariff when water is delivered to them through house connections. Thus, there is ample opportunity to develop the sector on these strengths. Improved latrines such as those currently constructed are still unaffordable by most rural people. Willingness to pay for latrines could substantially increase if lower-cost latrines having simpler design and using less expensive materials are introduced.

There continues to be strong orientation in all regions to providing to large settlements first. This reflects response to economies of scale and development potential, but it is also a result of political influence which adversely affects less influential communities which may be in greater need for services.

Cost recovery is weak in all regions, partly due to the lack of political will and partly due to weak institutional mechanisms. For example, even though the PHED of Sind is operating and maintaining most of the piped water schemes in the province, it is not empowered to collect revenues. The Union Councils in Sindh have the power to collect revenues, but their performance is poor. The funds collected are not used for O&M. Despite a poor records in cost recovery, field investigations have shown good potential for cost recovery (Section 2.4.4, page 16), provided this is supported by political will and legislation. One of the most promising mechanisms for cost recovery is the collection and management of funds for O&M by the community itself. This system is already functioning in AJK and the Northern Areas.

2.6.4 Supporting Activities

There are no structured human resources development programs within the line departments. Training is limited to newly-recruited middle-level staff being assigned to more senior staff for in-service familiarization. Likewise, formal training programs for operators and other lower-level technicians are inadequate. Many of the operators, like those in Balochistan, were guardsmen (*shawkidar*) on the construction sites. Existing training facilities are inadequate in staffing and instructional material. Fortunately, donor assistance has helped to narrow this gap. Within the universities in the country, curricula hold little relevance to the needs of sector's development in rural areas.

3. Population and Demand

3.1 Population Projections

Projections for population at the ends of the Fifth Five-Year Plan (1983) and of the Seventh Five-Year Plan (1988) were made using 1981 Census data. These projections are shown in Table 7.

Table 7 : Projected Rural Population ('000)

	Rural Population ('000)			Annual Growth Rate, %
	1988	1993	1998	
AJK	2,141	2,390	2,670	2.2
NA	677	804	955	3.5
Balochistan	4,535	5,293	6,205	3.1
NWFP	13,814	15,339	16,852	§
Punjab	39,424	43,374	46,549	¶
Sindh	12,841	14,552	16,518	2.5
	-----	-----	-----	-----
Rural Nationwide	73,432	81,752	89,749	*

¶ 1.9% during 1988-1993 and 1.4% during 1993-1998

§ 2.1% during 1988-1993 and 1.9% during 1993-1998

* 2.2% during 1988-1993 and 1.9% during 1993-1998

3.2 Demand for Services

3.2.1 Demand for Water Supply

AJK. Demand for water supply is high throughout AJK. To fulfil the proposed target, an additional coverage over the next nine years of 934,000 is required, resulting in an annual average implementation rate of about 100,000.

Northern Areas. Although the total water coverage is some 27% of the rural population, only 9% can be said to have *safe* drinking water supply. The systems serving the remaining 16% need rehabilitation. Rural water supply is a widespread felt-need in NA.

Balochistan. The estimated demand for basic level of water supply service by 1990 is 3.4 million people. Of the total demand, an estimated 50,000 people have water supply schemes that need rehabilitation. The proposed investment plan calls for increasing coverage at the rate of 5% (or roughly 225,000 people) per annum, in order to achieve 70-75% coverage by 1998.

NWFP. Demand for water supply is high. In the northern region, the demand is often for available water to be made more accessible and its use more convenient. In the central region, demands are for access in those settlements not covered and for reliable supplies. Demand is highest in the southern region where water is scarce.

Punjab. The need for water is high in brackish groundwater areas of the irrigated plains. The element of need most prevalent in these areas is poor water quality. However, it seems this element is of least concern to the user when compared with quantity and level of service. Therefore, although there is a need for quality water, villagers have greater demand for sufficient quantity and convenience. When good quality is combined with a higher level of service through house connections, the demand and thus willingness to pay increases substantially.

In rainfed (*barani*) areas where the water quality is good the demand could be highest as the distance to the source is far and the quantities available are either low or seasonal. Although water quality in these areas is good, the accessibility and quantity are not. This high level of need creates a strong demand for water in the rainfed areas. In the Potwar plateau, the willingness to pay is often matched by an ability to pay.

Demand is low in the sweet-water areas of the irrigated plains as good quality groundwater is available at shallow depths in essentially unlimited quantities.

Sindh. Field surveys suggest that as high as 80% of the water schemes (both those commissioned and reported completed but have not yet commissioned) require rehabilitation at various degrees. An estimated 60% of the PHED drainage schemes require a significant level of rehabilitation.

3.2.2 Demand for Human Waste Disposal

The question of demand for adequate excreta disposal must consider the people's felt-need and their willingness to pay for all or part of the cost of latrines. In this respect, even though current coverage figures throughout the regions are low, real demands are much lower than the needs. Nevertheless, demand for human waste disposal does exist in some areas. Field surveys in southern AJK indicate a significant interest in installation of latrines especially in areas close to urban centers and main roads, also where people have returned from working overseas. In Sindh, the need for latrines is greatest in villages with a population of over 500, a fact which is true in all of the densely-populated settlements.

Based on current demands and institutional capabilities, it is envisaged that sanitation coverage could be increased to 5.3 and 10.5% in 1993 and 1998, respectively, in AJK, and to 10 and 20% in the same years, respectively, in NWFP.

3.2.3 Demand for Drainage

There is no significant demand for drainage in AJK. In other regions, drainage of greywater is required where there is a piped water supply scheme or where individually-owned mechanized pumps are used especially where the topography is flat. Thus, requirements for drainage will depend closely on the type and number of water supply schemes. As in the case of excreta disposal, demand for drainage depends on beneficiaries' felt-need and

willingness to pay, both of which are usually low. NWFP has set targets for drainage coverage as 4% of rural population in 1993 and 9% in 1998.

In Punjab and Sind there is an increasing demand for drainage in the sweet-water zone of the flat irrigated areas. A substantial number of villages in this zone require drainage because of large spillage from household mechanized handpumps installed on tubewells. The need in Punjab is not only strong because of the severity of the problem, but also large in size because 52% of the Province's population (approximately 20.5 million) live in sweet-water areas and only 10% of them have drainage schemes. In brackish and rainfed areas, the need for drainage exists primarily in villages with house connections.

A problem frequently expressed by women is the unhygienic conditions in village lanes. However, cultural inhibitions discourage women from assuming responsibility for matters outside their household compounds. Benefits of cleaning the homes are, therefore, undermined by unsanitary village lanes.

3.3 Service Levels

3.3.1 Water Supply Service Level

All regions have proposed specific basic service levels of water supply as summarized in Table 8. Where the demand exists and is matched by a willingness and ability to pay, higher service levels of house connections will be provided.

3.3.2 Human Waste Disposal Service Level

The regions have proposed pit and/or pour-flush latrines as the minimum excreta disposal service level; the choice depends on the local availability of water and the affordability of the latrine. Household latrines are favored over communal latrines.

3.3.3 Drainage Service Level

The regions have proposed drainage as a means for preventing stagnation of water within the bounds of the village, and particularly at water facilities. Sindh proposes either household soakpits or drains. Waste stabilization ponds are considered as an appropriate technology for final treatment and disposal, except where stream dilution is considered adequate for discharge from small villages.

3.3.4 Hygiene Education Level

The following levels of hygiene education are proposed:

Basic Services: during meetings introducing new schemes: a review of the basic hygiene messages, introduction to hygiene education for TBAs, and meetings with women's groups. Home visits may be made if possible.

Table 8 : Proposed Water Supply Service Levels

Region	Service Level
AJK	Minimum quantity: 5 gallons/capita-day Minimum quality of clear, odorless water Maximum distance: 1,000 ft (305m) from user dwellings Minimum availability: 4 hours a day (2 in the morning and 2 in the evening)
NA	Minimum quantity: 5 gallons/capita-day, with 15 gallons/capita-day for 50% of population Minimum quality: achieved by water testing and treatment. Minimum availability: one standpost for each 10 households
Balochistan	For villages with more than 1000 people: piped systems, with communal tanks at convenient locations For small isolated settlements: wells and handpumps with storage facilities
NWFP	Minimum quantity: 5 gallons/capita-day for standposts and communal tanks, and 10 gallons/capita-day for house connections Maximum distance: 500ft in the plains and 300ft in the hills Minimum availability: 3-4 hours a day.
Punjab	Minimum quantity: 45 litres/capita-day Minimum quality: free of bacteria and total dissolved solids level below 1,500 mg/L
Sindh	Communal handpumps, communal tanks, or house connections depending village size and hydrogeological zone Minimum quantity: 5 gallons/capita-day for communal handpumps, 10 for communal water tanks, and 15 gallons/capita-day for house connections

Second Level: all women should have access to hygiene information and education at local health centres and Basic Health Units.

Third Level: school hygiene promotion is undertaken, a series of meetings are organized between women's groups and female workers (eg., TBAs or primary school teachers) supported by effective teaching aids.

Forth Level: women receive home visits from trained female village-level workers (TBAs, LHV's, sanitation promoters, primary school teachers, NGO staff, volunteers) to discuss existing home and personal hygiene, and better hygiene practices.

Basic hygiene education services should be provided even for small and remote communities. Messages include, but are not limited to, hand washing, disposal of feces, particularly those of children, cause, prevention and treatment of diarrhea, garbage disposal, and messages in support of water supply improvement, latrines and drainage.

4. Investment Strategy

4.1 General Goal

The overall long-term goal of the Strategic Investment Plans is to improve health, enhance quality of life, and protect the environment from fecal and wastewater pollution through increased coverage of water supply, human waste disposal and drainage facilities which are integrated with hygiene education, community development, and institutional strengthening.

4.2 Policy Guidelines

At the National Policy Conference on Rural Water Supply and Sanitation in Islamabad in April 1989, the following components were recommended for sector investment policy guidelines:

- *Community participation in planning, implementation and operation, including community financing of part of capital costs and all of O&M costs.*
- *Integration of water supply, human waste disposal and hygiene education.*
- *Institutional strengthening with improved coordination of line departments.*
- *Expanded human resources development programs which develop the skills necessary to achieve village participation and to design and install appropriate facilities.*
- *Increased support to the private sector including NGOs.*
- *Adoption of appropriate, affordable and sustainable technologies.*
- *Provision of service levels that reflect the beneficiaries' express demand and willingness to afford.*

4.3 Investment Strategies

Based on the above policy guidelines, the following investment strategies are proposed with some elaboration on methodology and mechanisms.

System Sustainability

- Mechanisms and institutional arrangements for cost recovery should be improved to make projects self-sufficient and sustainable. This task is particularly crucial in light of future financial constraints in sector investment (Section 2.4.1).

- For the same reason, more responsibility in operation and maintenance should be shifted from Government to the community, with Government agencies providing technical assistance.
- Community participation in all phases of the project cycle should be particularly encouraged. In particular, women's role and status in the community with respect to health, water supply and sanitation should be promoted and enhanced.

Project Integration

- Whenever possible, water supply, human waste disposal and hygiene education should be an integrated package implemented in every settlement approved for water supply.
- More attention should be paid to human waste disposal and drainage, not to water only. In this regard, more promotional effort should be geared towards latrine construction due to the weak felt-need for this component. In regions where latrines are perceived as too expensive, improved latrine designs using low-cost material should be introduced to make them more affordable.
- For human excreta disposal, the focus should be on promotion rather than implementation of schemes. Latrine promotion programs will be linked closely with water supply programs.
- In particular, hygiene education programs should be implemented in an comprehensive way, with extensive pre-testing of material and methodology and effective follow-up.
- Care should be taken to prevent adverse impacts of water stagnation caused by increased water supply.
- For Government agencies extensively involved in groundwater exploitation, a strong technical capability in hydrogeology should be developed within the agency. For example, a Hydrogeological Cell is proposed for Sindh PHED and two Hydrogeological Cells (North and South) for Punjab PHED. This will enable these agencies to conduct preliminary test drilling programs for groundwater supplies as an integral part of their activities.

Institutional Strengthening/Arrangement

Table 9 outlines the proposed institutional arrangements for sector investment. In general, it is proposed that:

- The Planning & Development Departments should have a stronger role in coordination, monitoring and evaluation of schemes.
- The Public Health Engineering Departments (and Public Works Departments in the cases of AJK and NA) should continue to take the lead role in designing and supervising construction of schemes for larger communities. Meanwhile, their common weaknesses in involving the community, cost recovery and monitoring and evaluation need to be remedied.

Table 9 : Suggested Institutional Arrangements for Sector Investment

Region	PHED/PWD	LGRDD/LBRDD	Health Dept.	Education Dept.	Others
AJK	PHED/PWD to implement water and watershed management schemes in District and <i>markaz</i> headquarters.	Improved implementation of water supply, drainage and hygiene education. Creation of Monitoring & Evaluation Unit. Training of Village Development Committees members and artisans.	Key technical inputs to HE.	HE, with curriculum development changes for schools.	P&D: coordination through AJK Water Working Committee. Private sector: with training support continues to contribute to water supply and excreta disposal services especially in rehabilitation and upgrading, and undertakes water resource assessment
NA	PWD to create Public Health Engineering Circle for construction and maintenance of rural water supply and drainage schemes, revenue collection, and water resources data collection.	LBRDD as leading implementing agency in the sector. Creation of Rural Water Supply & Sanitation Unit for implementation. Monitoring & Evaluation Unit to be merged with Rural Water Supply & Sanitation Unit.	Water quality monitoring. Creation of Health Education Unit for hygiene education.	Training of engineers who will work in the sector.	UCs coordinate disbursement of funds locally and encourage implementation. Aga Khan Rural Support Program to cooperate with Rural Water Supply & Sanitation Unit, LBRDD, in project planning and execution.
Balochistan	Implementation of large water supply schemes and provide drainage facilities for these schemes. Creation of Planning & Community Relations Cell.	Implementation of small water supply schemes, all excreta disposal, and some drainage schemes. Monitoring and coordination at District level.	Hygiene education through Health Education Units and TBAs.	Hygiene education through primary and mosque schools.	P&D: Steering Committee for overall coordination. BIAD: continuation of its integrated program for sector development during 7th Plan. Rural Development Academy: provision of training.
NWFP	Design and construction supervision of all schemes financed through ADP, major repair and rehabilitation. Take the lead technical role in promoting latrine construction through Sanitation Division.	Creation and training of Village Development Organizations, training of operators. Construction of water supply and drainage schemes financed by elected officials' grants, outside ADP.	Hygiene education through Health Education Unit.	Training programs for PHED and LGRDD staff through Polytechnics.	Provincial Steering Committee: over all planning, coordination, monitoring and evaluation. Peshawar Polytechnic: training programs for PHED and LGRDD in the short term.
Punjab	Elevated to a Secretary status. Planning, design and construction of water and drainage systems. Eventual discontinuation of O&M services for new facilities. Creation of two Hydrogeological Cells (North and South).	Provision of support to communities in setting up their water committees and in organizing revenue collection. Creation of O&M Water & Drainage Support Division. Assistance to communities for O&M.	Hygiene education by Rural Health Centres, Basic Health Units, and the new Hygiene Cell.	Hygiene education through schools.	In the long term both PHED and LGRDD come under a new Additional Chief Secretary. Private sector: improvement of installation services, provision of O&M services to communities. Rural Development Academy: training.
Sindh	Implementation and rehabilitation of mechanized water supply and drainage schemes. Creation of the following Cells: Hydrogeological, O&M, Planning & Monitoring, and Training.	RDD & LGD: implementation of non-mechanized water supply schemes. Promotion of on-site latrines. LGD: formation of village organizations through UCs, creation of Village Motivation Cell and O&M Cell. RDD: creation of a Training Cell.	Hygiene education by the new Hygiene Education Cell and TBAs.		SAZDA: non-mechanized and water resources evaluation in arid zone. UCs: interim responsibility for O&M. Information management systems at PHED, RDD and SAZDA. Rural Development Academy: training.

- In smaller communities adopting simple technologies, **Local Government & Rural Development Departments** and the **Local Bodies & Rural Development Department in NA** should be the prime executing agencies.
- Although the implementing departments should play strong roles in promoting hygiene education during project implementation, the **Health Departments** should be leading agencies in providing expertise for hygiene education. The **Education Departments** also have longer-term roles to play in effecting hygiene education through the schools.
- In all Government agencies, vigorous human resources development programs should be initiated in order to provide sufficient competent staff to undertake investment plan implementation. This should, first, be started at the middle managerial and technical staff levels.

It should be noted that institutional strengthening does not always mean increasing staff numbers or physical resources. Given macro resource constraints and consequently scaled-down sector resource availability, some Government agencies (such as PHED of NWFP) should be in a position to absorb a moderate level of Donor assistance without having to expand their present capacity. In this case, the focus would be on improving staff competence and efficiency. In contrast, the Balochistan Investment Plan is exceeding Balochistan PHED's capabilities for implementation. This agency will need more support for expansion and better cooperation with other agencies. Inter-departmental cooperation is vital in view of PHED's weakness in certain capabilities, such as hydrogeology and water resources management. As another example, in AJK the promoter or extension worker staff will need to be substantially increased.

Private Sector Support

- Household-owned components such as latrines and shallow-well handpumps should be private undertakings. More training should be given to technicians (eg. plumbers, handpump installers, well diggers, masons...) who work as private contractors to improve their quality of installation and repair work.
- Larger contractors who have greater expertise and resources should be given a better share in undertaking rural water supply projects, whereas support should be continued for small contractors.
- Householders should be encouraged to install their own systems (household latrines and handpumps) instead of relying on Government agencies for materials and technical support. This will speed up installation, reduce costs, and reduce the burden on government agencies.

Technology Selection

- Government agencies should spend more effort on design improvement, investigation of available options, and development of innovative technologies with a view to reduce costs and increase efficiency.
- The rate of system failures or under-use in several regions has reached an alarming level. Adequate effort should be given towards rehabilitating existing systems whenever necessary, and lessons should be learned from failures for implementation of more effective systems in the future.

Service Level

- High-level service should be provided whenever the user requires and can afford at least the operation and maintenance costs of the service as well as the incremental capital cost for the higher service level. Otherwise basic levels should be provided.
- When a basic level of service is provided, a certain minimum of service quantity and quality should be attained. This usually calls for concentrated, instead of dispersed, geographical implementation.

5. Investment Plans

5.1 Overview of Plan Components and Size

The Investment Plans are based on projected institutional absorptive capabilities and expected financial resources. For this reason, targets are not the pre-determinants. Table 10 shows the capital costs required for Provincial Investment Plans implementation. The total costs of each component in Table 10 are approximate only, and are listed to provide a general view of allocations among components. It can be seen from this Table that better integration of components is called for as indicated by substantial allocations to drainage, human waste disposal and hygiene improvements. The allocations to human resources development and institutional strengthening are also substantial. Rehabilitation has been suggested wherever necessary in order to maximize the use of existing investments in schemes.

Table 11 presents some analyses of capital cost data. The average annual costs were approximated here by dividing the total cost in the 7th Five-Year Plan and 8th Five-Year Plan periods by the number of years in each period. The Plan's total capital costs per uncovered person (in 1988) gives an indication of the level of investment being proposed on a comparative basis with the numbers of people not covered by water supply in 1988. In this respect, Balochistan, Northern Areas and Sindh are the heaviest investors, placing greatest priority on this sector.

Table 12 shows the *incremental* recurrent costs incurred by the Provincial Governments resulting from increased spending in the Strategic Investment Plans. The net costs are also given as stated in the notes to the Table.

The principles of allocation slicing proposed for the Provincial Strategic Investment Plans and main features of implementation are presented in the following sections.

5.1.1 AJK Investment Plan

The Investment Plan for AJK will provide mainly gravity-fed water supplies whenever possible. A new borehole will be provided in 10% of pumping schemes, and slow sand filters in another 10% using surface waters as water sources. Two-thirds of available funds will be allocated to Districts proportionally to district populations. One-third will be kept as a special allocation to the three needier Districts (Bagh, Kotli and Muzaffarabad), and shared on the basis of uncovered population. The incorporation of the "needs" factor into the allocation formula has the consequence of increasing the share in development funding for these Districts. For water supply, two-thirds of the fund will be spent on new schemes and the remaining one-third on rehabilitation. It is expected that the Strategic Investment Plan for AJK will provide a water supply coverage of 59% and 75% by 1993 and 1998, respectively.

Table 10 : Capital Costs of the Investment Plans
(Rs million at constant prices 1989)

	AJK ¹	NA	Bal'n	NWFP	Punjab	Sind	Total
7TH PLAN (1990-1993)							
<i>Hardware Components</i>							
New water supplies	99.1	98.5	596.0	791.2	1,440.0	551.9	3,576.7
New drainage schemes	0.0	0.0	10.0	68.4	1,385.0	647.0	2,110.4
Water & drainage rehab.	44.1	10.1	90.0	(a)	35.0	44.0	223.2
Excreta disposal	2.5	.4	2.0	32.8	(c)	(c)	37.7
Water resources dev't	5.6	(a)	90.0	(a)	(d)	9.0	104.6
Sub-Total, Hardware	151.3	109.0	788.0	892.4	2,860.0	1,251.9	6,052.6
<i>Software Components</i>							
Human resources dev't	3.8	2.0	45.0	19.3	9.0	(e)	79.1
Institutional development	44.3	43.8	58.0	41.4	102.0	132.9	422.4
Monitoring & evaluation	0.3	1.5	4.0	(a)	8.0	(a)	13.8
Hygiene education	6.4	.5	6.0	18.8	9.0	21.0	61.7
Sub-Total, Software	54.8	47.8	113.0	79.5	128.0	153.9	577.0
Others [§]	0.0	7.2	120.0	0.0	20.0	30.0	177.2
TOTAL, 7TH PLAN	206.1	164.0	1,021.0	971.9	3,008.0	1,435.8	6,806.8
8TH PLAN (1993-1998)							
<i>Hardware Components</i>							
New water supplies	217.7	134.2	1,118.0	820.1	2,847.0	1,320.4	6,457.4
New drainage schemes	0.0	0.0	35.0	114.3	2,791.0	1,298.2	4,238.5
Water & drainage rehab.	108.8	0.0	190.0	(a)	105.0	96.0	499.8
Excreta disposal	9.0	0.7	9.0	48.5	(b)	(b)	67.2
Water resources dev't	2.1	(a)	156.0	(a)	(d)	11.0	169.1
Sub-Total, Hardware	337.6	134.9	1,508.0	982.9	5,743.0	2,725.6	11,432.0
<i>Software Components</i>							
Human resources dev't	1.4	1.2	18.0	49.1	20.0	(e)	89.7
Institutional development	10.5	42.5	57.0	20.55	122.0	79.6	332.2
Monitoring & evaluation	0.0	0.6	5.0	(a)	16.0	(a)	21.6
Hygiene education	6.7	0.8	7.0	28.1	15.0	9.0	66.6
Sub-Total, Software	18.6	45.1	87.0	97.8	173.0	88.6	510.1
Others [§]	0.0	2.0	200.0	0.0	46.0	20.0	268.0
TOTAL, 8TH PLAN	356.2	182.0	1,795.0	1,080.7	5,962	2,834.2	12,210.1
GRAND TOTAL	562.3	346.0	2,816.0	2,052.6	8,970.0	4,270.0	19,016.9

Notes

- ¹ These costs are those to be financed by Government and external agencies.
- (a) The component is incorporated into the Investment Plans, but its cost figure is not explicitly given.
- (b) Water supply rehabilitation is included in new water supply schemes.
- (c) Latrine promotion is included in hygiene education.
- (d) Water resource planning is included in institutional development.
- (e) Human resource development is included in institutional development.
- § These include Revolving Credits in NA, Rapid Development and Valley Development programs in Balochistan, local consultants for training and latrine promotion in 6 Districts in Punjab, and sustainability in Sindh.

The excreta disposal component in AJK consists of 2 low-cost demonstration latrines per village, free pans, pipes and their delivery for up to 10% of the population benefitting from a new water supply, and training of artisans. The resulting coverage will be 8% by 1998.

**Table 11 : Analysis of Capital Cost of the Investment Plans
(Constant prices 1989)**

	AJK	NA	Bal'n	NWFP	Punjab	Sind	National
Average Annual Cost, Rs million							
7th Plan 1990-93	68.7	54.7	340.3	324.0	1,002.7	478.6	2,268.9
8th Plan 1993-98	71.2	36.4	359.0	216.4	1,192.4	566.8	2,442.0
Capital Investment per person not covered in 1988, Rs	419	696	797	325	368	616	442

**Table 12 : Incremental Recurrent Costs Resulting from Investment Plans
(Rs million at constant prices 1989)**

Period	AJK (1)	NA (2)	Bal'n (3)	NWFP (4)	Punjab (5)	Sindh (6)	National
7th 5-yr Plan (1990-1993)	6.8	28.4	105.9	10.4	390.8	250.5	801.3
8th 5-yr Plan (1993-1998)	18.0	45.8	461.0	31.3	483.1	370.7	1,441.9
	-----	-----	-----	-----	-----	-----	-----
Total, Investment Plan	24.8	74.2	566.9	41.7	873.9	621.2	2,243.2

Notes:

- (2) Total costs incurred by LBRDD, Aga Khan Rural Support Program, Public Work, Public Health Engineering Circle, Health, NA Polytechnic, and on other components.
- (3) Costs incurred by PHED, LGRDD, Rural Development Academy, P&D, Health and Education.
- (4) Costs incurred by PHED, LGRDD and Health Department.
- (5) Costs incurred by PHED and LGRDD resulting from proposed donor project plus PHED's and LGRDD's O&M costs resulting from Investment Plan.
- (6) Costs incurred by Government, including O&M costs.

5.1.2 NA Investment Plan

In view of the Government's concern with equity considerations in the three Districts in NA, the level of investment for water supply in Diamer has been set at a slightly higher rate. A total of 164 small, 180 medium and 43 large water supply schemes will be implemented in NA. The Plan will achieve 100% water supply coverage in villages with a population of more than 2,000, and 70% coverage in villages with a population of less than 2,000. The overall rural water supply coverage will be 78% by 1988.

The excreta disposal program will be initiated in those villages with existing water supply schemes which have a large proportion of house connections. It will also be introduced in those villages where new water supply schemes are being initiated. As such, it is expected that the sanitation will be initiated in 584 villages. It is estimated that an additional 2.3%

of the population will be covered as a result of the latrine demonstration program. A realistic target of 30% coverage is being aimed for.

An amount of Rs 9.2 million has been allocated for revolving credit, and 68% of this will be given for household water connections, 22% for household latrines, 9% for rehabilitation, and 2% for hygiene education.

5.1.3 Balochistan Investment Plan

In Balochistan, the institutional constraints to implementation of existing levels of investment is a more serious constraint than financial limitations. As a result, the strategy for the Investment Plan shifts away from the required funding levels in new schemes and towards requirements for institutional strengthening and sustainability. 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.

In view of institutional development requirements, 73% will be allocated to water supply in 1990/91 (excluding the Special Programs); this figure will increase to 83% by 1997/98. The allocation of funding for the sector by agency will be:

- 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
- 11% to 12% for Special Programs within the ADP.

The Strategic Investment Plan for Balochistan will provide water supply coverage of 50% and 73% by 1993 and 1998, respectively.

It is recommended that rehabilitation and major repairs of LGRDD schemes be the responsibility of the community. In PHED schemes, responsibility for O&M will be initially held by PHED allowing for the progressive transfer to responsibility over to the communities by the end of the 8th Five-Year Plan. Ultimately, PHED is responsible only for major repairs of PHED schemes.

For excreta disposal, the focus will be on hygiene promotion and simple improvements to existing systems. Although the use of latrines will be actively promoted, latrine demonstration programs will be limited to the provision of facilities in rural health facilities and schools.

5.1.4 NWFP Investment Plan

In settled areas of NWFP, 80% of the ADP sector allocation will be earmarked for water supply, 90% of this amount will be divided using the present 60/40 split by which each District will receive a share of the 60% equal to its percentage of the total rural population. The remaining 40% will be divided equally among those Districts with water supply coverage of less than the targeted 70% during the 7th Five-Year Plan period and 80% during the 8th Five-Year Plan period. The remaining 10% of the water allocation will be divided evenly among the needier Districts in the Province - Dir, Bannu and D.I. Khan.

During the 8th Five-Year Plan period, as Districts achieve coverages higher than 85%, the water supply allocation should be further divided between new systems and rehabilitation of existing systems. The recommended funding split between new construction and rehabilitation of water supply schemes is 2/3 and 1/3. The Strategic Investment Plan for NWFP will provide a water supply coverage of 70% and 80% by 1993 and 1998, respectively.

The drainage allocation at 15% of the total ADP will be divided on the basis of population of those Districts in the settled areas requiring it: 75% for Mardan and Peshawar and 25% for Kohat, Karak, Bannu and D.I. Khan. By 1993, Province-wide coverage of drainage will be 4%, and by 1998 will be 9%.

The human waste disposal allocation of the remaining 5% of the total ADP will be divided between all Districts in the settled areas on the basis of population. The resulting coverage of human waste disposal in 1993 and 1988 will be 10% and 20%, respectively.

The Strategic Investment Plan for FATA proposes a reallocation of the ADP on the basis of 95% to water supply and 5% to excreta disposal. Because of its hilly terrain and dispersed settlements in FATA, drainage here is not perceived to be a felt-need.

5.1.5 Punjab Investment Plan

An assessment methodology has been devised in Punjab based on the population served by existing water systems in each District relative to the total population of that District. Districts were ranked in accordance with their relative need. The impact of this ranking system, when combined with periodic assessment, is to enable each District to achieve the same coverage level at approximately the same time. For this Investment Plan, the progress of each District was reassessed in 1994 based on coverage achieved by the Plan in this year. The resources were then reallocated accordingly for the balance of the 8th Five-Year Plan period.

The Strategic Investment Plan allocates the projected ADP resources according to the relative district rating. Additional resources of Rs 2,000 million will be superimposed on this ADP distribution to reflect the impact of external funding in selected Districts as follows:

- Rs 1,000 million will be distributed to Districts Rawalpindi, Attock, Gujrat, Bahawalpur, Bahawalnagar, and Rahim Yar Khan over the four-year period 1991-95, again in proportion to relative need.
- Rs 1,000 million will be distributed over a new set of six most needy Districts based on an assessment of projected needs in 1994. These Districts are Rajanpur, Faisalabad, Multan, Okara, Sargodha, and Muzaffargarh.

The ranking system of District need is also used to allocate funds for drainage. Thus, investment in drainage will be focused on sweet-water zones having mechanized schemes where the need is highest.

The Strategic Investment Plan for Punjab will provide a water supply coverage of 48% and 57% by 1993 and 1998, respectively. These are *actual* coverages, which are gross coverages minus 50% of the private sector handpumps and mechanized pumps in the sweet-water zone considered to be contaminated. The gross coverage is 73% and 83% by 1993 and 1998, respectively. The coverage for drainage will be 20% and 32% in 1993 and 1998, respectively.

5.1.6 Sindh Investment Plan

For water supply in Sindh, the Investment Plan consists of:

- 760 new schemes in medium and large villages in barrage areas with the basic level of service;
- 16,500 schemes in small villages in barrage areas;
- 140 new schemes in large villages in arid zones with basic service;
- 5,215 improved schemes in small and medium villages in arid zones;
- upgrading and extension of 250 water supply schemes primarily by retrofitting canal source water supply schemes with slow sand filters; and
- rehabilitation of 350 existing schemes.

The drainage component will consist of 370 new schemes in villages with piped water supplies; 490 new schemes in large village in sweet-water areas, and rehabilitation of 110 drainage schemes. The objective is to provide a drainage scheme for all of the villages that will receive a water supply scheme with house connections or already has a piped water scheme but no drainage system. In addition, all of the large villages in the sweet-water zone will be provided with a collector drain system.

In order to determine geographical allocation, Districts were ranked based on criteria related to need as expressed by coverage gap, degree of difficulty in obtaining a satisfactory service, and the cost per capita of the service. A set of secondary criteria were also applied and consisted of the anticipated responsiveness of the users to the programs, the presence of any NGO that will participate in implementation, the status of development, the size of the landless poor group which is the main target segment of the population, and the degree of economic backwardness.

5.2 Beneficiaries

The direct beneficiaries benefitting from the Strategic Investment Plan are rural people receiving services provided by the Plan. Table 13 shows the *accumulated incremental* rural population covered by the Plan's water supply component, and the resulting *total* rural population coverage percentages. As rehabilitation of existing schemes is undertaken chiefly in the 7th Five-Year Plan, the rate of new coverage will attain a high level of 3.7 million of people per year during 1990-1993. Implementation will be shifted from rehabilitation of existing schemes to construction of new schemes in the 8th Five-Year Plan, resulting in a slower rate of new coverage of 2.5 million people per year during 1993-1998. It is estimated that, by the end of the 8th Five-Year Plan period (1998), an additional population of some 23.5 million will be serviced by the Strategic Investment Plan, bringing to a total of 62 million of the rural population having water supplies with reasonable quality, quantity and convenience.

Other beneficiaries will be sector institutions whose capabilities will either be expanded in fields of expertise such as hydrogeology, water resources management, and monitoring & evaluation, or strengthened particularly in software activities such as community management, cost recovery, and sector management information systems. With such enhanced capabilities at various institutions from the village to Provincial level, high levels of spin-off development within and outside the sector is expected.

**Table 13 : Water Supply Coverage by the Investment Plans
(population in '000)**

Region	Total % rural population covered in 1993	Accumulated incremental pop. covered 1990-1993	Total % rural population covered in 1998	Accumulated incremental pop. covered 1993-1998
AJK	59	296	75	778
NA	42	265	78	659
Balochistan	50	1,534	72	3,165
NWFP	70	3,322	80	5,852
Punjab	48	4,363	57	7,551
Sindh	70	1,351	88	5,460
	----	-----	----	-----
Rural nationwide	58	11,131	69	23,465

5.3 Policy Implications for Government

Various policy implications as the result of applying the Investment Plans strategy have been discussed in Section 4. Others are presented below.

5.3.1 Funding Allocation

Allocation to Districts. In the Strategic Provincial Investment Plans, it is suggested that investment emphasize those Districts having greatest needs. Therefore, the Plans have devised fund slicing schemes which deviate somewhat from existing practices. For example, assessment methodologies have been developed for ranking Districts needs for water supply in Punjab and Sindh. In place of the present LGRDD funding allocation to Districts in AJK in proportion to population, the AJK Investment Plan proposes that two-thirds of the funds continue to be allocated this way and one-third be reserved for the three Districts with least coverage. This is sufficient to eliminate major disparities in coverage by the end of the 8th Five-Year Plan. Equity considerations have also been incorporated into the Investment Plans of other regions.

Allocation to Components. The allocation slicing among components has also been modified to give more attention to drainage and excreta disposal needs. For instance, in NWFP the investment of the present program is 97% to water supply and 3% to drainage and excreta disposal. The NWFP Investment Plan suggests 80% to water supply, 15% to drainage and 5% to excreta disposal.

5.3.2 Scheme Approval Procedures

The general principle is to develop 'bottom-up' processes for communities to request and acquire a water or drainage scheme. To facilitate O&M cost recovery and to enhance the opportunity for long-term system sustainability at the village level, the basic criteria on which the village is initially considered is a genuine desire within the community for a new scheme, and a commitment to revenue collection and O&M responsibilities. The community itself should take initiatives in identifying the scheme, with technical and financial assistance from the Government. This will include strengthening/use of existing community-based organizations or the creation of new ones such as Village Water Committees in Punjab or User Groups in NA. In some areas, the community will be required to put up a substantial deposit before detailed design and construction starts. This is to ensure the sincerity of the community regarding their O&M responsibility.

Community commitment is secured by agreements or contracts signed between the community and the implementing agency. These agreements would specify the delegation of responsibilities in financing, revenue collection, and O&M including rehabilitation and repairs.

To provide rational frameworks for village selection, it is proposed to prepare District Water Plans in AJK, Sindh and Balochistan whose total annual allocation, approximate number of beneficiaries and number of schemes are consistent with the allocations given in the respective Strategic Investment Plans. Within this framework, a set of selection criteria will allow villages to be prioritized.

6. Financing

6.1 Capital Cost Financing

AJK. There will be three main sources of capital funds for the sector in AJK:

- ADP through LGRDD, which is expected to remain constant in real terms;
- UNICEF fund, which is assumed to remain constant in real terms to the end of 1992/93; and
- communities, which are assumed to provide 30-40% above the Plan costs which are those to be financed by government or external agencies.

The average annual investment would be Rs 41.1 million during 1990-93 and Rs 33.1 million during 1993-98; the latter is lower due the phasing out of UNICEF assistance. It is expected that only modest amounts (if any at all) of the PWP fund will be spent in this sector and, therefore, it is not taken into consideration.

NA. Projected resources for the entire Investment Plan period are (in constant prices 1989):

• ADP through PWD and LBRDD	Rs 72.0 million
• SDP and PWP	Rs 24.0 million
• UNICEF	Rs 8.0 million
• Community financing	Rs 26.3 million
Total	Rs 130.3 million

Balochistan. Financing sources include:

- ADP, which is anticipated to increase at a real rate of 2% per year and totals between Rs 2,600 to 2,640 million during the Investment Plan period;
- SDP, which could be increased in the future; and
- communities, which are expected to provide land and possibly skilled labor on a self-help basis.

NWFP. The following financing sources are expected (in constant 1989 prices):

ADP	1,217.6
PWP	240.0
Existing donor agencies	136.6
Total	1,594.2

Punjab. Expected available resources are:

- ADP at constant rate of Rs 940 million/yr, totalling Rs 7,520.0 million over the Investment Plan period;
- communities, which contribute land for water schemes, pay for house connections and provide rough grading for drainage schemes; and
- existing donors.

Sindh. The four main sources of capital funds (in real terms) are:

- ADP through PHED, SAZDA and RDD, expected to remain constant at real terms of Rs 245.9 million/yr;
- PWP, suggested to be Rs 53.6 million/yr over the Investment Plan period;
- District and Union Councils' programs, expected to remain constant at real terms of Rs 25 million/yr; and
- beneficiary communities, which are expected to provide land and unskilled labor.

Total resources amount to Rs 324.5 million/year, or Rs 2,596 million during the Investment Plan period.

6.2 Cost Recovery

Water tariff collection by local organizations such as Village Development Organizations in NWFP and Water Committees and/or Union Councils in Punjab is proposed. In Sindh, it is expected that ultimately the users will bear the full cost of O&M of their schemes which include normal running costs (such as electricity, salaries and minor repairs), major repairs and rehabilitation, and extensions to the schemes. Initially the intent will be to recover at least the normal running costs. It is also proposed for Sindh to recover the O&M costs of mechanized water supplies and drainage systems through a surcharge collected by the Revenue Department, and the O&M costs of small village schemes through direct collection of water fees.

It is suggested to increase the water tariffs in Balochistan from Rs 20 to Rs 30 per household per month in view of inflation of fuel prices and operating salaries and of willingness to pay. It is recommended that the size of the matching grant fund in AJK be increased and its use encouraged due to its cost-effectiveness with respect to public funds.

For AJK, the capital cost estimates assume that communities will continue to provide inputs amounting to 30-40% above the costs presented in this Investment Plan.

The method of monthly revenue collection by Provincial agencies from households with yard/house connection is often inefficient. It should be replaced by community financing by which water charges are collected and managed within the community. Such a system has been operating in AJK and NA, and has been recommended for NWFP and new schemes constructed by PHED and LGRDD in Balochistan.

6.3 Donor Assistance Requirements

There are four main reasons to involve donors in the Strategic Investment Plans.

- (1) Large financial resource gaps have been identified in the Investment Plans. Part or all of this gap could be made up by external assistance.
- (2) There are human resource and institutional constraints that must be resolved if effective implementation of the Investment Plans is to be possible. The donors can play a major role in satisfying these needs.
- (3) External donors help introduce new concepts and technologies that are appropriate to sector development. For instance, UNICEF has successfully introduced the concept of component integration into several areas. New technologies and implementation methods, such as village-level operated and maintained (VLOM) handpumps developed by World Bank/UNDP, are highly relevant to rural water supply in Pakistan.
- (4) Line departments and other agencies involved in the sector are often poorly coordinated. Donor agencies have the ability to encourage better cooperation and thereby promote a more integrated approach to sector development.

Potential donor involvements in the Provincial Investment Plans have been identified. They consist of:

- Technical assistance to Government agencies for enhancing existing capabilities and creating new ones, such as community relations, monitoring and evaluation, and information management systems.
- Human resources development through on-the-job training, workshops, seminars, or short training courses to enhance the technical and managerial capacity of staff (both at the central and District levels).
- Provision of expertise and material to develop community capabilities in project methodology (planning, administration and evaluation), financial management, and public administration.
- Provision of equipment and expertise necessary for training, office automation, water resource planning, water quality monitoring, hydrogeological investigations and inventory, and sector database development.
- Provision of financing for water supply, sanitation and drainage infrastructure.

It is anticipated that most of the bilateral donor inputs in the first 2 or 3 years will be focused on software components: human resources development, institutional strengthening, and community management. Only later will the focus be shifted to hardware component implementation once local capabilities have been built up and the Investment Plans gain momentum.

6.4 Donor Project Proposals

6.4.1 Donor Project Proposals for AJK

The resource gaps in AJK have been identified at Rs 82.5 million in 7th Five-Year Plan period and Rs 190.6 million in 8th Five-Year Plan period, totally Rs 273.1 million during the Investment Plan period (all in 1989 prices).

A new donor assistance of Rs 273.1 million in 1989 prices is proposed to meet the full resource gap. 73% of this amount will be used for hardware and the rest for software. Most of new donor funding during the 7th Five-Year Plan period would finance strengthening of the institutions implementing the Plan mainly through technical assistance and vehicles and, to a lesser degree, a hygiene education capability, a monitoring and evaluation unit, and a water resources study.

During the 8th Five-Year Plan, the overwhelming proportion of external funding will be utilized for increasing coverage. There will be no further foreign technical assistance and a gradual phasing out of the institutional strengthening activities.

6.4.2 Donor Project Proposals for NA

The recommended new donor investment for the Strategic Investment Plan in NA is Rs 233.3 million in constant 1989 prices, and consists of:

- water supply schemes	Rs 155.5 million
- sanitation	Rs 1.2 million
- water control & testing	Rs 2.0 million
- human resources development	Rs 3.3 million
- hygiene education	Rs 1.3 million
- institutional strengthening	Rs 70.0 million
- revolving credit	Rs 9.2 million

6.4.3 Donor Project Proposals for Balochistan

In Balochistan, the World Bank and the Government of the Netherlands have indicated interest in considering support to the sector.

The World Bank. The World Bank is considering assistance in two areas: support to PHED and support to water resources development and conservation. The level of investment is US\$ 10 to 12 million (Rs 200 to 240 million) during the 8-year Investment Plan period. The proposed allocations to components in constant prices are:

- 42% for institutional aid;
- 22% for water supply schemes (new and rehabilitated);
- 28% for water resources development; and
- 8% for small delay-action dams implemented by LGRDD.

Government of the Netherlands. The Government of the Netherlands has expressed interest in:

- strengthening the coordinating role of the Steering Committee;
- support to line departments (LGRDD, PHED, and Health);
- strengthening District Council capabilities;
- hygiene education;
- implementation of small village water supplies and low-cost sanitation schemes in selected Districts; and
- pilot projects involving piped water supplies and drainage.

The total investment would be between US\$ 4 to 6 million (Rs 80 to 120 million) for the first 4 years. In addition, assistance to the Rural Development Academy of approximately US\$ 1.7 million (Rs 34 million) is being considered. An additional assistance in the next 4 years is possible, bringing the total investment to Rs 175 million. The proposed share by component over the entire Investment Plan period in constant prices is:

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

6.4.4 Donor Project Proposals for NWFP

Three donors have indicated they would consider assisting sector development in NWFP: the Government of Netherlands, KfW and GTZ. Therefore, three donor projects are proposed. In each of these projects, it is suggested that the donors finance 80% of the initiative including all of the foreign exchange costs, and the remaining 20% be financed through the ADP.

The three proposed projects, costing a total of Rs 177.9 million, are summarized below.

Netherlands Project: This project consists of strengthening of the P&D; institutional strengthening and human resources development in LGRDD, and a slice of the Dir District Investment Plan. The cost up to the end of 1997/98 fiscal year is Rs 93.6 million in constant 1989 prices.

KfW Project: This project constitutes a slice of the Investment Plan being proposed for Swat and Kohistan. These two Districts have low coverage levels at present and, as a result, the recommended investments are high. The project cost is Rs 23.4 million in constant 1989 prices.

GTZ Project: This project is made up of the institutional and human resource development for PHED and a hygiene education initiative. The project cost is Rs 60.9 million in constant 1989 prices.

6.4.5 Donor Project Proposals for Punjab

Donor assistance of Rs 2,000 million over 8 years, from 1991-92 through 1997-98, is proposed to fill the resource gap. The donor project will be staged in 2 phases of Rs 1,000 million each, each phase will last 4 years with one-year overlap. The total amount of Rs 2,000 million is broken down into:

- Rs 792 million for new water schemes;
- Rs 681 million for new drainage schemes;
- Rs 70 million for rehabilitation and extension of existing schemes; and
- Rs 457 million for key institutional development, human resource development and hygiene education.

6.4.6 Donor Project Proposals for Sindh

The overall resource gap of Rs 1,674 million (in 1989 prices) will be met by donor contributions. Two projects are proposed as follows.

Project A: This project will concentrate on piped water supply implemented through the PHED with minor allocations through the Rural Development Department and SAZDA. The total investment for this project is civil works are estimated to consume nearly 81% of the investment. Technical assistance will require 14%. This project is being considered for World Bank support.

Project B: This project will concentrate on small village water supplies in Districts of Thatta, Badin and Hyderabad through the Rural Development Department and Local Government Department. This project is being considered for CDA support.