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Literature Review
Drinking Water, Sanitation and Hygiene Knowledge, Attitudes, and Practices
Khyber Pakhtunkhwa Province and Peshawar City, Pakistan

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PAKISTAN SAFE DRINKING WATER AND HYGIENE PROMOTION PROJECT

Literature Review
Drinking Water, Sanitation and Hygiene Knowledge, Attitudes, and Practices
Khyber Pakhtunkhwa Province and Peshawar City, Pakistan

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List of Acronyms

ADB	Asian Development Bank
BCC	Behavior Change Communication
BoS	Bureau of Statistics, GoNWFP
CBOs	Community Based organizations
CCBs	Citizens Community Boards
COs	Community Organizations
CDMD	City District Municipal Department
CDWA	Clean Drinking Water for All
CDWI	Clean Drinking Water Initiative
CRISP	Community Rehabilitation Infrastructure Support Program
DFID	Department for International Development
EC	European Commission
EIROP	Essential Institutional Reforms Operationalization Program
EPA	Environmental Protection Agency
FATA	Federally Administered Tribal Areas
FBS	Federal Bureau of Statistics
GDP	Gross Domestic product
GoNWFP	Government of Northwest Frontier Provinces
GOP	Government of Pakistan
HRD	Human resource Development
KAP	Knowledge, Attitudes and Practices
KPK	Khyber Pakhtunkhwa
KPP	Khushal Pakistan Program
LGE&RD	Local Government Elections and Rural Development Department
LGO	Local Government Ordinance (2001)
LGs	Local Governments
MGD	Million gallons per day
MICS	Multi Indicator Cluster Survey
MM	Million
NGOs	Non Governmental Organizations
NPIU	National Project Implementation Unit
NRSP	National Rural Support Program
NUST	National University of Science and Technology
NWFP	North West Frontier Province
O&M	Operations and Maintenance
PACOSAN	Pakistan Conference on Sanitation
PCRWR	Pakistan Council for Research in Water Resources
PDA	Peshawar Development Authority
PHED	Public Health Engineering Department
PKR	Pakistan Rupee
PPAF	Pakistan Poverty Alleviation Fund
PIHS	Pakistan Integrated Household survey
PTAs	Parent Teacher Associations
PSDW-HPP	Pakistan Safe Drinking Water and Hygiene Promotion Project

P&F	Planning and Finance department
RWSS	Rural Water Supply and Sanitation
RWSSP	Rural Water Supply and Sanitation Project
SAPP I	Social Action Program Project I
SAPP II	Second Social Action Program Project
SEC	Socio Economic Groups
SCs	School Committees
SMCs	School Management Committees
TMAs	Tehsil/Town Municipal Administration
ToRs	Terms of Reference
UC	Union Council
UNICEF	United Nations International Children Education Fund
USAID	United States Agency for International Development
VOs	Village Organizations
W&S	Water and Sanitation
WASAs	Water and Sanitation Authorities
WB	World Bank
WSP-SA	Water and Sanitation Program- South Asia
WOs	Women organizations
WHO	World Health Organization
WUA	Water User Association

Literature Review
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Khyber Pakhtunkhwa Province and Peshawar City, Pakistan

1. Background

Peshawar district is facing an acute water shortage caused by rapid population growth and a persistent drought that has caused ground water levels to drop rapidly. Peshawar depends on groundwater for all its supply, and many tube wells have gone dry in the last few years. The water supply and distribution system in the whole of Peshawar is characterized by many discrete distribution systems that are not interconnected.

Maintenance of the systems has been poor, but the reasons for this are not clear - it could be the town council was not prepared to take over from the Public Health Engineering Department (PHED) when authority was devolved to the local level in 2001. The Town Council might not have the skilled personnel necessary to operate an extensive pumping and distribution system, there might be inadequate revenue collections, or customers might not be paying their bills because they feel the service is totally inadequate. It could be a combination of all of these.

United States Agency for International Development (USAID) has undertaken an initiative to conduct an engineering and social feasibility study to improve the Peshawar Water Distribution System. The social survey is being conducted by Pakistan Safe Drinking Water and Hygiene Promotion Project (PSDW-HPP/Abt) while a concurrent engineering study is carried out by USAID's Community Rehabilitation Infrastructure Support Program (CRISP) contract. These studies will make recommendations to USAID, PHED and the Town Councils on the governance and public health issues related to improved water and sanitation service delivery in Peshawar.

While CRISP is conducting their literature review and Engineering feasibility study on water resource and distribution, Abt has carried out a literature search and review of existing reports/information on customer satisfaction with: water and sanitation services; water-related health disease prevalence; and drinking water, sanitation and hygiene knowledge, attitudes and behaviors in Peshawar. This data will be used along with the engineering review carried out by CRISP to identify critical areas for social and customer satisfaction and to target high priority neighborhoods for further detailed studies.

2. Purpose of Literature Review

This Literature Review was undertaken to provide a depiction of current conditions with regard to water and sanitation knowledge, attitudes and practices in Peshawar City, Pakistan in order to inform and maximize the effect of possible future investments in the institutions and infrastructure of this sector. In accordance with the Terms of Reference (ToRs), (Appendix A), Abt Associates, Inc. conducted a literature search on customer satisfaction with water and sanitation services, water-related health disease prevalence, and drinking water, sanitation and hygiene knowledge, attitudes and practices. The literature review was based on sources within Pakistan, previously published reports from Abt Associates, Inc., searches on the Internet, and other information resources. As expected, it is difficult to obtain relevant data specific to Peshawar City, but there is a significant amount of work that has been done by the Government of Pakistan, non-governmental organizations (NGOs), and others focusing on the North West Frontier Provinces (NWFP), now known as Khyber Pakhtunkhwa (KPK). It is assumed that much of this information is relevant to Peshawar City, with caveats noted within the report. Wherever possible, regional reports have been supplemented by Peshawar-specific data and information.

The report first gives an overview of the Water and Sanitation sector in Pakistan, followed by more specific information on Khyber Pakhtunkhwa province. Next, the available information specific to Peshawar is presented, including a description of the sources of water, current system and administrative problems, and figures on improved water access. District data is presented in tables with the KPK (NWFP) data highlighted for ease of comparison. A history of past interventions and a description of the outcomes are provided in the literature review.

The following sources/ organizations were consulted to collect data and information;

Sources/ Organization:

1. Internet
2. PSDW-HPP records/ studies/ Reports
3. Abt Headquarters
4. WSP-SA World Bank Consultations
5. UNICEF, Pakistan
6. Peshawar Development Authority
7. Planning and Development Department, GKPK
8. Local Government and Rural Development Department, GKPK
9. Public Health Engineering Department, GKPK
10. Bureau of Statistics, GKPK
11. Administration Town-1, Peshawar

3. General Overview of Water and Sanitation Sector

Water supply and sanitation services in Pakistan have several shortcomings and challenges. The overall access to improved drinking water sources in Pakistan is estimated at 95% in urban and 87% in rural areas. Access to improved sanitation facilities is estimated at 72% urban and 29% rural (WHO/UNICEF JMP, 2010). Huge disparities exist with regard to the urban-rural areas as well as within the provinces-regions. The quality of services is extremely poor, and data from Multi-Indicator Cluster Surveys (MICS) suggest that half of the latrines in the country may be unsanitary. Inadequate water supply, sanitation and hygiene services result in high incidence of water and sanitation-related diseases, which in turn increase morbidity and mortality rates and pose a major threat to the survival and development of Pakistani children. It has been estimated that water, sanitation and hygiene-related diseases cost the Pakistan economy about PKR 112 billion per year or over PKR 300 million each day in terms of health care costs and lost earnings. Out of this, the cost associated with diarrheal diseases alone is estimated to be around 55-80 billion per year. The systems for wastewater disposal and solid waste management are inadequate, mostly serving as transfer rather than treatment systems. Presently only 50% of the urban solid waste is collected, of which only a fraction is disposed of in an environmentally safe manner. Similarly it is estimated that only 50% of wastewater is collected and of that only 10% is effectively treated (PACOSAN, 2009).

The sector faces major challenges concerning the quality of services. These problems are partly a result of the previous focus on irrigation, which prevailed in the Pakistani water policy for decades. This has now changed, at least since the Medium Term Development Framework 2005-2010 was passed. The framework provided for about US$404 million per year for water supply and sanitation, and was accompanied by several policy documents with the objective to notably improve water and sanitation coverage and quality.

4. Water and Sanitation in Khyber Pakhtunkhwa

This chapter presents the knowledge that was gained about water and sanitation knowledge, attitudes, and practices in the Khyber Pakhtunkhwa region, in Peshawar District, and in Peshawar City. Much of the information, including tables in this chapter is derived from two USAID Pakistan Safe Drinking Water and Hygiene Promotion Project (PSDW-HPP) studies, the 2008 Baseline Report and the 2007 Assessment of CDWI Filtration Plants. The 2008 Baseline study was a survey of about 4,000 households in two sample groups (SG-1 and SG-2) that had children between the ages of 0-59 months and that belonged to lower socio-economic classes C, D and E as described below. The aim of the study on Assessment of CDWI Filtration Plants was to: assess the status of the program's filtration plants as to whether the plants were complete; determine if they were currently operational, and whether ownership and maintenance had been assumed by any responsible agency; to check water quality for bacteriological contamination at the source and plant effluent; and to assess community knowledge and trends in attitude towards hygiene and sanitation.

The CDWI study assessed the condition of each of the plants initiated under the program. The Baseline Report used a sampling procedure as detailed below.

4.1. Baseline Study Sampling Procedure

Urban and rural households (as defined by the Government of Pakistan) were each classified into five socio-economic classes (SEC). The urban households were differentiated on the basis of education and occupation of the chief wage earner, while the rural households were classified based on the physical structure of the house and education of the head of the household. The urban households were classified based on 11 occupational categories and five education categories. For the rural households the classification scheme included four types of houses (pukka upper, pukka lower, semi-pukka and kaccha) and seven levels of education ranging from illiterate to post graduation (illiterate, up to primary –less than 5 years, 6-9 years of school, matriculated -10 years, intermediate -12 years, graduate, post graduate).[1] The five SEC categories range from the highest educational level and occupational status (A) to the lowest (E), See Appendix C for more detail. For more information, see Appendix C.

[1] Kuccha means houses that are not very permanent and are made of mud or similar materials. Pukka, means permanent houses made of concrete, bricks or other materials.

Table 1: Sample Socio-economic Breakdown

Province Name	Socio Economic Class			
	C	D	E	Total
NWFP	43%	20%	36%	561
All districts	38%	27%	35%	3,934

Data source: 2008 PSDW Baseline Survey

4.2. Access to Safe Drinking Water

Two of the important factors that can affect health outcomes in children are access to safe drinking water, and handling or treatment of drinking water at home. In KPK. water usage and availability are often dependent on the affluence and influence of the service population. Some areas and populations have no access to safe water, and some of those that do have access, overuse the resource for unintended purposes, such as irrigation and gardening.[2] Those with political connections, or who are able to afford to pay for extra or special service have better access to safe drinking water

The aggregated baseline data for all districts show that 75% of the households responded that the main source of drinking water was inside the house/compound (Table 2). However, the baseline study did not include the Peshawar District of KPK. Peshawar District is in the Northern part of KPK, whereas the Federal Bureau of Statistics (FBS) reports look at the entire Northern, Central and Southern areas. The Baseline Survey was conducted in Buner, Battagram, Mansehra and Upper Dir in KPK, and it must be noted that all of these districts have very different population density and topography than Peshawar. Most water service in these districts is from gravity water systems and community managed wells, as compared to Peshawar, where municipal pressurized household service is more the norm.

According to the trends reported from successive Federal Bureau of Statistic Surveys (FBS), 71% of the population of KPK (91% of the urban population and 64% of the rural population) have access to an improved water source. According to the Pakistan Demographic and Health Survey, 2006-07, 90.8% of the Pakistani population have access

[2] Integrating Technical and Socio-Cultural Approaches for Improved Sanitation and Access to Safe Water in the North West Frontier Province, Pakistan, Bahadar Nawab and Kjell B. Esser, Journal of Applied Sciences in Environmental Sanitation, Vol. 3, No. 3, pp 191-203, September-December, 2008

within a half hour (round trip) of the household.[3] Rural areas typically receive intermittent supplies of up to 15 gallons per capita per day which is spread over two 4 hour supply periods. In comparison the supply standards in urban centres are slightly better, with water supplies of up to 30 gallons per capita per day reported in some areas.[4]

Table 2: Main Source of Drinking Water

Province Name	Inside House*	Outside House	Total
NWFP	75%	25%	561
All Districts	75%	25%	3,934

Data source: 2008 PSDW Baseline Survey

***Inside [the compound of the] house:** Many houses have private (personal property and not Municipal supply) boreholes inside their compound. A borehole is like a tube-well except that it provides for the needs of a single house only, therefore its bore size (pipe) is usually smaller 3"- 4" (compared to 8" or 10" for tube-wells). It is shallower than the tube-well and has smaller size pump. Its design life is variable depending upon the conditions under which it is installed. A tube-well supplies water to a large area (sometimes an entire village) and has a design life of 20+ years. A tube well is generally 200-300 feet deeper that a bore-hole).

Despite large public sector investments, there is a very high reliance on self developed water systems including a combination of hand pumps, dug wells and tube wells, most of which are totally unregulated. The situation in southern KPK and some other parts of the province is particularly grave, because ground water aquifers are either quite deep (exceeding 500 ft) or the available water is brackish and therefore unfit for drinking. As a result there is a high reliance on unsafe sources including ponds, unprotected springs and/or local streams which are open to contamination.[5]

Table 3 provides a breakdown of the types of water sources that are found within the compound of the house. It shows, among other things, that even within the KPK province there are large differences in water sources, and in the safety of the water supply. Table 4 on page 9 breaks down the source and type of water found in households where the supply point is outside the compound of the house.

[3] Pakistan Demographic and Health Survey, 2006-7, National Institute of Population Studies, Islamabad, Pakistan (Macro International Inc., Calverton, MD)
[4] Assessment of NWFP Drinking water supply sector, KPK Public Health Engineering Department & Reforms Management Group on Policy & Coordination, KPK Provincial Reforms Program, January 2010
[5] Ibid

Table 3: Type of source inside the compound of the house*

Province Name	Tap	Tubewell/Boring	Protected Dug well	Total Improved Sources	Unprotected Dug well	Total Inside House
	Improved Sources				Unsafe Sources	
NWFP	49%	13%	12%	74%	2%	561
All Districts	46%	24%	4%	74%	1%	3,934

Data source: 2008 PSDW Baseline Survey

***Notes on sampling in Tables 3 and 4:** For these data, there were two districts that could not be surveyed because of military operations in the area. The result was that 561/646 (87%) of the households were interviewed.

4.3. Water Quality

Pakistan Council for Research in Water Resources (PCRWR) conducts water quality testing across the country and tested water samples from 23 major cities, including Peshawar. The results of the 4th survey indicated that 92% of the water samples collected from Peshawar were contaminated. Neither bacterial nor arsenical contamination can always be detected by color, clarity, or smell of the water, and contamination may therefore not be recognized by appearance (see section 4.7.3). While arsenic in groundwater is a serious problem in Punjab and other places in Pakistan, it is not particularly a problem in Peshawar.

There is a high reliance on ground water which may be safe and pass testing at the source, but it is then pumped to storage reservoirs or directly into piped networks. A very large number of the urban water supply systems are running parallel to open sewage disposal systems and are therefore vulnerable to serious contamination. In a country where it is common to have electricity black or brown-outs and leaky distribution systems, potable water systems often lose pressurization, and are subject to contamination by diffusion from nearby sources.

Further, the handling practices for water once it arrives at the end user often results in contamination There is a need to not only treat and ensure clean water at the source, but also an equal need to ensure that the water remains safe as it travels through distribution

systems and indeed as it is used in the home.[6] Tables 5-9 provide additional information about the types of treatment and storage practices that are used, with comparisons between the samples from all provinces and those from KPK.

The clear indication in Table 5 is that the large majority of households do not use treated water, and that, especially given the water quality results from PCRWR, the water is therefore often unsafe to drink.

A principal observation from Table 6 on page 10 is that there are a significant amount of households that do not have water storage. This may result in an excessive amount of time spent in water collection and transportation to the household. While roof and cistern systems may indicate some sort of automated collection process, other container systems, or a lack thereof may be more labor intensive.

Table 7 provides the distribution of the households by the types of water cover used among the households that store drinking water in containers. In KPK, approximately 83% of the households that used containers to store drinking water reported using hard covers on all their water containers. Only 1% of the households in KPK that store water in containers inside the house reported using no covers. Note: The total number of households with containers is less than that reported in Table 6 because there was missing data for 165 households on the covers used.

Raised or refrigerated storage may decrease the likelihood or severity of contamination of water during storage, as access to the water by disease vectors is limited, and lower temperatures may inhibit propagation of pathogenic microbes. The proportion of refrigerated storage found both in KPK and all provinces is shown in Table 8.

Similarly, raised or refrigerated storage with covers may further decrease the likelihood of contamination because access by disease vectors such as vermin and disease-carrying insects will be further limited. Data on use of raised or refrigerated storage of drinking water is shown below in Table 9.

[6] Assessment of KPK Drinking water supply sector, KPK Public Health Engineering Department & Reforms Management Group on Policy & Coordination, KPK Provincial Reforms Program, January 2010

Table 4: Type of source outside the house*

Province Name	Tap	Tube Well	Protected Well/Spring	Rain water	Tanker Truck	Filtration Plant	Total Improved Sources	Unprotected Spring/well	Surface Water	Total Unsafe Sources	Other	Total Outside House
	Improved Sources							Unsafe Sources				
NWFP	6%	2%	6%	1%	3%	6%	0%	0%	0%	2%	25%	561
All Districts	5%	3%	2%	1%	3%	4%	0%	3%	1%	3%	25%	3,934
Data source: 2008 PSDW Baseline Survey												

*See note on page 7

Table 5: Water treatment methods

Province Name	Boil	Bleach	Tablets	Sachet	Solar	Packet	Total-Safe Treatment	Ceramic Filter	Cloth	Alm	No Treatment	Total -Unsafe Treatment	Total
	Safe Treatment							Unsafe/No Treatment					
NWFP	4.1%	0.4%	0.0%	0.0%	0.0%	0.0%	4.5%	0.0%	0.4%	0.0%	95.2%	95.5%	561
All Districts	4.9%	0.2%	0.1%	0.4%	0.0%	0.1%	5.7%	0.1%	4.3%	1.3%	88.7%	94.3%	3,934
Data source: 2008 PSDW Baseline Survey													

Table 6: Type of Storage

Province Name	Containers	Roof/Cistern	No Storage	Total
NWFP	76%	15%	9%	561
All Districts	69%	16%	15%	3,934
Data source: 2008 PSDW Baseline Survey				

Table 7: Type of cover on water storage containers

Province Name	All Hard	Some Hard	Soft	Total
NWFP	83%	13%	3%	419
All Districts	60%	36%	4%	2,540
Note: The total number of households with containers is less than that reported in Table 6 because there was missing data for 165 households on the covers used.				
Data source: 2008 PSDW Baseline Survey				

Table 8: Raised or refrigerated storage

Province Name	Not Raised (%)	Raised/Fridge	Total
NWFP	24%	76%	419
All Districts	27%	73%	2,541
Data source: 2008 PSDW Baseline Survey			

Table 9: Raised or refrigerated storage with covers

Province Name	Raised/Fridge and Covered	Total
NWFP	74%	419
All Districts	72%	2,540
Data source: 2008 PSDW Baseline Survey		

4.4. Water Borne Diseases

The mortality rate In Pakistan for children under five years is 89 deaths per 1,000 children.[7] Water and sanitation-related diseases are responsible for 11% of total child mortality cases[8], with diarrheal diseases killing close to 100,000 children under the age of five every year (UNICEF, 2006). Diarrhea is the disease most commonly associated with water and sanitation; related hygiene practices also have direct correlations to pneumonia and other acute respiratory infections for both children and adults in Pakistan. Diarrhea caused by consumption of water contaminated with fecal bacteria is a significant cause of malnutrition, which can affect the overall health of a child. According to UNICEF, 40% of hospital beds in Pakistan are occupied by patients with waterborne diseases (Pak-SCEA 2006).

Awareness of community members regarding spread of diseases due to drinking unsafe water is encouraging. They have listed diarrhea (53.5%) as the number one disease caused by contaminated water (especially for children), followed by hepatitis (12.6%) and stomach problems (10.2%). Their beliefs about the causes of diarrhea are mostly accurate, as shown in Table 10.

Table 10: Beliefs about causes of diarrhea

Province Name	Dirty Water	Germs/ bacteria	Unclean hands	All three
NWFP	32%	14%	32%	4%
All Districts	39%	23%	29%	6%
Data source: 2008 PSDW Baseline Survey				

4.5. Sanitation

A lack of understanding of faecal-oral routes of contamination is a primary factor in poor sanitation practices. Open defecation is still practiced, and among some of the population is considered culturally correct. Other methods of human waste management include pit disposal, and flush latrines directed to open channels in the street. Attitudes range from pride in owning a flush latrine, to disapproval of same as contrary to cultural norms. Maintenance of latrines is deficient, and they become health hazards themselves. Together, these practices pose a range of health and environmental hazards, from direct and indirect

[7] http://www.unicef.org/infobycountry/pakistan_pakistan_statistics.html, accessed 07/25/10
[8] Demographic and Health Survey 2006-07

contamination of food, to contamination of groundwater used for drinking and other purposes.[9]

Many Pakistani consider water to be a gift from Allah, and hold the government responsible for its free provision. They expect all basic services including water and sanitation to be provided by the government and usually accept no responsibility for them. Rural people are usually poorly educated and relatively insular, and so less likely to embrace innovation in the form of modern technology in sanitation when compared to their urban counterparts.[10]

Table 11 below presents the data obtained in the 2008 PSDW Baseline Study about sanitation practices in KPK, and a summary for all the provinces surveyed.

Table 11: Type of toilet facilities

Province Name	Flush System	Pit Latrine	Cover or Bury	Open Defecation	Traditional Toilet (sit-down, flush)	Total
NWFP	83%	2%	0%	5%	9%	561
All Districts	71%	10%	1%	8%	11%	3,934
Data source: 2008 PSDW Baseline Survey						

Because of this combination of technical and cultural obstacles to good sanitation practices, there is a need to combine socio-cultural and innovative engineering approaches to improving practices.[11] For example, on the socio-cultural level, much of the KPK population are more willing to listen to and follow religious scholars and imams than NGOs and government campaigners. Mosques and Hujras are important institutions in behaviour change among the population of KPK, but it is not clear if this is an appropriate or acceptable form of intervention.

4.6. Management

Although CRISP will be reporting on the Governance and Management aspect of water and sanitation in Peshawar in detail, some of the major issues encountered in the literature search follow. Key water system management factors include numerous illegal connections that typically outnumber legal connections by a large margin; weak coverage or the virtual

[9] Integrating Technical and Socio-Cultural Approaches for Improved Sanitation and Access to Safe Water in the North West Frontier Province, Pakistan, Bahadar Nawab and Kjell B. Esser, Journal of Applied Sciences in Environmental Sanitation, Vol. 3, No. 3, pp 191-203, September-December, 2008

[10] Ibid

[11] Ibid

absence of collection systems, staff, procedures, etc.; lack of enforcement authorities and the needed staff to check illegal users; and major leakages due to inadequate O&M. [12]

Various studies (3, 10) and field evidence confirm that investment in maintenance, especially preventive maintenance, is a low priority. In addition, institutional culture allows that "fire fighting" is a norm, rather than practicing a system of preventive maintenance. This is a challenge that can only be addressed by improved management and planning.[13]

4.7. Knowledge, Attitudes, and Practices

4.7.1. Public Awareness Of Health, Hygiene, and Environmental Sanitation

Various knowledge, attitudes, and practices surveys (KAP) indicate that public awareness on health, hygiene and environmental sanitation is generally low. This not only contributes to a poor *demand* for quality services but may also be responsible for the high incidence of water borne diseases prevalent in KPK. On the part of service providers, there is a limited appreciation for the importance of public awareness on municipal issues as they relate to health and hygiene. This is reflected in the composition of staff, as well as the institutional cultures of the key service providers who are currently not geared for public outreach. They have limited or no staff to effectively plan and manage this function, and therefore do not allocate budgets for such activities on annual basis. The Local Government Ordinance (LGO) provides for contracting work to the private sector to assist the TMAs in plugging critical capacity gaps such as behaviour change facilitation, but these mechanisms have seen limited use.[14]

Some people in KPK feel that government decisions are bureaucratic and politically influenced, rather than need-based. In addition, there are conflicts and misunderstandings between the Government of Pakistan (GOP) mandated (2002) Tehsil/Town Municipal Administration (TMAs) and the Public Health Engineering Department that existed prior to the GOP devolution plan. These factors often deter the community from participating in the government's water supply and sanitation projects.

4.7.2. Knowledge and Use of Installed Filtration Plants

Table 12 below provides tabulated data on the knowledge about the existence and use by potential beneficiaries of public water filtration systems both in KPK, and aggregated for all districts. It was concluded that generally, there is lack of awareness within the communities about the operational status of existing water filtration plants, the quality of

[12] Assessment of NWFP Drinking water supply sector, NWFP Public Health Engineering Department & Reforms Management Group on Policy & Coordination, NWFP Provincial Reforms Program, January 2010
[13] Ibid
[14] Ibid

water it could produce, and the government efforts to give the beneficiaries clean drinking water. As mentioned, there is also a feeling of mistrust and disbelief between the people and the government, as the unfortunate history is that the people are uninformed and uninvolved in decision-making related to site selection, construction, installation, operations and management of these filtration plants.

By 2007, under the CDWI, only twelve plants were installed in Khyber Pakhtunkhwa. Out of the installed plants, only one was functional and the rest have not been started up due to variety of reasons.[15]

Table 12: Knowledge and use of filtration system

Province Name	Households who knew of Water Filtration System				Households who say there is no water filtration system	Households that don't know whether or not there is a filtration system	Total
	Households who know of a water filtration system (%)	Households who know of a water filtration system (Number)	Of those who knew, Percent who used the filtration system	Of those who knew, percent who used filtration system in last two weeks			
NWFP	8%	46	7%	1%	56%	36%	561
All Districts	11%	452	21%	2%	50%	39%	3,934

4.7.3. Perceptions about Quality of Water

This section discusses community attitudes and perception about water quality. It is alarming to note in Table 13 that despite the findings of poor water quality prevalence presented in Section 4.3. a majority of the population sampled believe that the quality of drinking water is good, and may, therefore, see no need to take preventative measures such as filtration or boiling.

[15] Assessment of CDWI Filtration Plants by PSDW-HPP, 2007

Table 13: Community perception of water quality

Province/Region	Perception of the Quality of Drinking Water	
	Good	Bad
NWFP	68%	32%
All Provinces	55%	45.00%
Note: Total Sample Size = 249		
Data Source: Assessment of CDWI Filtration Plants by PSDW-HPP, 2007		

A large percentage (80%) of households in KPK believe that clear water that does not smell is safe to drink. Table 14 provides data about perceptions regarding the relationship between aesthetics vs. water quality. Given the prevalence of arsenic and pathogenic contamination not visible to the naked eye, the perceptions are again alarming.

Table 14: Belief about clear, odor-free water

Province Name	Do you agree or disagree that water which is clear and has no smell is safe to drink?			
	Yes (Clear is safe)	No	Don't Know	Total
NWFP	80%	15%	4%	561
All Districts	71%	23%	6%	1,937
Data source: 2008 PSDW Baseline Survey				

4.7.4. Hand Washing Practice

The following are results from the 2008 Baseline Study:

Table 15 presents the percentage of households that report mothers or caretakers washing hands with soap at four critical times: (1) after washing child's bottom, (2) after defecating, (3) before feeding child and (4) before eating. The results indicate that approximately 65% of the mothers/caretakers in KPK report washing hands with soap after washing child's bottom and 63% of the mothers/caretakers reported washing hands with soap after defecating. A relatively smaller percentage of mothers/caretakers reported washing their hands with soap before either feeding a child or eating: 47% of the mothers/caretakers reported washing hands with soap before feeding a child and only 32% of the mothers/caretakers reported washing hands with soap before feeding themselves. These low levels of hand washing with soap, especially prior to eating or feeding children demonstrate the potential for disease transmission through fecal-oral transmission. Table 16 presents more general information about hand washing related to a variety of activities.

Table 15: Handwashing at critical times

Province Name	Mother/caretakers washing hands with soap after cleaning child's bottom (%)	Mother/caretakers washing hands with soap after defecating (%)	Mother/caretakers washing hands with soap before feeding child (%)	Mother/care-takers washing hands with soap before eating (%)	Total
NWFP	65%	63%	47%	32%	561
All Districts	66%	71%	52%	45%	3,934

Data source: 2008 PSDW Baseline Survey

Table 16: Other Hand washing Behaviors

Handwashing Behaviors – All Districts	(%)	N
Washing hands after defecating	85	2,784
After washing child's bottom	80	2,620
Washing hands before preparing food	74	2,424
Washing hands before feeding child	62	2,031
Washing hands before eating	54	1,769
Due to dirty hand with dust	5	164
After playing	4	131
Hands were dirty	2	66
Due to dirty hand because of touching foods	1	33
After cleaning	1	33
When children came back from school	1	33
After washing utensils	1	33
After washing cloths	1	33
Base: All respondents who washed their or children's hands		*3,275*

4.7.5. Cost Recovery and Willingness to Pay

Peshawar district has seven to eight different agencies responsible for provision of drinking water in their respective jurisdictions. These are the Four Towns, a Public Health Engineering Department, University Town Committee, Cantonment Board and Peshawar Development Authority for Hayatabad Township. Each agency has devised its own system for revenue collection. A relatively recent (2008) performance benchmarking study by NWFP Essential Institutional Reform Operationalization Project (EIROP) for UNDP encompassing six TMAs in NWFP found that in water supply, cost recovery stands between 10-30 %.[16] This confirms that drinking water remains a highly subsidized service.

[16] Performance Benchmarking and Municipal Services Vision Development of Six TMAs of KPK, EIROP-UNDP-LGRDD, 2008

Pricing has been a major political issue for many decades. While successive provincial and local governments continue to highlight full cost recoveries as the state policy, practice has been out of sync with this policy objective. In addition, service provision is currently plagued by a variety of institutional inefficiencies-- all of which directly or indirectly contribute to the costs. The key factors include weak and/or the virtual absence of tariff policies and collection systems, (including staff and procedures), lack of enforcement authorities, and the needed skilled staff to ensure adequate O&M.

Some investigations from the different service providers revealed that in Hayatabad Township and University Town, water bills are issued on half year basis, and a tariff based on plot size is collected through banks. In other Towns (Town-1, 2, 3 and 4), the Local Administration has contracted out billing, and the contractors collect water charges from the general public at the rate of Rs. 720 per connection per six month period. The Hayatabad administration has a more elaborate system: for a Two Kanal Plot they bill consumers biannually at Rs. 266/mo. for Water Supply, Rs. 105/mo. as Conservancy Charges, and Rs. 70/mo. as Sewerage Charges. Cantonment Board has its own arrangement and the University Town Administration collects Rs. 230 per month per connection from its Water Supply consumers billed on a quarterly/ half year basis. Interestingly, due to the inefficiency of water supply in the University Town area, most of the residents are depending on privately dug boreholes within their household compound.

The above billing pertains to legal connections, but as noted previously, illegal connections may outnumber legal ones. The perception is that most people are willing to pay reasonably justified costs for satisfactory service. However, any proposed tariff increases have particularly strong political implications, and are often resisted at a political level, meaning the government is continually pressured to provide subsidies.

4.8. Peshawar Water Distribution Systems

Peshawar District has projected 2010 population of slightly over three million persons (NWFP Development Statistics, Census 1998) spread over an area of 1257 sq km. The district comprises one Tehsil, 92 Union Councils, four Towns, one Cantonment area, University Town Committee and Hayatabad Township. The municipal services before LGO 2001 were managed by one Municipal Corporation for the entire city covering all urban areas. After the LGO 2001, the Urban and Rural divide was eliminated and the four Towns were assigned responsibilities for provision of Municipal services by regrouping the Union Councils (UCs) falling under Town-1, Town-2, Town-3 and Town-4. Detailed information was obtained only for Town-1, which has 25 Union Councils (21 urban and 4 rural) with a projected 2010 population of slightly under 0.8 million persons (1998 census). According to the referenced presentation made by Mr. Haroon Bilour, the District Nazim of Town-1, current water daily demand is about 27 MGD at an estimated rate of 30 gallons/ per capita

per day. At present 500 Tube wells are drawing water from the underground aquifer in the Peshawar metropolitan area. Out of these, 240 Tube wells are located in Town-1 alone. The Town-1 tube wells are producing an estimated 19.4 MGD, and the water supply is further supplemented with 3.6 MGD from the Bara River (Pishtakhara plant which is a pre-partition system in place and effective). Total supply in Town-1 is thus estimated to be 23 MGD, which is currently short by 4 MGD. It is estimated that the short fall will reach over 20 MGD in the next 20 years.

Key problems identified by the local administration with the water distribution system in Peshawar are:

- Depletion of water table resulting in low yield and quality
- Increase in power tariff
- Maximum life of tube wells is 15 years
- 40 to 50 existing tube wells require replacement.
- Some old tube wells discharge sand with water, resulting in damage to pumps and turbid water.
- Distribution system is not controlled effectively
- A large quantity of potable water is wasted or unaccounted for due to many illegal connections, broken pipes, and lack of maintenance.

Figure 1 below shows some of the problems pictorially.

Figure 1: Leaking and rusted pipes

4.8.1. Access to Water and Sanitation in Peshawar

As shown in Table 17 below, according to MICS 2001 Peshawar ranks #3 in the total of 24 districts in terms of access to water and sanitation. This shows that access to safe water and adequate sanitation in Peshawar is much better than other areas in the province. However, Peshawar is a metropolitan city with significant development issues and constraints, and suffers from difficulties and complications associated with effective delivery of safe water and sanitation. Additional information regarding water and sanitation access for Pakistan can be found in Chapter 2 and Appendix A of the Pakistan Demographic and Health Survey (Reference #23).

Table 17: Water and Sanitation Access

Water and Sanitation					
Use of Safe Water			Adequate Sanitation		
District	Rank	%	District	Rank	%
Bannu	1	84.8	Chitral	1	65.2
DI Khan	2	80.7	Haripur	2	57.1
Peshawar	3	77.0	Peshawar	3	56.1
Malakand	4	74.9	Abbotabad	4	54.5
L. Marwat	5	74.2	Kohat	5	45.4
Mardan	6	72.1	Nowshera	6	44.8
Nowshera	7	71.2	Swat	7	44.5
Swabi	8	69.8	Malakand	8	42.9
Swat	9	68.6	Hangu	9	41.8
Kohat	10	67.6	DI Khan	10	40.3
Karak	11	67.5	Shangla	11	39.2
Abbotabad	12	66.5	Swabi	12	38.8
Tank	13	64.3	NWFP		38.5
Haripur	14	62.9	Mardan	13	37.8
NWFP		62.8	Mansehra	14	36.9
Chitral	15	61.9	L. Marw.	15	31.4
Hangu	16	58.2	Bannu	16	31.3
Mansehra	17	58.1	Tank	17	30.1
Charsadda	18	57.8	Bunner	18	26.7
Bunner	19	54.0	Karak	19	26.6
Batagram	20	52.9	Charsadda	20	26.5
Lower Dir	21	44.8	Batagram	21	25.5
Shangla	22	44.1	Lower Dir	22	23.5
Upper Dir	23	22.5	Upper Dir	23	11.4
Kohistan	24	10.6	Kohistan	24	3.1

Data Source: NWFP MICS 2001

5. History and Results of Interventions

5.1. Government of Pakistan Water and Sanitation Programs

5.1.1. Pakistan Social Action Program Project (SAPP I), 1992-98

Pakistan's Social Action Program Project I (SAPP I) was launched in 1992 to reform the country's very weak social services in elementary education, primary health, population welfare and rural water supply and sanitation (RWSS). SAPP I was a coordinated multi-donor support system for addressing these government initiatives. Information on SAPP I is difficult to obtain on the Web, but the following was found within SAPP II documents, including a document [17] prepared as an appraisal of the feasibility of SAPP II based partially on the results of SAPP I.

SAPP I was a GOP project supported by the World Bank, Asian Development Bank (ADB), the European Commission (EC), United Kingdom's Department for International Development (DFID) and other donors. The objectives of SAPP I were to address basic social sector weaknesses by seeking improvement in: (1) implementation, by strengthening planning, budgeting and operational efficiency; (2) service design, with a focus on quality and access, especially for women and girls; (3) levels of effort, including government funding and community responsibility; and (4) political will. SAPP I worked by seeking annual agreements among government and participating donors on the annual Operational Plans, which included revisions of prior plans based on operational results. When agreement was reached on the Operational Plan, the project provided time-slice financing to reimburse a specific share of the subprogram's cost for that year.

Fund disbursement was also dependent on the macro conditions relating to overall financing levels and plans to reduce identified governance problems. Agreement on operational plans annually allowed government and donors to adjust the policies and expenditures more flexibly to meet changing circumstances, support innovation, and adapt to priority needs.

Within the time period covered by SAPP I, the coverage of rural water supply schemes increased to approximately 55 percent from 45 percent prior to SAPP. SAPP I also helped government and donors understand more fully how deep the problems were, and what needed to be done to achieve wider access to quality water supply services. Vested political interests at various levels remained strong enough to frustrate reform, implementation

[17] Project Appraisal Document, Second Social Action Program Project (SAPP II), Report No. 17398-PAK, The International Development Association, February 27, 1998

capacity remained weak, and users who ought to have had a stake in reforming the system remained largely uninvolved.[18]

5.1.2. Social Action Program Project II (SAPP II), 1998-2002

SAPP I provided a good background for SAPP II, and there was a strong effort to apply the lessons learned to the execution of this follow-on project.

Excerpts from the World Bank's Implementation Completion Report[19] follow:

Rural Water Supply and Sanitation (RWSS): As mentioned previously, RWSS was a component of SAPP 1, and was also incorporated into SAPP II. Outcomes for RWSS were rated as Unsatisfactory for reasons given below:

There was very little change in rural water supply during the course of SAPP II. Reliance on water piped to the house did not increase, and the most significant change was an increase from 65% to 70% in the use of hand and motor pumps, mainly indicating a greater reliance on ground water vs. surface water, which is more likely to be contaminated.

Sanitation practices barely changed in rural areas. Sanitation service via covered drains remained low, and there was only a small increase in access to open drains, from 31% in 1998-99 to 33% in 2001-02. The availability of toilet facilities also improved marginally. from 37% of the rural population in 1998-99, to 41% in 2001-02.

SAPP-II improved consistency in the policy environment toward community-based project development, at least in theory. In general, participation remained low, and the Khushal Pakistan Program (KPP) was an exception even to this policy. KPP was a poverty alleviation program, designed to provide jobs to the local populace while executing short-term community improvement projects. A fair amount of funds provided to KPP was allocated for water supply, sanitation, drainage and municipal services schemes, and involved the active participation of Town / Taluka Nazims.

Despite the potential benefits of a uniform development policy, this orientation toward community participation did not result in better access to clean potable water in the target areas. Concerns are often voiced that water and sanitation works transferred to communities, particularly mechanized drainage schemes, would not be properly maintained, and eventually fail. The historical and anecdotal inability of provincial governments to reliably perform these functions has provided skepticism about the capability of local government to succeed, and has also produced hesitation in accepting

[18] Project Appraisal Document, Second Social Action Program Project (SAPP II), Report No. 17398-PAK, The International Development Association, February 27, 1998

[19] Implementation Completion Report, Second Social Action Program Project (SAPP II), Report No. 26216, The World Bank, June 25, 2003

responsibility for systems already burdened with problems. District and implementation staff claimed that Tehsil Municipal Administration (TMAs) did not have adequate technical capacity to maintain the water supply schemes handed over to them. There is anecdotal evidence that some Water User Associations (WUA)s were formed by order of the government rather than a strong desire for participation among local users.

District level officials regarded the provision of drinking water as a basic public service and appreciated SAP's focus on the rural water supply sector.

Participants noted that the TMAs were not adhering to the uniform policy in the RWSS sector and hence expressed their concerns on post devolution sustainability of community water supply and sanitation schemes.

5.1.3. Rural Water Supply and Sanitation Project (RWSSP), 2003

Initially this project was intended to start in 1998, but due to certain political crises it was delayed until 2002-03. In July 2003, the GoNWFP launched the Rural Water Supply and Sanitation Project (RWSSP) with major support from DFID, to improve services through institutional capacity building of TMAs by installing over 5,500 low cost, community-managed schemes. The project also aimed to raise public awareness of water quality issues. The project provides safe water and sanitation services (hand pumps, spring-gravity, drains/street pavement, demonstration latrines etc) to the rural areas of the province by utilizing a participatory approach. It is based on the assumption that the earlier development projects at the local government level failed mainly because they were non-participatory. To ensure the sustainability of the projects and evolve the concept of ownership among the local people (both men and women), the Sarhad Rural Support Programme (SRSP)- a participatory NGO - worked as a partner with the local government, i.e., Tehsil Municipal Administration (TMA) by providing technical skill to its staff members.[20] As of October 2005, work had started on 484 of the water supply and sanitation schemes in the province, while another 600 schemes were started in the second quarter of 2005-06. See more information in Section 5.3.1.

5.1.4. Clean Drinking Water Initiative (CDWI), 2005

In 2005, the GOP through the Ministry of Environment undertook the installation of water filtration plants, one per Tehsil in all the Districts of Pakistan, under a project called the "Clean Drinking Water Initiative" (CDWI). With an initial budget of Rs. 495.5 million, 445 plants were proposed to be installed, with the Pakistan Environmental Protection Agency (Pak-EPA) responsible for project implementation. Two contractors were selected and

[20] Institutionalization of Participatory Development in Pakistan: A Case Study of a Local Government and NGO Partnership-based Project, Dr. Johar Ali, Department of Sociology, University of Peshawar

tasked to install one of five package plants depending on the particular site conditions as earlier evaluated by the National University of Science and Technology (NUST) and Pakistan Council for Research in Water Resources (PCRWR).

5.1.5. Clean Drinking Water for All (CDWA), 2006

In October 2006, the Government of Pakistan (GOP) shifted the responsibility for the implementation of CDWI from the Ministry of Environment (MOE) to the Ministry of Industries, Production and Special Initiatives (MOI). At the same time, a second phase of the project called "Clean Drinking Water for All" (CDWA) was also initiated, and placed under the same ministry. Within MOI, a National Project Implementation Unit (NPIU) was created which was tasked to plan for the CDWA, installing a filtration plant in each Union Council of Pakistan, some 6,000 plants in all. This Unit was also charged to take over responsibility for the CDWI installed plants in all Tehsils. The CDWI project was however, capped at the 409 plants which had already been installed by March 2007 and a revised budget of Rs. 12244.819 million was approved, incorporating the balance of CDWI work, and including the revised scope of work for CDWA.

5.2. CDWI Assessment of Water Plants, 2007

A Performance Assessment of the CDWI installed filtration plants was executed by the Pakistan Safe Drinking Water and Hygiene Promotion Project (PSDW-HPP) in the target districts of KPK, FATA, AJK, Punjab, Sindh and Balochistan. This assessment was carried out in field by Social Action Bureau for Assistance in Welfare & Organizational Networking (SABAWON), Peshawar under a grant agreement funded by USAID and managed by PSDW-HPP/Abt Associates.

The aim of the study was to assess the operational status and the feasibility of transferring responsibility for the filtration plants from federal to local control, It examined the adequacy of operation and maintenance programs, measured water quality parameters such as pathogenic bacteria and arsenic concentration at the source and after treatment, and assessed community knowledge and trends in attitude towards hygiene and sanitation. Field assessment included recording the geographical coordinates of each plant site using hand held GPS equipment. Some of the results of this assessment are detailed below, with special emphasis on the results from KPK.

5.2.1. Status of KPK Plants

Only one of the twelve existing CDWI filtration plants in KPK was operational, and that plant operates an average of 4 hours per day. The majority of the plants that were not operational were awaiting electricity or water connection. In a few cases, the plants have been left incomplete or rendered non-operational for other reasons. Ten of the twelve plants have no established owner, so it is unlikely that the status will change until

responsibility is established, preferably by a TMA. In KPK, 4 out of 12 buildings were found qualitatively to be unsatisfactory, although the individual reasons were not recorded in the study. The one operational plant serves a significant number of users. Further details are shown in Tables 18 through 20:

Table 18: Installation and Operational Status of Filtration Plants

Status of Filtration Plants Planned under CDWI					
S. No	Province/Region	No. of Plants Planned	Installed		Not Installed
			Operational	Non-Operational	
1	Azad Kashmir	11	4	5	2
2	Balochistan	25	10	13	2
3	NWFP	17	1	11	5
4	FATA	17	0	0	17
5	Punjab	27	20	3	4
6	Sindh	32	13	13	6
Total		129	48	45	36
Data Source: Assessment of CDWI Filtration Plants by PSDW-HPP, 2007					

Table 19: Ownership of Installed Filtration Plants

Ownership of Installed Filtration Plants (93 Plants)								
S. No	Province/Region	Total Plants	TMA		Public Health Department		No Established Owner	
			Operational	Non-Operational	Operational	Non-Operational	Operational	Non-Operational
1	Azad Kashmir	9	0	1	3	1	1	3
2	Balochistan	23	4	3	6	2	0	8
3	NWFP	12	1	1	0	0	0	10
4	Punjab	23	17	0	0	0	3	3
5	Sindh	26	13	8	0	0	0	5
Total		93	35	13	9	3	4	29

Data Source: Assessment of CDWI Filtration Plants by PSDW-HPP, 2007

Table 20: Usage of Operational Plants

Use of Operational Filtration Plants by Community (Total 48 Plants)					
S. No	Province/Region	Total Plants	Use of Plant by Community		
			High*	Medium*	Low*
1	Azad Kashmir	4	0	2	2
2	Balochistan	10	8	1	1
3	NWFP	1	1	0	0
4	Punjab	20	8	5	7
5	Sindh	13	12	1	0
Total		48	29 (60%)	9 (19%)	10 (21%)
Data source: 2008 PSDW Baseline Survey					

*Key to Classifications
Low: Less than 100 people per day
Medium: 100-200 people per day
High: Above 200 people per day

5.3. Emergency Response Actions

5.3.1. Refugees from Afghan War (CIIP), 2001

In the aftermath of 9/11/2001 and the resultant Afghan war, DFID assisted Pakistan with the Community Infrastructure Initiative Project (CIIP) to provide relief to KPK communities in anticipation of a fresh refugee influx. Due to the emergency nature of this project, the NGO Sarhad Rural Support Programme (SRSP) was engaged to implement the project by involving Tehsil/Town Nazims and Union Councillors. The project design required the beneficiary communities to contribute a minimum 20% of the capital cost in cash or kind, construct the infrastructure schemes, and take full responsibility for their O&M. CIIP proved to be a very successful and cost-saving intervention. It is estimated that these systems cost 30 to 50% less than any similar departmentally-built schemes with contractor

involvement. Self-sustenance of the CIIP schemes is proved by the fact that all 254 of them were fully functional in 2005.[21]

Subsequently, in December 2002, the Government of Northwest Frontier Provinces (GoNWFP) approached DFID for assistance in reinitiating the 1998 NWFP Rural Water Supply and Sanitation Project (RWSSP). The GoNWFP, SRSP and DFID were all fully involved in the redesign of RWSSP. The project was designed with a number of innovative features, such as:

- Support to and development of appropriate institutional relations between different tiers of the government (provincial, district and tehsil/town)
- Integrated Water and Sanitation (W&S), with hygiene promotion as an essential component
- Institutional capacity building of the TMAs, GoNWFP, local governments, and Elections and Rural Development Departments
- Facilitating the TMAs in providing integrated W&S services to one million poorer people of KPK by installing some 5,500 schemes
- Increasing community contribution in the capital cost of schemes (from 20% in the beginning to 30% towards the end of the project) and full O&M responsibility
- Women's mandatory role in decision-making;
- Poverty-focused resource allocation
- An effective data collection and management information system (MIS)
- A comprehensive monitoring and evaluation (M&E) system at all levels, including the community level
- Co-ordination with all capacity building projects in KPK.[22]

As of 2007–08, the fourth year of project implementation, the project has made commendable progress by executing 4938 W&S schemes and a number of capacity building workshops.[23]

5.3.2. Earthquake of October, UNICEF, 2005

As part of the UN's consolidated response to the devastating earthquake of 2005, UNICEF was given the main responsibility for ensuring the survival of children in the affected areas through health and nutritional care and provision of safe drinking water and sanitation,

[21] Maximising the Benefits from Water and Environmental Sanitation, Pakistan – Water and Sanitation Services in a Devolved Government System, Malick Zulfiqar Ahmad, Programme Officer, Department for International Development, Pakistan, 2005
[22] Ibid
[23] WES News - Issue No 20, May 2008-1

while restoring normalcy to their lives through education, recreation, rehabilitation, reunification and counseling.[24]

As background for this relief effort, in the NWFP 2001-02 Multiple Indicator Cluster Survey (MICS), it was found that 37.2% of the population of KPK did not have access to safe drinking water and 61.5% used unsafe toilets, resulting in incidences of disease and infection. Water supply networks and treatment plants in major towns were in poor condition and in some cases existing infrastructure was completely destroyed. A limited understanding of safe hygiene practices exacerbated the poor sanitation conditions of the affected areas before the earthquake.

From the above, it can be concluded that access to safe drinking water in major urban areas of PAK and KPK was a major constraint even prior to the earthquake. The main water plant in Muzaffarabad, Makri Water Treatment Plant, was functioning at 40% of its designed production capacity serving only 50,000 people. Both Muzaffarabad and Mansehra water plants were pumping into the distribution networks water of high turbidity which was not properly chlorinated. No information was available regarding the status of *rural* water supply systems prior to the earthquake.

Water supply systems in five major cities and 180 villages were rehabilitated. Over 396,000 people in urban settlements and around 175,000 people in rural areas were able to access safe drinking water. More than 695,000 people benefited from the 34,750 latrines constructed with UNICEF support in IDP camps, schools and at household level. Similarly, 150,000 gender friendly hygiene kits were distributed to displaced families. The above achievements prevented any significant outbreak of diarrhea or other water borne diseases despite the crowdedness of the camps and urban areas.

A Bonus – Education and Capacitation

UNICEF made good use of the opportunities provided by the concentrations of people in IDP camps to train and educate their beneficiaries in water, sanitation, and hygiene. Many IDPs used latrines and received health and hygiene education for the first time during their stay in camps. UNICEF believes that health and hygiene education has had a lasting impact on the lives of people.

An Opportunity

It is not clear if this new level of knowledge and understanding has been fully exploited in terms of the IDP participants sharing and disseminating their new knowledge back to the villages from which they came and to which they have presumably returned. This could

[24] UNICEF Pakistan Consolidated Emergency Thematic Report, October 2005 – March 2006

represent an important opportunity in water and sanitation behavior change communication (BCC).

6. Lessons and Opportunities

6.1. Social Action Program Project I (SAPP I)

This program enjoyed increased effectiveness by frequent appraisal involving multiple participants of project progress, and adjustment of funding levels based on the results. There also developed a far greater awareness of the importance of social sector investments, particularly among senior level bureaucrats and increasingly among politicians. This has resulted in better siting of facilities based on agreed objective criteria rather than political preference, and staff hiring based on merit instead of connections. The coverage of rural water supply schemes increased to approximately 55 percent, up from 45 percent prior to SAP.

Vested political interests at various levels remained strong enough to frustrate reform, implementation capacity remained weak, and users who ought to have a stake in reforming the system remained largely uninvolved.[25]

6.2. Social Action Program Project I (SAPP II)

SAPP II was not considered a successful program by its main funder (World Bank), or by the majority of its targeted beneficiaries. The main indicators that showed modest improvements were an increase in the use of pumps (65-70%) versus open water sources, and an increase from 37% to 41% in the percentage of the population reported toilet availability. It was also perceived that there was a shift and a consistency in policy towards encouraging and requiring community participation, but this goal has not been fully realized. Some improvements were made in the design of efficient and sustainable water systems. All in all, the results realized did not justify the amount of expenditures.

Project assessment notes include the following:

Complex programs such as SAPP-II that aim to bring about comprehensive institutional reform take a long time to implement. As a consequence, greater perseverance, and stronger donor coordination are needed to move to scale on successful 'pilot' interventions and innovations, and to undertake fundamental institutional and governance reforms that require, almost as a prerequisite, changes in orientation and mindset, attitudes, work ethics, and even political culture. *The low levels of achievement under SAPP-II provide yet another example of the failure of umbrella projects, especially those involving a multi-sector*

[25] Project Appraisal Document, Second Social Action Program Project (SAPP II), Report No. 17398-PAK, The International Development Association, February 27, 1998

and multi-provincial operation. Such projects are scattered in their scope. It is inherently difficult to ensure a degree of focus that can be attained in designing programs and projects that are province-specific and relevant to their stage of development.[26]

6.3. Rural Water Supply and Sanitation Project (RWSSP)

One of the organizing principals of RWSSP, participatory development, was based on the assumption that the earlier development projects at the local government level failed mainly because they were non-participatory. To ensure the sustainability of the projects and evolve the concept of ownership among the local people (both men and women), the Sarhad Rural Support Programme (SRSP)- a participatory NGO- worked as a partner with the local government, i.e., Tehsil Municipal Administration (TMA) by providing technical skill to its staff members. Under this extended program, some improvement was made in increasing the participation of beneficiaries in the design, construction, and operation of water and sanitation systems. SRSP was apparently able to ameliorate some of the distrust and lack of confidence in government.

However, in practice, most of the organizations of both men and women developed in connection with this program existed in name only and were highlighted on the papers as a pre-condition for award of schemes and for donors' satisfaction. They had no real existence because the union councils' *Nazims* or *Naib Nazims* alone decided where work would be done and whose names would be included in the organizations. The Tehsil *Nazim* was the central figure to decide where to work and which union councils' *Nazims* would be allotted the schemes. The Tehsil *Nazim*, being the most important person and belonging to a particular political party, distributed the schemes on the basis of party politics and not on the basis of needs.[27] This demonstrates once again that political institutions and traditions are a serious force to be reckoned with when planning water and sanitation development efforts.

6.4. Clean Drinking Water Initiative/Clean Drinking Water for All (CDWI/CDWA)

As further detailed in the CDWI Performance Assessment, these two programs have been particularly ineffective in KPK. Out of 17 plants that were planned, only twelve were built to any stage of completion, and only one of those is actually operational. This failure to follow through to completion and startup may have many causes, including failure to involve beneficiary populations in the development despite the lessons learned from prior

[26] Implementation Completion Report, Second Social Action Program Project (SAPP II), Report No. 26216, The World Bank, June 25, 2003

[27] Institutionalization of Participatory Development in Pakistan: A Case Study of a Local Government and NGO Partnership-based Project, Dr. Johar Ali, Department of Sociology, University of Peshawar

projects, poor initial planning in many aspects of siting, including convenience for the beneficiary population as well as electrical and water source availability; deficient construction oversight; insufficient construction funding, and lack of capacitation (education, training, development of cost recovery systems, etc.).

6.5. Community Infrastructure Initiative Project (CIIP)

Better than the previously mentioned programs, CIIP was able to involve the beneficiary population in every phase of the planning, construction and operation of water and sanitation facilities. The communities were required to contribute 20% of the costs in cash or in kind, and were required to *construct and operate* the facilities. In addition, SRSP facilitated these processes through the provision of intermediary and technical services. This short-term emergency response served as a model for subsequent RWSSP projects, but RWSSP was not able to duplicate its success, despite the continued assistance of SRSP. It may have been the emergency nature itself, as well as the psychological and physical orientation of displaced populations that contributed to the success of CIIP.

6.6. UNICEF Earthquake Response Coordination

In an emergency response situation, UNICEF managed to maintain provision of safe drinking water and sanitation services for 1.7 million people, while coordinating the efforts to rehabilitate the permanent systems in five cities. The methods for accomplishing these results are not clear, although there was collaboration and participation by multiple internal and external groups, as well as an influx of perhaps $35 MM specifically for water and sanitation from a wide assortment of donors. Moreover, the methods of operating in emergency situations may not be feasible under more ordinary circumstances.

An important point from this experience, however, was the amount of education that IDPs received concerning water, sanitation, and hygiene. UNICEF was able to provide primary water and sanitation education to large numbers by taking positive advantage of the extraordinary conditions and close quarters in the IDP camps, and the lesson was sharp for the IDPs. Identifying and engaging those beneficiaries to encourage them to spread their knowledge to their communities would be an important step in effective behavior change communication.

7. Summary Discussion and Conclusions

From the literature, it becomes apparent that a multitude of programs and projects have been undertaken to improve water and sanitation access in Peshawar, KPK, and Pakistan as a whole. These programs have been sponsored by the Government of Pakistan, foreign governmental agencies such as USAID and DFID, international banking and development organizations, and international relief organizations such as UNICEF and WHO, as well as

domestic and international nonprofit organizations. These efforts have enjoyed varying degrees of success, but certain themes are persistent throughout.

The dominant theme appears to be the lack of participation by the intended beneficiaries in the planning, development, operation, and maintenance of the water and sanitation systems. The reasons for this lack of participation appear to be complex, and involve factors both external and internal to the communities involved.

There is no evidence to suggest that any efforts were made to involve beneficiary communities in W&S projects until SAPP I was analyzed in preparation for SAPP II around 1998. Up until that time, water and sanitation projects were largely conceived, developed, and managed using a top-down approach. The reasons for that approach are also complex, involving desire for control on the part of donors, bureaucratic mindsets, conflicts between various levels of government, concerns about manipulation of project focus and outcomes by influential individuals, attitudes among beneficiaries that the government was responsible for the provision of W&S services, and inadequate resources available to all parties.

This type of top-down orientation does not change quickly, on the part of donors, government, local leaders, or communities. Policy has evolved, but practice on the ground does not always reflect stated policy. Powerful local leaders are a strong fixture in Pakistan, and to some extent, their power is based on the ability to dispense benefits to their supporters. Mobilization of communities requires first the recognition by all of the importance of community action, then strong and charismatic leaders to activate and motivate the communities, and also the evolution of belief on the part of stakeholders that their efforts will be recognized, accepted, and rewarded.

Pakistan appears to be only part way through the process of adaptation to this change of philosophy and mindset. Some W&S programs have managed to incorporate an inclusive process, while others have not. Some of the most successful efforts seem to have been the emergency actions in response to an influx of refugees from the war in Afghanistan, and the response to the destruction of infrastructure due to earthquake of 2005. The CIIP program in particular was successful in not only involving beneficiaries at all stages, but also in providing economical and sustainable outcomes. Unfortunately, although a subsequent effort was made to duplicate this success, little progress was made. It could be that the emergency circumstances made it necessary and possible to work outside of normal routes, routines and channels.

It is interesting and ironic to note that the Krushal Pakistan Program (KPP), which was designed for rural poverty relief, did not adhere to the then-current policy of community involvement in project development and execution. This program could possibly have provided an excellent vehicle for developing the necessary skills and expertise in water and

sanitation system operation and maintenance that would have advanced the policy of devolution espoused by the federal and provincial governments at that time. Instead, it was made exempt from the policy of community involvement, ostensibly in favor of short-term results. The outcome appears to have been an even larger inventory of orphaned and malfunctioning W&S systems.

7.1. Gaps and Needs

From the literature, general discussions, and informal meetings with citizens and government officials, it is apparent that there is tremendous room for improvement when it comes to the provision of water supply and sanitation services in Peshawar and in particular Town-1. The current GOP programs CWDI and CDWA have been particularly ineffective in KPK, perhaps to due a lack of coordination and participation by beneficiary communities.

Work should continue to operationalize the policy of devolution and community involvement. This will require recognition of the additional social work required in capacitation and behavior change, both at the level of government, and in community activation. Although this may prove to be more costly in terms of project spending, if the method results in long-term sustainable water and sanitation systems rather than orphaned and non-functioning ones, the cost will have been worth it.

District-level surveys have demonstrated the range of conditions and behaviors that exist in Pakistan, within the KPK, and even between sample groups used by the Baseline Survey. From this it becomes evident that knowledge and understanding of local conditions and behaviors are essential to the formulation of coherent strategies to wisely invest in the institutions and infrastructure of Peshawar in order to achieve the best possible value. Unfortunately the specific knowledge that could lead to better insight into the perceptions, behaviors, knowledge, attitudes and practices specific to the Peshawar population is limited.

Gaps in information for Peshawar City are identified below;

1. General Characteristics of Town-1 Population
    a. Profile of Town-1 UCs
    b. Household Demographics
2. Water Supply in Households
    a. Access to Water
    b. Storage of Water
    c. Treatment of Water
3. Water Service & Quality in Households
    a. Source of Water Supply
    b. Water Supply Service
    c. Cost of Water Supply
    d. Quality of Water Supply
4. Sanitation & Sewerage in Households
    a. Sanitation
    b. Sewerage
5. Hygiene Practices of Households
6. Awareness About Diarrhea in Households

To address some of the above information gaps, a comprehensive questionnaire was designed and developed to utilize in a household survey based on random sampling in the 25 Union Councils (UCs) of Town-1 covering 1,000 households. As of July 2010, this survey is in progress and will be completed by September 2010. The results of this survey should greatly enhance the knowledge base specific to knowledge, attitudes, and practices (KAP) in Peshawar, and facilitate informed decision making.

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Appendix A – Scope of Work

Peshawar Water Distribution System Improvement Scope of Work

The City of Peshawar is facing an acute water shortage caused by rapid population growth and a persistent draught that has caused ground water levels to drop rapidly. Peshawar depends on groundwater for all its supply and many tube wells have gone dry in the last few years. The city is under the jurisdiction of four town councils and is characterized by many discrete distribution systems that are not interconnected.

Maintenance of the system has been poor but the reasons for this are less clear - it could be the town council was not prepared to take over from the PHED when authority was devolved to the local level in 2001. The Town Council might not have the skilled personnel necessary to operate an extensive pumping and distribution system, there might be inadequate revenue collections, or customers might not be paying their bills because they feel the service is totally inadequate. It could be a combination of all of these.

In coordination with the concurrent engineering study carried out by USAID's CRISP contract, this study will make recommendations to USAID, PHED and the Town Councils on the governance and public health issues related to improved water and sanitation service delivery in Peshawar.

Tasks

I. Literature Review

While CRISP is conducting their literature review on water resource and distribution, Abt will carry out an extensive literature search and review of any existing reports/information on customer satisfaction with water and sanitation services, water-related health disease prevalence, and drinking water, sanitation and hygiene knowledge, attitudes and behaviors in Peshawar. This data will be used along with the initial results of the literature review carried out by CRISP to identify high priority neighborhoods for further detailed studies.

II. Household Survey

While CRISP is conducting the detailed engineering study in high priority neighborhoods, a random sample of households in high priority neighborhoods will be selected for participation in a Knowledge/Attitudes/Practices study. Data will be collected from both men and women, either jointly or separately, as appropriate. The objectives of the study include:

- Determine extent of house connections, number of hours of service, frequency of billing, and bill payment procedures ;
- Document existing household strategies for access to drinking water supply, water storage, water treatment, and sanitation facilities
- Document customer perceptions of current quality of water and sanitation situation
- Document current knowledge, attitudes and practices for household water, sanitation and hygiene
- Identify any household hygiene behaviors that increase risk of water-borne disease

III. Stakeholder Identification and Consultation

Stakeholder identification and consultation will be an integral component of the study. Specifically, to launch the study, the team will meet with USAID Peshawar, Public Health Engineering Department, Secretary for Planning and Development, Local Government and Rural Development Office of the Secretary; Peshawar Development Authority and relevant Town Municipal Officers who are responsible for operation and maintenance. A debrief meeting will also be held to report on findings and discuss next steps. *These meetings should only be held in coordination with CRISP, so as to lessen the burden on government offices.*
In addition to the key governmental stakeholders, this team will identify meet with NGOs working in Peshawar, Lady Health Workers, women's groups, CCBs, Water Users Groups (if any), religious organizations, and primary schools, and others as identified during the process. Key informants from these groups may be selected for more in-depth interviews regarding water and sanitation service delivery governance and water/sanitation/hygiene knowledge, attitudes and practices.

Regular high level consultative meetings will be held with key stakeholders to ensure the team is working along lines that are in keeping with provincial government and USG concerns, including early identification of the candidate sections of the distribution system where work will take place.

The team will need to be fully aware of what groups make up the complete set of potential beneficiaries of the project: commercial, industrial, public sector or household level. Identification of groups that might be opposed to the WSS improvement project must also be identified and their issues taken into consideration. The current and potential future relations among these groups should be mapped. The team will prepare a directory of key stakeholders in the selected neighborhoods.

- The high level meetings will be backed up by as many local workshops as necessary. It may be appropriate to hold workshops for men and women separately in order to ensure maximum participation. Workshops will be structured to obtain information on at least the following issues:
- Public awareness on water use, hygiene and environmental sanitation
- Perception/satisfaction with current levels of service, and infrastructure needs and priorities

- Willingness to pay and ability to pay for improved water and sanitation services

Deliverables

Literature review summary document
Household surveys – to be defined and approved
Focus groups with community– to be defined and approved
Key informant interviews– to be defined and approved
Draft final report
Final report

Personnel

The Senior Social Scientist would have at least 10 years experience in the participatory community development. The incumbent should be able to demonstrate significant experience in assessing the gender implications of various research and data collection methods, and of specific municipal service delivery designs. The Senior Social Scientist would be responsible for liaising with USAID and Peshawar officials, drafting all reports, and presenting findings in meetings.

Public Health Specialist

The Public Health Specialist would have at least five years of experience in designing, implementing and analyzing knowledge/attitudes/practices survey instruments. Local language and knowledge required.

Level of effort

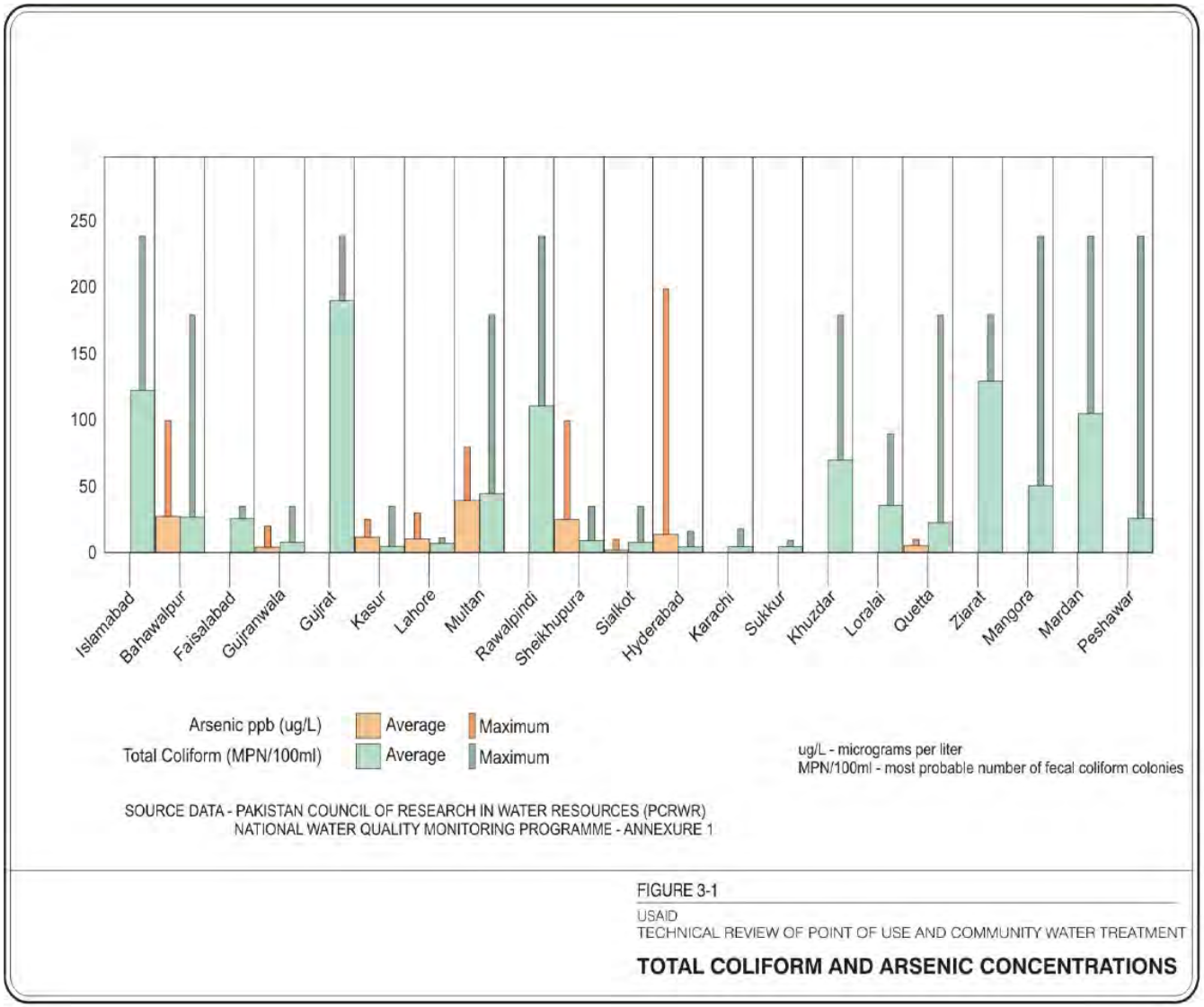
Senior Social Scientist – 10 weeks

Public Health Specialist – 10 weeks

Junior level social scientists – 10 weeks

Survey team – 7 weeks.

Appendix B – Average and Maximum Concentrations of Total Coliform and Arsenic in 21 Regions of Pakistan



Appendix C – Baseline Study Sampling Procedure

Urban and rural households (based on Government of Pakistan criteria) were each classified into socio economic classes (SEC) based on different criteria. The urban households were classified into five SEC based on the education and occupation of the chief wage earner, while the rural households were classified based on the structure of the house and education of the head of the household. For the rural households the classification based on four types of houses (pukka upper, pukka lower, semi-pukka and kaccha) and seven levels of education ranging from illiterate to post graduation (illiterate, up to primary –less than 5 years, 6-9 years of school, matric -10 years, intermediate -12 years, graduate, post graduate).[28] Households were classified into five SEC categories going from the highest (A) to the lowest (E), based on the following criteria:

A - Education of the head of household is at least intermediate and the structure of house is either pukka lower or pukka upper.

B - Education of the head of households is up to matriculation level (10 years of education) and the structure of house is any one from all four types.

C - This is the middle class of rural Pakistan. Education level of heads of households is less than matriculation level (type of house?).

D - Illiteracy amongst the heads of households is very common. Structure of house is either semi pukka or pukka lower.

E - Education of the head of households in this class have not acquired any formal education. Structure of the house is kuchha.

The urban households were divided into five SEC categories based on education of the household head and the occupation of the chief earner. The households were classified based on 11 occupation categories and as with the rural areas, into five education categories. Households were classified into five SEC categories going from the highest (A) to the lowest (E), based on the following criteria:

A - Well educated, self-employed/employed professionals, senior level executives/officers in public/private limited organizations, well-educated small-to-large scale businessmen, and supervisors.

B - Relatively less well-educated lower/middle level executives and officers, well educated small businessmen and supervisors.

[28] Kuccha means houses that are not very permanent and are made of mud or similar materials. Pukka, means permanent houses made of concrete, bricks or other materials.

C - Predominantly small retailers/businessmen, supervisors and lower level executives who have 5-10 years of schooling.

D - Relatively well educated skilled workers; not so well-educated small retailers and non-executive staff members.

E - Skilled/unskilled workers, petty traders and non-executive staff members who have at least 5-10 years of schooling and illiterate unskilled/skilled workers and petty traders.

Of the households in these five socio-economic classes, the study focused on the lowest SECs –C, D and E.

Table 21: Socio Economic Class

Province Name	Sample Group 1 (SG1)				Sample Group 2 (SG2)			
	Socio Economic Class				Socio Economic Class			
	C	D	E	Total	C	D	E	Total
NWFP	35%	25%	40%	239	49%	17%	34%	322
All districts	39%	27%	34%	1,937	37%	27%	36%	1,997

Data source: 2008 PSDW Baseline Survey