



**Aga Khan Planning and Building Service, Pakistan**

**WASEP Conference Papers**  
*by*  
**WATER AND SANITATION EXTENSION PROGRAMME**



# **WASEP Conference Papers**

*by*

# **WASEP**

WATER AND SANITATION EXTENSION PROGRAMME

*A Programme of*

Aga Khan Planning and Building Service, Pakistan

*Compiled and Edited by*  
*Mansoor Ali Lalani*  
*@ 2002*

## **LIST OF WASEP PAPERS**

### **Papers presented in WEDC conference held in Islamabad, Pakistan 1998**

1. **Paper # 1:** Seasonal investigation of drinking water quality  
*By Haider Raza, Manzoor Hussain and Dr. Karim Alibhai*
2. **Paper # 2:** Strategies to involve women in water supply and sanitation  
*By Sarah Jean Halvorsan, Nahida Aziz and Dr. Karim Alibhai*

### **Papers presented in WEDC conference held in Dhaka, Bangladesh, 2000**

1. **Paper # 3:** Community Management of RWSS in Northern, Pakistan  
*By Javaid Ahmed and Dr. Karim Alibhai*
2. **Paper # 4:** Water Tariffs: A challenging issue for WASEP implementation  
*By Manzoor Hussain, Saleem Khan and Dr. Karim Alibhai*
3. **Paper # 5:** Ensuring sustainability through technical monitoring and evaluation  
*By Latif Jina, Dr. Karim Alibhai and Naik Alam*
4. **Paper # 6:** Health and hygiene education programme: Northern Pakistan  
*By Dr. Tameez Ahmad and Dr. Karim Alibhai*
5. **Paper # 7:** Faecal contamination in water before and after intervention  
*By Haider Raza and Dr. Karim Alibhai*

### **Papers presented in WEDC conference held in Lusaka, Zambia, 2001**

1. **Paper # 8:** Health impact of water supply and sanitation projects in Northern Pakistan  
*By Dr. Tameez Ahmad and Dr. Karim Alibhai*
2. **Paper # 9:** Promotion of healthier behaviors through school children in Northern Pakistan  
*By Dr. Karim Alibhai and Dr. Tameez Ahmed*
3. **Paper # 10:** An Analysis of WASEP's role in improving women's participation in WSS projects  
*By Tanya Barnett, Dr. Tameez Ahmad and Dr. Karim Alibhai*
4. **Paper # 11:** Evolution of women's involvement in W & S projects in Northern Pakistan  
*By Dr. Karim Alibhai, Dr. Tameez Ahmad and Ms. Nahida Aziz*

## **Paper # 1**

Presented in WEDC Conference, Islamabad, Pakistan (1998)

### **SEASONAL INVESTIGATION OF DRINKING WATER QUALITY**

*By Haider Raza, Manzoor Hussain and Dr. Karim Alibhai*

EIGHT THOUSAND CHILDREN around the world die from diarrhoea each day. That is one child every ten seconds, or three million children every year who die from a preventable disease. According to WHO more than 80 % diseases in the world are attributed to un-safe drinking water or inadequate sanitation practices (Microbiology Volume II, Monica). According to the National statistics, 56 % of the total population of Pakistan enjoy safe drinking water and 24 % have sanitation. For the rural population, the figures are 45 % and 10 % respectively. In theory, this might be the case. However, when factors such as accessibility, reliability, water quality and effective use of water and sanitation facilities are taken into account, the situation looks less promising. For example, out of 502 existing water supply schemes in the Northern Pakistan, only 86 can possibly be described as satisfactory (WSHHSP issue paper 8). The number will be further reduced if continuity and quality of the water supply is taken into account.

Glaciers and snow deposits are the principal source of all water in the Northern Pakistan. The melted water enters streams called nallahs, which subsequently feed man-made channels that bring water into the settlements for agriculture, livestock and domestic use. Almost every village in the Northern Areas and Chitral has a network of water channels. These channels are generally 2 - 4 feet wide and of similar depth. These channels are a symbol of the region's ancient history, indigenous art and collective efforts, since many of these were built centuries ago, cutting through rock and difficult terrain.

Generally, a main channel carries water into a village, which subsequently divides into a network of smaller channels and streams coverage the entire village. Traditionally, water for domestic usage is fetched from the channels flowing near the household. The villagers living at higher altitudes have freezing problems in winter. Under the mentioned conditions, people break the ice in the channels to carry water for filling the traditional water pits once a week or fortnight. Similarly where available, people rely on rivers or springs in these circumstances. A common practice in the area is of having water-pits, locally called as Gulko, Sardawai and Chudong. These pits are filled from the channels and are usually 2 - 3 meters deep and about 2 meters in diameter. Their benefits are multifold including, storing, cooling and reducing turbidity of water. Water from these pits is generally reserved for drinking and cooking purposes only.

Piped water system is becoming more common in the region. Since most of the settlements are established on slopes, the systems usually operate by gravity. They are generally fed by man-made channels and consist of a storage reservoir and distribution network. Ground water is un-common in the area. Compared to the above sources, river water is used by a small number of people for drinking purposes, and this practice itself is limited to the winters only.

## **OBJECTIVES OF THE STUDY**

The overall objective of the study was to make an assessment of the seasonal variation of drinking water quality of Northern Areas and Chitral.

Specifically, the study aimed to:

- Investigate the bacteriological and physical (turbidity) quality of drinking water in and at different points of the delivery system from source to the point of consumption
- Investigate the bacteriological quality of water in household storage vessels; and
- Study and define different drinking water source and system

## **METHODOLOGY**

The water sampling activity was initiated in June 1993. In a total 105 villages in the project, sampling in these villages was undertaken twice in 1994 i.e. in peak winter and summer seasons to judge the impact of seasonal variations on the water quality. All samples were collected at mid-day to get the worst situation of water quality. Two seasonal categories were generated:

- The samples processed from October to February were categorized as winter samples
- The samples process from May to September was considered as summer samples.

For greater reliability and precision, all the samples were processed in-situ. To do this, portable Del-Agua water testing kits were used. These employ membrane filtration techniques for bacteriological sampling.

The samples from all selected points were taken in sterile sampling cups and were processed in duplicate. At the end of each cycle, a control sample of sterile distilled water was processed to ensure the quality control of the process and consumables used. In summer season when processing highly turbid water or where high bacteriological contamination of the sample was suspected, different dilutions were made to obtain readable results. Turbidity of the sample was measured in Turbidity Units by using turbidity tubes providing with the water testing kit. These turbidity tubes are graduated with logarithmic scale that covered ranges from 5 to 2000

TUs. For pH measurement, phenol red tablets were used in a color matching comparator. The procedures recommended by the manual (Del. Agua) were adhered to.

When sampling water channels, three sampling locations were selected:

- a) Outside the inhabited area
- b) At the middle of the village
- c) At the end point of the channel system in the village

The purpose of this selection strategy was to find out the trend of faecal contamination's levels right from sources to the end point of the channel. Similarly, for the piped system, the sampling points included outside the habitude area, the storage reservoir and a series of taps in the distribution network.

Spring samples were generally taken at the spring outlet (also a collection point for domestic usage). Samples from the household containers were also taken. Before sampling, the water storage container was mixed by sterile water sampling cup. The reason for doing this was to get a representative sample (uniform distribution of microbes) of the stored water. However, a clear relationship of these samples with the specific source(s) and quality of water at the fetching time was not established, especially when the storage time varied from half and hour to about six hours in some cases.

Samples from the water pits were collected directly by using the sterile sampling cup by dipping it to one meter depth. This exercise was repeated three to four times before collection of the final representative sample. For analysis, the samples were graded into regimes A, B, C, D and E shown in Table1. These grading was recommended for the South Asian Regional Organization member states (WHO / SEARO, 1996).

**Table 1: Faecal Coliform Category for unchlorinated RWS Selected for the Study**

Category	Faecal Coliform / 100ml	Health Risk
A	0	No health risk
B	1 - 10	Low health risk
C	11 - 100	High health risk
D	101 - 1,000	Very high health risk
E	> 1,000	Grossly contaminated

## RESULTS

It is alarming that none of the samples collected from traditional water channels, water pits, taps and storage vessels fell in Category A.

**Table 2: Distribution of Winter and Summer Samples in Different Categories of Contamination (E.Coli / 100 ml.)**

Sampling points	No of Samples		Category A 0		Category B 1 - 10		Category C 11 - 100		Category D 101 - 1000		Category E* > 1000	
	Win	Sum	Win	Sum	Win	Sum	Win	Sum	Win	Sum	Win	Sum
Water Channels	108	144	Nil	Nil	30%	7%	26%	15%	30%	55%	14%	23%
Water Pits	60	58	Nil	Nil	10%	3%	31%	2%	47%	57%	12%	30%
Tap Water	104	135	Nil	Nil	51%	20%	26%	35%	21%	41%	2%	4%
Spring Water	51	54	83%	63%	7%	17%	9%	16%	1%	4%	-	-
Storage vessels	136	141	Nil	Nil	59%	9%	16%	12%	18%	54%	7%	25%

- 93 % of the channel's summer samples were in high health risk categories (C, D & E), whereas in winter, 70 % samples fell in the same category.
- 30 % winter and 7 % summer samples were in low health risk category B. (see Table 2)
- Water pits samples were found grossly contaminated with 90 % winter and 76 % summer samples in category high to very high health risk categories (C, D & E).
- Only 10 % winter samples and 3 % summer samples came under category B.
- The situation of tap water was slightly better with 51 % winter and 20 % summer samples come under category B. The remaining samples were in the C, D and E categories.
- As expected, water quality analysis of spring showed low bacterial presence. 83 % winter and 63 % summer samples were in the Grade; category showing little or no health risk.
- Water quality analysis of storage vessels showed that 49 % winter and 80 % summer samples were in high to very high health risk categories. Only 20 % summer and 51 % winter samples were in low health risk category.

## DISCUSSION

Results revealed that a considerable number of summer samples representative traditional and piped delivery system exist in categories which could be termed as “**dangerous**” for health. It

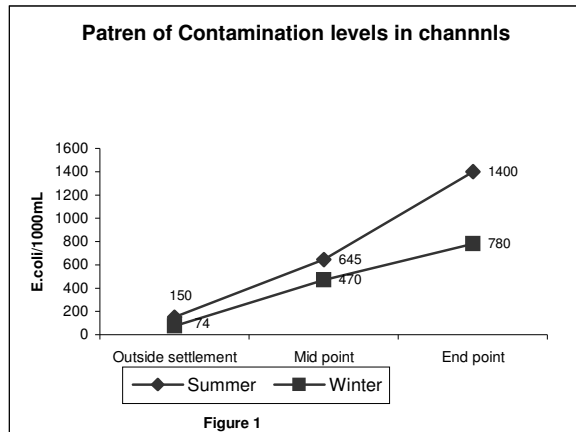
is worth mentioning that contamination levels observed in 23 % of water channel's summer samples, 30 % of water pit's summer samples as well as 25 % of storage container's samples could be classified as "grossly contaminated" i.e. category E.

Water samples collected from the traditional water channels show 5 to 10 times higher contamination levels compared to the source. Gradual increases in the contamination levels right from sources to the end point of the channels is attributed to human and animal activities around the channels (actually observed during the sampling).

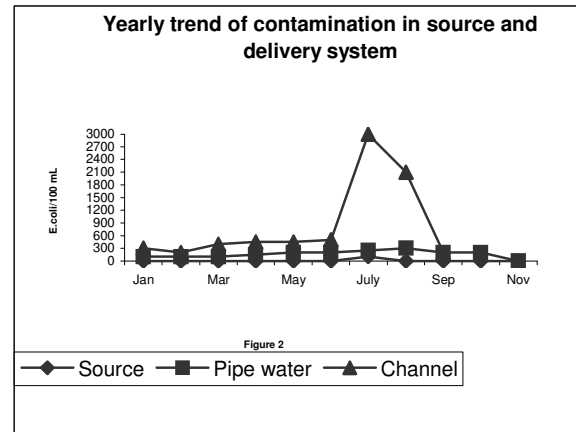
The absence of an appropriate drainage system for agriculture fields and domestic run-off exacerbates the existing water quality situation of these channels. It is worth mentioning that in most of the villages the cattle sheds are situated near or above the water channels, which increases the likelihood of faecal contamination. During the process, faecal droppings were seen near drinking water channels.

In summer, the usage of water normally increases as compared to the winter season, as such, spread of diseases is higher in summer as compared to winter. High incidence of diarrhoeal diseases in June, July and August has been reported by Aga Khan health Service, Pakistan's Gilgit Office. Furthermore, the weekly water quality study confirmed that June, July and August are also the peak faecal contamination periods. This indicates possible linkage between drinking water and diarrhoeal diseases. (WSHHSP, Weekly water quality reported 1996).

**Figure 1**



**Figure 2**





Improved water supply system were found to be less contaminated compared to the traditional water channels, but the levels are significantly higher than the recommended WHO guidelines for drinking water. The reason for this increase is that majority of the water supply systems are being fed by the traditional channels. The catchment area is not protected due to which the quality of source water deteriorates due to faecal ingress. In some cases, water quality deteriorates in the distribution system itself, which indicates that ingress of faecal material has occurred. About 7 to 9 times higher contamination levels were observed at mid and end points of the distribution compared to the inlet water (Figure 2).

The water pits found to be highly contaminated with faecal coliforms (Although in practice water pits are filled early in the morning when the water quality is thought to be clean). The reason for this high contamination is the poor super structure and water handling practices. It was observed that poor water handling practices are the most important contributing factors for deterioration of water quality in pits. The space which is used for water collecting is highly contaminated, and during extraction water splashes from the containers and re-enters into the water pits with contaminants. Inappropriate location of water pits is another reasons for higher contamination. It was observed that almost all water pits were situated near the cattle sheds or paved pathway. Possibly in the rainy season the surface run-off enters the pits bringing with it surrounding pollutants. The potential role of these traditional water pits were found to be polluted with *Cryptosporidium* (WSHHSP: Issue Paper 15).

Water in storage containers was found to be less contaminated in winter, however, the contamination levels are higher as compared to the water collecting points. One possible reason for the seasonal variation is that in summer, water is collected from the traditional water channels which already have higher contamination levels, whereas, in winter most of the water channels get frozen due to extreme cold, and people have to collect water from different sources which possibly have low contamination levels. Also in winter, storage time is lengthier, which produces an in-situ form of treatment thus reducing contamination levels. Finally, volumetric usage in winter is less and thus chances of contact and / or contamination by water handling practices is reduced to some extent. Storage vessels that were kept with lids and were apparently clean had lower contamination levels than dirty and uncovered containers (as would be expected of course!). Spring water was generally found to be safer compared to the other existing water sources, as majority of the summer and winter samples were in Category A. The unprotected springs were found contaminated due to human and animal activities in the surroundings.

Though the results indicate a seasonal contamination trend, a few issues needed further examination namely;

- (a) In which month of the year are contamination levels highest and how and why do levels increase and decrease?
- (b) Do contamination levels vary during the day, and if so, what is the pattern and the reason?

To investigate these key unknowns, an intensive weekly water sampling activity was conducted from January to December 1995. The results of two villages have been shown in (Figure 2). As can be seen contamination progressively increased in the channels.

The study patently highlighted the problems of water quality in villages of Northern Pakistan. Even where water supply from source is relatively pure, at the point where water is drunk (ingested), the likelihood of contamination is high. It is, therefore, imperative that a programme of water and sanitation should encompass not only the supply component i.e. hardware, but should take into account the Knowledge, Attitude and Practices (KAP, software) and relevant intervention in this area as required. KAP issues have to be focused on with particular emphasis on women and children for likely interventions. Furthermore, regular monitoring to ascertain the causal relationship between turbidity, faecal contamination and disease need to be examined so that likely preventable strategies could be in place particularly for months where peak contamination occurs. WASEP, under its new integrated programme of water and sanitation, is likely to focus not only on the technical issues but also on the software issues plus operational issues (which have not been discussed in this paper), as well.

## **REFERENCES**

**HAIDER RAZA**

WASEP; Aga Khan Planning and Building Service, Pakistan

**MANZOOR HUSSAIN**

WASEP; Aga Khan Planning and Building Service, Pakistan

**DR KARIM ALIBHOY**

WASEP; Aga Khan Planning and Building Service, Pakistan

## **Paper # 2**

Presented in WEDC Conference, Islamabad, Pakistan (1998)

### **STRATEGIES TO INVOLVE WOMEN IN WATER SUPPLY AND SANITATION**

*By Sarah Jean Halvorsan, Nahida Aziz and Dr. Karim Alibhai*

THE WATER AND SANITATION Extension Programme (WASEP) is a new initiative under the AKPBS,P which is working to improve drinking water and sanitation facilities in mountain communities throughout Northern Pakistan. WASEP seeks to assist rural people in their efforts to improve their health through safe drinking water and better environmental sanitation. While there have been previous initiatives in the water and sanitation sector in this region, expected results in terms of the reliability and the long-term sustainability of many water schemes have not been achieved. The reasons for these deficiencies are rooted in a range of issues from inappropriate technology to the lack of a holistic approach to development. Probably one of the most critical factors that impeded project implementation in the past was the low level of community involvement. WASEP seeks to rectify these shortcomings through approaches that rely heavily on community participation at all stages of the process of improving water and sanitation. A key underlying concept of the WASEP approach to this participatory process is to encourage the active participation of women and men in all aspects of projects. It has become evident, however, that the notion of “participation” is an elusive one and does not necessarily guarantee the participation of all project beneficiaries, particularly women, in this social and cultural context. Similar observations are well documented in the literature on rural water supply and sanitation and underscore the theme that social division along gender lines can influence the ability of women to participate in water-related development activities (*Wakeman, 1995; Wijk, 1996*).

In Northern Pakistan, women have a great interest in reliable and high quality water supplies because of their special roles as managers of households and domestic water supplies. Furthermore, they are responsible for the sanitary conditions of households and are the traditional sources of health and hygiene knowledge and education within families and communities. Yet, women’s involvement in measures to improve water and sanitation has been constrained by a number of interrelated factors including; cultural expectations of gender roles; the exclusion of women from leadership positions; the gender division of labour; and poor access to education and information (*Halvorson, 1994*).

The realization of these constraints has led WASEP to begin working with the communities to develop gender-responsive strategies to increase women’s involvement in water supply, sanitation, and hygiene education projects.

These strategies are designed to identify gender-specific factors, to enable people to address those factors to reduce the risk of disease transmission, and to achieve projects which result in equitable impacts and benefits for all the community members. The following discussion outlines three of the strategies adopted to explicitly enhance women's involvement in programme activities.

## **APPLICATIONS OF STRATEGIES IN THE PROGRAMME AREA**

The strategies applied thus far in the programme area include;

- (a) Utilizing participatory methods of collecting gender-specific data
- (b) Developing institutional mechanisms for women's participation; and
- (c) Providing health education and hygiene training to women and children

The following discussion will revolve around four project communities; Datuchi, Chirah and Ayeenabad in the district of Gilgit and Suri in the district of Baltistan in which these strategies have been employed.

### **STRATEGY # 1**

#### **PARTICIPATORY METHODS OF COLLECTING GENDER-SPECIFIC DATA**

The goal of adopting participatory methods of collecting baseline data on project communities is to disaggregate data. Related staff teams went to Datuchi and conducted separate focus groups with women and men to collect baseline data on the needs and perspectives of both women and men, to explore the local resources available, and to learn about the community members' willingness to participate in water and sanitation projects. Since the groups were conducted separately, it enabled women to discuss their lives and water and sanitation-related issues freely and openly. The five participatory methods employed in Datuchi in the women's groups included:

**Question: What are your reasons for wanting tap water ?**

#### **Reason and Ranking by Female Participants (N = 6)**

<b>Reason</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>Total Score</b>
Water is clean	4	5	6	6	6	6	33
Convenient	6	3	4	4	4	5	24
Saves physical energy	2	2	5	5	2	3	19
Save lives (from drowning)	5	4	2	2	3	2	18
Improves health	3	6	3	1	1	1	15
Saves time	1	1	1	3	5	4	15

*6 = Most important, 1 = Least Important*

**Question:     Where would you like the stand taps located?**

**Ranking by Female Participants (N = 5)**

<b>Location</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>Total</b>
Courtyard	5	5	3	3	5	23
Kitchen	4	3	4	4	3	18
Washroom	3	4	2	2	2	13
Field	2	1	5	5	1	10
Garden	1	2	1	1	4	11

**Reason and ranking by Male Participants (N = 6)**

<b>Reason</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>Total Score</b>
Not visibly dirty	4	2	4	3	4	4	21
No germs	3	4	1	4	3	2	17
More accessible	1	3	2	2	2	1	11
Alleviates water Shortage	2	1	3	1	1	3	11

*4 = Most important, 1 = Least Important*

**Ranking by Male Participants (N = 5)**

<b>Location</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>Total</b>
Courtyard	2	2	2	1	2	9
Communal taps	1	1	1	2	1	6

**Focus Group Discussions**

The discussions within these groups provided salient and detailed information on key water, sanitation and hygiene-related issues. Furthermore, the groups provided the structure for pursuing other participatory methods listed here.

**Direct Observations**

Observations took place during village walks. During the walks, the women identified important aspects of the settlement pattern, the soil and water conditions, the locations of local materials, and sites and sources of contamination in the village.

**Question: Why do you prefer Pour Flush (PF) latrine option as compared to the Twin Pit Composting Latrine? (TPCL) and Ventilated Improved Pit Latrine (VIP) options?**

#### **Criteria and Ranking by Women**

<b>Criteria</b>	<b>Rank</b>
Reduce incidence of diseases such as Diarrhoea, fever, and stomach pain	1
Improves personal and household Cleanliness	2
Can be used by guests during their visits to the village	3
Provides a private and secure place for Women to use	4
Reduce the need to defecate in open Areas in the village	5
Provides privacy for women	1
It is accessible since it can be built next to or attached to the house	2
It looks clean and it is clean to use	3

#### **Preference Ranking**

Using this technique, the women explored their reasons for wanting potable water supply systems, their preference for standtap locations, and their criteria for selecting the Pour Flush (PF) latrine, as a suitable option for meeting their sanitation needs. The following tables provide a sense of women's responses to these issues and how these compare with the responses to the same issues generated by the male participants. In the groups, the participants themselves generated various categories and then ranked them according to the preference.

It is interesting to note that while these women and men both preferred the courtyard as the most suitable location for stand taps, the women specified four other locations within domestic spaces in which they work and spend their time. In this sense, the women preferred to keep the stand taps within the "private" spaces of their households. The other option suggested by the men - the communal taps - are located outside the household in more "public" spaces.

In the following tables, the sets of criteria that describe why the women and men prefer the Pour Flush (PF) latrine are shown. The women identified five criteria and the men identified three. An important point is that the men highlighted the need to provide privacy for women in their choice of sanitation option, thus indicating their awareness of women's needs. However, in this particular case, the men commonly practice open defecation, yet they did not specify privacy as a specific concern of theirs.

#### **Social Mapping**

The use of this technique helped the women to get an overall view of their village including the water supply and drainage systems, the time devoted to fetching water; the sanitation situation (i.e. how many people use latrines and what kind of latrines are used); the female literacy rate, and the most acceptable options for improving the condition of water and environmental health.

## **Daily Time Budget and Seasonal Calendar Exercises**

The outcomes of these two methods provided valuable data on how much time is spent on water, women's responsibilities regarding care of household water sources and hygiene; women's involvement in income generating activities, the time constraints placed on women's everyday lives and the effect of seasonality on these constraints, and the expected impacts of a water supply project.

Overall, these approaches provided a means of exchanging information between the women of Datuchi themselves and between the women and the WASEP staff. By using participatory research methods, female community members have been directly involved in the data collection process. Additionally, these methods as well as others can be applied in other project communities and in other stages of implementation and monitoring to establish the strengths and weaknesses of interventions and recommend appropriate gender action.

## **STRATEGY # 2**

### **INSTITUTIONAL MECHANISMS**

#### **WOMEN'S WATER AND SANITATION COMMITTEES**

The idea of forming institutional mechanisms to enhance women's participation in decision-making concerning water supplies grew out of the knowledge of constraints which prohibit women from taking on leadership roles or voicing opinions in public settings. Initially, Water and Sanitation Committees (WSC) were formed in the project communities with the stipulation that a minimum number of women participants would be included. However, it was quickly realized that even if women were included, it did not automatically ensure that women's priorities would be voiced or that their full participation in the decision-making would be realized. Such fears of low female activity in the WSC has lead WASEP to support all-female institutions such as Women's Water and Sanitation Committees (WWSC). These committees are formed voluntarily and the women of the communities are responsible for selecting the members. In the case of Chirah and Ayeenabad, the women felt strongly about the need to have representation of all ages, and hence, selected members who would represent younger, middle and older age groups. Once the WWSC's were formed in these two communities, the women set about identifying the tasks of the committees. In both communities, the women decided that the tasks of the committees would include:

- (a) Promotion, maintenance and quick repair of the water stand taps by households
- (b) Monitoring the use of stand taps to avoid wasteful water practices and issuing fines in the case of non-compliance; and
- (c) The education of women and children about proper water use and cleanliness around stand taps. In Ayeenabad, the women further articulated that the WWSC should assist the male WSC with other tasks such as tariff collection and the maintenance of O & M funds.

Since their organization, the WWSC's have provided a channel through which project information and the process of learning (Strategy # 1) can be activated at the project level to reach women in a manner distinct from the men. Furthermore, women have gained new skills, a role in planning to reach a consensus about key choices (e.g., fee collection, the design of latrines, and feasibility), and a sense of ownership of the project. While the formation of women's committees may not be acceptable or appropriate in all valleys and villages. While the men in the aforementioned communities have been supportive of WWSC's, it remains essential in this male-dominated society to work within the socio-cultural constraints and maintain a flexible approach to providing support to women's committees.

### **STRATEGY # 3**

#### **HEALTH AND HYGIENE EDUCATION TRAINING**

A third complementary strategy adopted has been to provide health and hygiene education training to groups of women and to individual health and hygiene education promoters who are village-based. This strategy evolved out of the needs identified by women for more education and information about a range of hygiene-related issues and concerns. In both Chirah and Suria hygiene promotion materials designed by health educators and artists based in Gilgit, were used as training tools. These materials in pictorial and story form stress practical problems and depict individuals in "the real life" settings indicative of the region. For example, the picture cards depict the health hazards of open defecation and sensitive issues such as purdah and how this has a bearing on women's sanitation and hygiene practices. The materials are designed to initiate discussion and problem solving by the participants themselves.

The sessions conducted in Suri and Chirah included between 10 - 12 participants and all village women were included. The first health education sessions ever conducted in Chirah was held in January 1998. During the sessions in both of these communities, the women were motivated to identify solutions to local problems which they have observed in their communities and which are depicted as problematic by the picture cards. Solutions were generated within the groups themselves by the women participants and included the safe disposal of excreta, the removal of hens and animals from near the houses, and proper storage of water. At the end of the session, the participants issued several requests for more of these types of informal discussion and information exchanges and identified personal hygiene and sanitary food practices as topics for future training sessions. This type of strategy is ideal for enhancing the knowledge of women in an informal manner and has been observed to make women more active as they start to analyze the problems and consider the actions to protect their water sources and health.



## CONCLUDING REMARKS

In the context of Northern Pakistan, many of the reasons for the existing barriers to enhancing women's participation are highly sensitive and complex. Participatory methods have proven to be very effective in identifying and explaining these factors. If the process of collecting data, for example, did not employ participatory methods for gender-specific data collection, it is doubtful that specific issues of preference would have been reported. Moreover, these strategies have resulted in tangible improvements in women's technical skills, knowledge of project maintenance, awareness of disease transmission, and hygiene practices.

Because these strategies are designed to be locally appropriate, they have proven to be responsive to the needs and priorities of women and their communities. A key factor relevant to this region is that these strategies have been well received by men who have supported the institutional measures (i.e., WWSC's) and the provision of information to enhance both women's participation and health knowledge. As such, this is a beginning towards not only capacity building and ameliorating health, but also improving women's position and status in rural societies. Continuing to put these strategies into practice will promote gender sensitization at all levels of Programme activities.

## REFERENCES

- BOLT, E. 1994. *Together for Water and Sanitation Tools to Apply a Gender Approach: The Asian Experience*. IRC International Water and Sanitation Centre. The Hague, The Netherlands.
- HALVORSON, S. 1994. *Women, Water and Sanitation: Lessons from the Field*. Women and Development Section, The Aga Khan Rural Support Programme, Gilgit,
- WAKEMAN, W. 1995. *Gender Issues Sourcebook for Water and Sanitation Projects*. UNDP-World Bank Water and Sanitation Programme/PROWESS. Washington, DC: The World Bank.
- WIJK, C. VAN; LANGE E. DE AND SAUNDERS, D. 1996. "Gender Aspects in the Management of Water." *Natural Resources Forum*, 20 (2):91-103.
- S.J. HALVORSON, Research Associate, Water and Sanitation Extension Programme, Aga Khan Planning and Building Service, Pakistan, Gilgit, Pakistan.
- N. AZIZ, Community Liaison Assistant, Water and Sanitation Extension Programme, Aga Khan Planning and Building Service, Pakistan, Gilgit, Pakistan.
- K. ALIBHOY, Director, Water and Sanitation Extension Programme, Aga Khan Planning and Building Service, Pakistan, Gilgit, Pakistan.

### **Paper # 3**

Presented in WEDC Conference, Dhaka, Bangladesh (2000)

<p style="text-align: center;"><b>COMMUNITY MANAGEMENT OF RURAL WSS IN NORTHERN PAKISTAN</b></p>
--

*By Javaid Ahmed and Dr. Karim Alibhai*

#### **BACKGROUND**

Donor funding made available to NGOs has considerably supplemented the efforts of the government agencies to facilitate rural communities with potable tap water. The National estimates of overall coverage of water supply and sanitation schemes in Pakistan for rural drinking water supply and sanitation are 45% and 10% respectively. A study conducted in Northern Pakistan shows a similar picture; drinking water supply and sanitation being 42% and 20% respectively.

#### **Partnering With Communities**

Review of the past experience shows that resources will be wasted if enough thought is not given to the need of long-term operation and maintenance of water supply schemes. (Ahmed, 1996, IRC, 1993). Donors can mainly finance the construction of the water supply schemes, and have limited input in subsequent running costs. It is imperative that the communities maintain and operate their schemes with all costs being borne by the respective communities (in line with the users pay principles) and that a formula for operation and maintenance be in place at the outset. Hence, donors need to involve the communities as partners to share the responsibility for operation and maintenance - in addition to the traditional community role of providing labour and local materials during construction. To make the communities real partners, it is imperative to involve them right from the planning phase.

#### **Community Experience**

The concept of community management is as old as the settlements started here about a thousand years ago. The management of irrigation channels independently by communities is common in the region. Apart from this, taking care of pastures and forests has been another active practice in community management. Nevertheless, community management of RWSS has not been a successful experience in Northern Pakistan despite the fact that community management is an inherent prevailing practice in the region. The prime reason being that the communities never “owned” the RWSS projects.

### Current Status

In order to assess the status of water supply schemes, a study was conducted in 1994 - 95 to produce a quantitative database and situation report about the traditional and improved water supply and sanitation schemes in the area. (Ahmed 1996). The results of the study are presented in table 1. This table shows that a considerable number of RWSS are non-functional. The major reason has been a lack of community participation and community management, misuse of allocated funds, and other unscrupulous practices within the sector has resulted in partial coverage and poor quality construction.

**Table 1. Status of Water Supply Schemes**

Category	No. of Villages	Percentage
Total number of villages visited	986	100%
Villages with completed WSS	417	42 % of 986
WSS totally non-functional	85	20 % of 417
Villages with partial coverage	127	30 % of 417
Villages with full coverage	201	48 % of 417
Villages where WSS is under construction	33	3 % of 986

The committees were formed on an adhoc basis often with varied interests. Although these committees were responsible for the implementation and post implementation management of the schemes, enough attention was not given to making clear the roles for post implementation management. As a result, the systems did not last long enough to take care of the operation and management of the schemes. Table 2 shows the existence and the functionality of the committees in 502 communities. In over 95% of the cases, committees no longer existed to take responsibility for the scheme's operation and maintenance.

**Table 2. Existence and Functionality of Committees**

Description	No. of villages	Percentage
Non-existent	479	95.5%
Existent but not functioning	5	1.0%
Existent and functioning	18	3.5%

### Initiative for Change

The International Water and Sanitation Center, IRC of the Netherlands initiated a Participatory Action Research (PAR) Project on *“The role of communities in the management of Rural Water Supplies in 4 villages of Northern Pakistan along with another 5 countries around the world”*. Under this initiative, separate water committees, both for men and women, were formed in all communities. The capacity of the water committees was built through a series of workshops, exchange visits and meetings. These committees, by involving other community members, introduced water tariff systems and fines on misuse of water. These measures significantly improved the O & M of the existing RWSS, but not upto the desired level. The major reason had been the inequitable access to tap water. Taking its lead from the lessons learnt in the PAR project, WASEP introduced a unique system of community management into its interventions. The following section will describe the salient features of the WASEP approach to community management.

## WASEP GOAL AND APPROACH

### Goal and Specific Objective

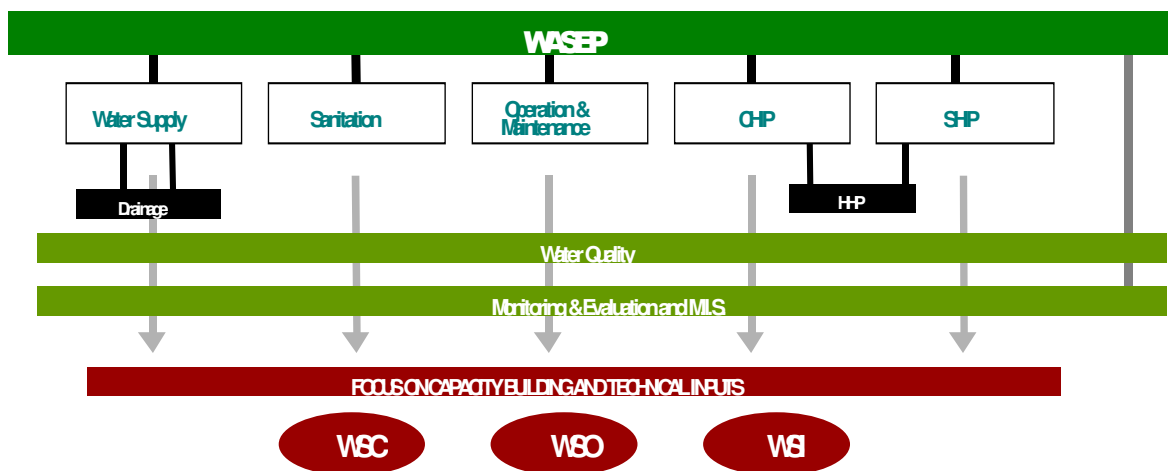
The broad objective of WASEP is to enhance the quality people's lives in Northern Pakistan. In particular, the programme will develop local capacities for integrated implementation of drinking water, sanitation and hygiene education in order to reduce by 50% water and sanitation related diseases.

Specific objectives include

- (a) To build up the organizational and managerial skills
- (b) To increase awareness among the beneficiaries about hygiene concepts
- (c) To enhance the availability, accessibility, reliability and quality of water

Physical investments include piped water supply systems bringing water to household tap stands and construction of improved latrine facilities. Infrastructure is complimented with water quality sampling and health and hygiene education. Considering the extent of investment being made into communities, WASEP is concerned about the ability of the village to implement and sustain both the physical infrastructure and health benefits

**Figure 1. The WASEP Approach**



It is held by WASEP that a project designed and implemented with the principles of inclusiveness, equitable access, and a true sense of community participation guarantees its long-term sustainability. As the figure 1 shows, WASEP's input into projects focuses on developing community capacity to manage, operate, and sustain both the hardware (infrastructure) and software (health and hygiene) intervention.

### **Development of Application Form and Distribution**

Prior to any work being carried out in a village, the community fills out an application form. In addition to providing basic village information to WASEP, the form requires 75% of the households to sign and endorse the request. The application is a community's formal request for assistance and indicated that it is a community wide initiative.

### **Terms of Partnership (ToP)**

A detailed Terms of Partnership has been developed and is signed by all the households of the respective community. Roles and responsibilities of the community and WASEP are made clear in this document.

Features of the ToP include; formation of a democratically elected Water and Sanitation Committee (WSC) through a general forum where at least 75% of the households are present. The WSC is responsible for coordinating the village's participation in all aspects of the scheme including planning, construction, and maintenance. The community selects a village plumber (Water and Sanitation Operator - WSO) and a female health and hygiene promoter (Water and Sanitation Implementer - WSI) and fix their remunerations. The collection of an operation and maintenance (O & M) fund and monthly tariffs are parts of the ToP included to assist the community in developing financial systems. The ToP signifies a community's acceptance of working towards improving community health and establishes that the scheme is owned by and the responsibility of the village.

### **Community Needs Assessment**

During WASEP's 5 - year tenure, 105 villages are to be covered, but over 600 applications for water supply and sanitation schemes have been received. In order to target those communities where there is a balance between the need and the ability to carry out and sustain an intervention, WASEP performed a series of Participatory Rural Appraisals (PRAs) in a short listed set of villages. Detailed information about the social and technical issues vital for water and sanitation interventions are obtained using different PRA tools. Village mapping has been a major exercise to get the required information. Such exercises are conducted separately with men, women, and children. These maps are used not only to find out about the physical and socio-economical information, but also gives a good opportunity for the community to get involved in the planning of the project. In case of differences in the choice for proposed source, preference-ranking exercise is conducted and consensus is drawn for the source preferred by the majority of the villagers. Through PRA, the community is able to assess its real needs and abilities, and WASEP is able to use this information to select potential partners. On the basis of the findings, villages are selected for the further process and are asked to deposit their operation and maintenance (O & M) fund. (See details below) Collection of O & M fund confirms for their needs and commitment to contribute for the construction and management of the scheme.

### **Equitable Access**

During the topographic survey, the route proposed by the villagers during the PRA exercise is followed, if feasible. In case of a problem with the proposed network, a consensus is drawn for a possible alternate route before proceeding further to avoid conflicts during construction. No willing house shown on the village is left un-surveyed. Men and women are both consulted on routing and design matters from the source selection to tap stand location. This level of involvement in the process helps to create a sense of community participation and decision making authority in the implementation of the scheme.

### **Appropriate Designs and Choice of Material**

One of the major causes of interrupted supply of tap water has been the inappropriate choice of construction material and laying of pipes within the frost level (PEPAC, 1993, a third party evaluation of RWSS in Northern Areas). Communities are confident that their WASEP assisted schemes will work as the materials chosen for construction are similar to the North American standard pipes (HDPE) and due attention has been given to quality construction. Pipes are laid at 4 feet depth with the villagers investing their labour for excavation task. State-of-the-art computer software is used for hydraulic calculations, whose results are shared with the community. Again, involvement of the community in the planning and implementation of schemes creates a sense of ownership and true participation.

### **Selection for Different Sanitation Options**

Communities are facilitated in choosing appropriate sanitation options taking into accounts the technical feasibility and social acceptance. Pour-flush is preferred by those in the lowlands, Dry Pit by those in the highlands, and Twin pit Composting latrines by those with a preference for manure fertilization. The coverage and usage of latrines is surprisingly high from 100% to a minimum of 60%. A comprehensive hygiene education and a token incentive of < 15% of the total cost has boosted up the coverage and usage (Ahmad, Alibhoy, 2000). Having households decide on the technology of their choice has gone a long way to facilitate the use of latrines.

### **Hygiene Education**

A comprehensive hygiene education programme involving men, women and children is run as an integral part of the water and sanitation scheme. The aim of this activity is not only to raise awareness regarding hygiene issues in the community but also to create a sense of responsibility for operation and maintenance of the scheme among women and children. Women are the prime targets for this information as their traditional roles in their homes allow for changes in behaviour and fostering of values vis-à-vis water and sanitation. Details about the programme are presented elsewhere in this Conference (Ahmad & Alibhai 2000).

### **Formation of Committees and Capacity Building**

Although Table 2 shows that in 479 cases, there are no committees at all, committees actually existed during the construction phase but did not stay longer because enough thought was not given for their long-term sustainability. In order to avoid this situation, the communities are told that WASEP is equally conscious about the long-term operation and maintenance along with quality construction. In all the 44 partner communities, Water and

Sanitation Committees (WSC) have been elected by the communities themselves and are functioning. These WSCs were involved right from the planning phase to the O & M phase of the project. The WSO is responsible for daily maintenance and the WSI is responsible for health and hygiene issues in the village. In addition, the WSI is established as a link between the women of the community and the management structure of the scheme. Both the WSO and WSI are integral members of the committees and as they are compensated by the community and are ultimately responsible to them to carry out their tasks. Other office bearers include the President, Secretary and Treasurer. They are responsible for bringing consensus for various water and sanitation related issues, preparation of agenda, record keeping, and to look after the finance issues respectively.

To train all the three office bearers, WSO and WSI, a two-day training workshop is organized prior to handing over of the project to the community. All the five members are given basic training in their respective fields. In addition to attending the training workshop, the WSO gets on-the-job training in his village during the construction of the scheme, which generally takes over three months. The WSI is trained in conveying health messages and to assess and record health and hygiene data in the village. Special emphasis is given to the training of the Treasurer. He is given training in basics of book keeping, whose performance is monitored by WASEP.

### Financing

Generating enough funds in order to remunerate the operators and to arrange the spare parts for repairs has been a major constraint for smooth operation of the RWSS in all developing countries. In order to avoid the same problems, WASEP introduced a promising system of collecting the required funds for O & M prior to the scheme construction. Communities deposit a sum of PKR 1,000 per household into a profit bearing fixed deposit account. A nominal amount is contributed to this account by WASEP. The communities use the profit to remunerate the WSO and WSI. In addition, approximately 20% of the fund collected is used to purchase a *village spare parts revolving stock*. The community buys spare parts from WASEP at a wholesale rate and sells the parts in the village as required.

Table 3 shows the amounts deposited by the communities and how in real terms, their contribution covers over 45% of the total scheme costs.

**Table 3: Community Cost Contribution**

Year	# of communities	Population	Total Project Cost (PKR)**	Share for Construction		Share for O & M	
				Community	WASEP	Comm.-unity	WASEP
1998	15	11,380	19,419,023	7,749,154	10,515,369	703,500	450,000
1999	25	20,212	47,178,824	16,821,722	27,005,840	2,601,262	750,000
2000	25			1,637,700*			

\*collection is in progress

\*\*55 PKR is equal to 1US\$

In addition, a monthly tariff is also collected by the community and is kept in the WSC's account. The income generated through tariffs is to be utilized to repair major breakdowns and to meet the additional costs due to yearly increment in remuneration of WSO and WSI.

## **LESSONS LEARNED AND CONCLUSIONS**

The rate at which the communities agreed to the TOP (which is considered onerous with respect to other organizations in the region) showed that the communities with real needs were willing to invest in, work for, and take ownership of their schemes. Evaluating each application for its merits and the subsequent PRA sessions assisted WASEP in determining the most likely to succeed partners. However, the time and effort involved caused delays in the programme implementation and proved to be a mammoth undertaking. The inclusion of all members of the community in design and construction (men, women, rich, and poor) has assisted in creating a true sense of community ownership and has helped achieve O & M goals.

WASEP's decision to provide household taps was a direct result of responding to the community demand. This level of service, coupled with the messages disseminated by WASEP's health and hygiene programme, has resulted in increased water use and healthier communities. The significant impact that has been made on diarrhoeal morbidity in the partner communities (i.e. a reduction of 50%) is a direct result of consumer satisfaction with the product they have developed and the messages women and children have chosen to adopt.

Community management and capacity building of village organizations is a key to the success of the scheme. However, although WASEP has been successful in creating committees, it has realized that the investment required into building their managerial and financial skills must be increased substantially. Long-term viability of the physical infrastructure depends on how effectively committees can plan for contingencies and collect tariffs – systems which are still being developed by WASEP and its partners.

WASEP's experience shows that the likelihood of a scheme to remain functioning is highly correlated with the level to which the community participation and the management is facilitated. Each component must be addressed as part of a whole, where omission or suppression of one section can result in the entire strategy being compromised.

By addressing the community ownership and the management as a complimentary component to infrastructure and health and hygiene, WASEP has been able to work towards the schemes that are likely to remain functioning in the future and has created an enabling environment for sustainability. The example produced by WASEP is being replicated by other agencies working in the sector, especially by the local government agencies. The success of the community based management and local O & M will go a long way in ensuring that the schemes remain functional well into the future.



## **REFERENCES**

Ahmed, J., and Lagendjik, M.M. (1996), Water and Sanitation inventory of 986 villages of Northern Areas and Pakistan, (Issue Paper No. 8. Water Sanitation Hygiene and Health Studies Project, Age Khan Heath Service, Northern Areas and Chitral, Pakistan.

IRC, 1993, Taking care of your water supply, Training series, A manual for community based operation and maintenance of pipe water systems, The IRC, The Netherlands.

IRC, 1992, Paying the pipe: An overview of community financing of water and sanitation, Occasional Paper series, The IRC, The Netherlands.

De Lange, E. (1998), Learning in the field: How 22 communities improved their water management. Community managers for tomorrow, Document 2. The IRC, The Netherlands.

PEPAC, 1993, Third party evaluation of RWSS in Northern Areas, PEPAC, Pakistan.

## **Paper # 4**

Presented in WEDC Conference, Dhaka, Bangladesh (2000)

### **WATER TARIFFS A CHALLENGING ISSUE FOR WASEP IMPLEMENTATION**

*By Manzoor Hussain, Saleem Khan, and Dr. Karim Alibhai*

#### **1.0 INTRODUCTION**

The lack of proper operation and maintenance (O & M) has long been acknowledged as being a major contributing factor to non-functioning of water supply schemes in the developing countries. A common strategy of most agencies that operate in rural areas has been to delegate the responsibility of O & M to the user communities. However, it is common to observe that these communities are often unable to meet the above expectations for reasons which may include, amongst others, the absence and understanding of well-defined management systems, dissatisfaction with service levels, lack of motivation, general reticence, and social conflicts.

The surveys conducted by the Water, Sanitation, Hygiene and Health Studies Project of the Aga Khan Health Service, Pakistan in the Northern Areas and Chitral during 1993 - 96 have shown that nearly 50 % of the rural water supply schemes were under different levels of functioning, with many in the complete non-functional state. One of the major reasons for the given condition was found to be lack of proper O & M.

The Water and Sanitation Extension Programme (WASEP) of the Aga Khan Planning and Building Service, Pakistan is a comparatively recent addition to the agencies working in the rural water supply and sanitation sector in the Northern Pakistan. The WASEP approach places significant importance to ensure the proper O & M of the schemes after construction. In this connection a two-pronged strategy is applied in the WASEP Terms of Partnership with the communities, including the establishment of O & M fund as a pre-requisite to scheme approval, and collection of water tariffs after the completion to be supplemented to the aforementioned fund. After completion of the first batch of 15 WASEP schemes in 1998, a monitoring exercise was undertaken in 11 out of the 15 schemes in order to assess the operational conditions of these schemes and to examine the tariff collection situation. Through the mentioned exercise, it was revealed that the tariff collection strategy was not being followed satisfactorily in most of the cases. To substantiate the above exercise, it was decided that an in-depth study be carried out in 3 of the mentioned villages. Through this study, it was aimed to gain a better understanding of the tariff situation and to assess the effectiveness and the shortcomings of the community based tariff strategies that were implemented by WASEP. This paper presents the findings of the mentioned study.

### 1.1 Presumed Key Hypothesis

To analyze and ascertain the tariff system breakdowns, the following hypothesis were used as a probable cause - effect relationship:

- i. *Inappropriate tariff collection strategies*  
Often the tariff collection procedures are inappropriate with respect to the specific conditions. Alternative strategies and procedures of tariff may be examined such as tariff through trade, barter instead of currency; collection in one or two installments in a year linked with the marketing of crops and / or livestock instead of fixed monthly collections; centralized collection verses door-to-door collection.
- ii. *Lack of users' confidence in the community based organizations*  
There may be lack of users' confidence and trust with the community-based organizations and the workers / activists, who are responsible for implementing the tariff collection procedures and managing community funds at the local level.
- iii. *Lack of women's participation*  
It is often very common for women to get excluded from the major decision making procedures and O & M activities. They are generally perceived as the passive partners, and considered to be unable to carry out managerial and technical activities.
- iv. *Free riding*  
Often, free riding, even at a small scale, can result in the disruption of collective efforts. In the case of water supply, it is common not to pay, often the poverty argument is used for exclusion to pay (standard willingness and ability to pay dichotomy).
- v. *Disparities in the service level*  
Through the provision of individual household connections, WASEP has already made an effort to minimize the level of services between the rich and the poor. Some disparities may still exist in the service levels in terms of influential people obtaining more than one connection, and larger amount of water used in the case of large families.

### 2.0 STUDY METHODOLOGY

The information gathering process methodology entailed (and was not limited to):

- i. Meetings held with the village Water and Sanitation Committees (WSCs) in order to review the existing strategies regarding tariff collection, and to identify issues and problems faced in this connection.
- ii. The tariff records from each study village were obtained and reviewed.
- iii. Where applicable, meetings were held with non-payer target groups to verify the tariff records and to obtain their reasons for non-payment.

- iv. Village general body meetings with men were held to present the findings of the study and to discuss the current situation regarding the payment of tariffs. Their views for improvements were also sought.
- v. General body meetings of females were held to assess their understanding about the tariff issue and to seek their opinion about the current situation. The possible role of women in the tariff collection activity was also explored.



**Figure 1: Study villages in Northern Pakistan**

### 3.0 THE STUDY VILLAGES

A brief introduction of the study villages and their strategies of tariff collection are presented in Table 1.

**Table 1: Introduction of study villages and their strategies of tariff collection**

Description	Datuchi	Mayoon	Yono
Number of Households	120	90	58
Population	930	720	595
Languages Spoken	Shina (100 %)	Shina / Brushiski (80/20)	Balti (100 %)
Major Tribe	Yashkun	Shine	Mughul
Sources of Income	Agriculture, Local and outside jobs, Seasonal laboring	Agriculture, Local and outside jobs, Seasonal laboring	Agriculture, Minerals, Tourist guiding
Year of Scheme Construction	1998	1998	1998
Type of Scheme	Gravity water supply and household latrines	Gravity water supply and household latrines	Gravity water supply and household latrines
Tariff Rate (Rs / family / month)	Rs. 5/=	Rs. 5/=	+ water treatment plant Rs. 10/=
Tariff Collection Method	WSC (door to door)	WSC (door to door)	Operator (door to door)

WASEP recommended a monthly tariff of Rs. 10/= per family for the scheme villages. For Gilgit and Baltistan regions where the tariffs were linked with repair and maintenance, this translated into an annual O & M cost of about 2 % of the external investment cost of the water supply component (excluding the cost of community share i.e. local labour and materials). Whereas in Chitral region where the tariffs were used to pay the salaries of the scheme operator and health and hygiene worker (WSI), it assumed wages of approximately 14 hours of un-skilled labour per week for the operator and 10 hours per week for the WSI.

## 4.0 RESULTS

### 4.1 Summary of tariff collection in 1999

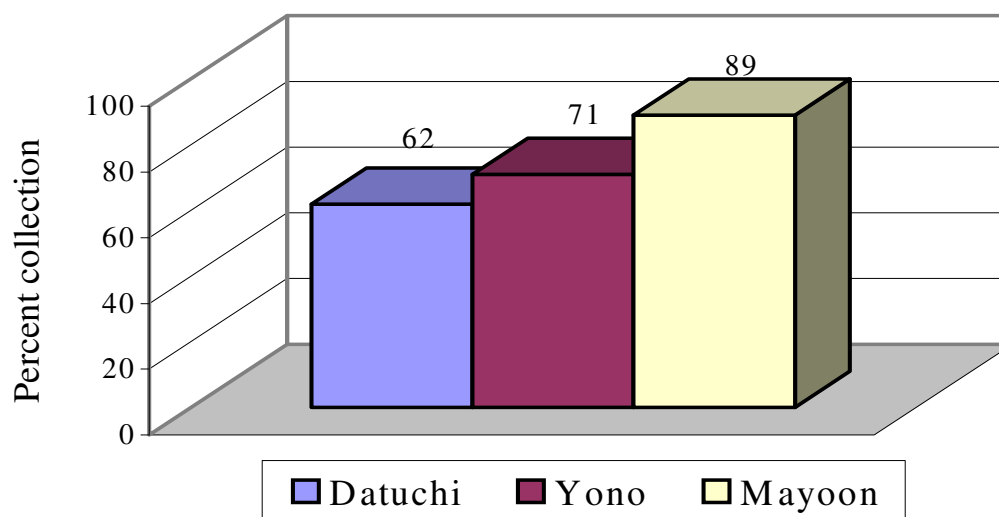
The tariff rates set by the villagers in Datuchi and Mayoan was 50 % lower than that recommended by WASEP as a minimum standard. The Water and Sanitation Committees (WSC) in these villages, which are the responsible body for the scheme implementation and management at the village level, explained that an increase in the tariff rates was planned for the second year of scheme operation, i.e. from January 2000. However, such a step was not undertaken until March 2000 when the study was being carried out. Similarly, in the same villages, the cash subsidy paid by WASEP for latrine construction was utilized for paying water tariffs of up to 6 months. The subsidy accounts for 15 to 20 % of the total cost of the latrine, much of that is paid in shape of external materials. The remainder of the subsidy amount works out to between 15 to 20 % of the total grant (the sanitation subsidy policy is in contention with some donor agencies). It suggests that the actual tariff collection situation in the aforementioned villages could be worse if the subsidy factor was excluded.

The tariff data for the study villages has been presented as percentage of user families paid for different time periods over the year i.e., zero months, 1 - 5 months, 6 - 11 months, and 12 months (see Table 2). These figures suggest that in Yono where the tariff rate was higher and where it was collected on a monthly basis, only 19 % of the users paid for the whole year. However, a sizable number of user families i.e. 66 % paid their tariff for 6 to 11 months of the year. For Datuchi and Mayoan, these figures work out to 44 % and 86 % respectively. Figure 2 provides the aggregated overall percentage of tariff amounts collected in the study villages for the study year. The data suggests that the amount of tariff collected over the entire year equals to 62 %, 71 %, and 89 % for Datuchi, Yono, and Mayoan respectively.

**Table 2. Tariff paid by user families in 1999**

Villages	Categories of tariff payment over the year 1999			
	0 months	1 - 5 months	6 - 11 months	12 months
Datuchi	18 %	18 %	20 %	44 %
Mayoon	3 %	9 %	2 %	86 %
Yono	9 %	6 %	66 %	19 %

**Figure 2. Aggregated overall % of annual tariff collection in study villages**



## **4.2 Verification of the Study Hypothesis**

### ***i. Inappropriate tariff collection strategies***

All three villages adopted the strategy of collection in cash and on a door-to-door basis. Alternative forms of collection, such as, through trade and barter was not encouraged in any of the villages. A specific duration for payment was not set, it was left up to the users' discretion to pay for as many months as possible. The payment of tariffs was not linked with the marketing of crops and livestock during certain specific times of the year when the villagers are generally in a better position to pay. The door-to-door collection, which was adopted in all villages, proved to be difficult and time consuming; the collectors felt inappropriate to making repeated visits to the individual households.

### ***ii. Lack of users' confidence in the community-based organizations***

This was not found to be a substantive factor contributing towards the unsatisfactory tariff recovery conditions in the study villages. The WSCs in all three villages were elected through a free and fair procedure. These WSCs generally seem to enjoy the confidence of the majority of the villagers to manage the technical and financial matters of the schemes. Some women in some of the villages seem not be aware of the usage of the O & M funds. Some thought these funds were being used for paying salaries to the village operator and the health and hygiene worker, which was not the case.

### ***iii. Lack of women's participation***

In none of the study villages did women play any substantive role in the collection and management of water tariffs. It was however apparent that most women in the study

villages had a reasonable understanding about the O & M requirements and need for a proper tariff policy. They were also willing to play an active role in this connection. On the contrary, the male members of the community in all three cases disagreed with any potential role that women could play in tariff collection. They suggested that this was impractical given the limitations of female mobility.

**iv. *Free riding***

'Free riding' was not noticed as an issue in any of the villages. There were, however, some cases where some poor families were exempted from tariff payment for which the entire village community seemed to be in agreement. These families generally include those headed by widows and orphans. These families were also exempted from other communal obligations such as seasonal rehabilitation of irrigation channels, fees of community run schools and health centres, pasture activities etc.

**v. *Disparities in service level***

Through the provision of individual household connections, WASEP has already made an effort to minimize disparities in the level of service between the rich and the poor. In one of the villages, i.e. Yono, some five families who are among the non-payers complained about not having reliable service in terms of continuous water supply. All of these households are situated on a higher location in the supply network where a satisfactory supply could only be ensured by throttling the downstream flow by means of a control valve. It was found that the system operator was not attentive to these requirements due to the remote location, and later due to the broken valve which was left unattended for a few months before WASEP staff intervened to improve the situation.

### **4.3 The Conclusive Findings**

**i. *Apathy and lethargy on part of the WSCs***

Although not envisaged, the common factor that has contributed to the unsatisfactory conditions with regard to tariff collection is the general apathy and lethargy from the WSCs in all the three villages. In two of the three villages, the entire responsibility of tariff collection tariff lied with the WSC, whereas in the third village, i.e. Yono, the WSC was expected to help the operator to make the door-to-door collection. In Datuchi, the selection of the WSC members was made on the basis of representation of different clans, and was agreed that each member would cover their respective clans. In Mayoan, the distribution of collection zones did not follow any specific criteria - here the level of responsibility varied with the level of the volunteerism of the individual WSC members. In all the three villages, it was apparent from meetings with the village general body and individuals that insufficient efforts were being made by the WSC members regarding tariff collection. Many users reported they were not approached for many months. In all the three cases, the WSC members admitted to above finding and showed willingness to make renewed efforts in the future. Besides follow-up, one factor to be appreciated here is the perception of "why should collection of tariffs be undertaken when nothing is wrong".



**ii. *Users' Perspective of the Tariffs***

***According to WASEP strategy in the Gilgit and Baltistan*** regions, the salaries of the village operator and female health worker are being paid from the profit of the O & M funds. The monthly tariffs are meant to cater for the needs of any major repairs and maintenance. Since WASEP implemented schemes are relatively new, such a situation may arise in a few years. The users in these villages generally seem indifferent to such future needs and tend to consider the tariff collection as a mere condition of WASEP. A different O & M strategy has been introduced by WASEP in the Chitral region - here the tariffs are being linked to the salaries and the profit from the O & M account for future repairs and maintenance. It has been noticed that the tariff payment / collection rate in all four of the 1998 scheme villages in Chitral region i.e. Hingil, Siya Arkari, Madaklasht, and Snoghore has been quite near a 100 % for the year 1999.

## **5.0 RECOMMENDATIONS**

**i. *Follow-up of village activities***

According to the WASEP's Village Terms of Partnership, the sole responsibility of the scheme management lies with the user community. WASEP staff is available to offer technical assistance only on request. It is assumed that the WSC, which is chosen by the community and trained by WASEP during implementation, will continue to play an active role in the village. This study suggests that some follow-up activities can substantially contribute to the better and timely performance of the WSCs, which can be done through periodic visits of the agency staff to the villages for at least the first couple of years after completion of the schemes. The recent visits to the study villages have proved to enhance peoples' interest in the tariff procedures. In Mayoona, the tariff rate was increased from Rs. 5 to Rs. 10 per family, and in Datuchi and Yono the WSCs undertook to initiate renewed efforts to improve collection of tariffs.

**ii. *Introduction of alternative strategies***

Having proved the strategy in Chitral as being more effective, it is recommended that the tariff collection be linked to the payment of salaries elsewhere. Through this, the users shall be able to appreciate a definite and a visible purpose of the tariff collection activity. Other alternative strategies may also be applied according to the specific conditions. These may include different forms of collection such as through trade and barter. Similarly, the payment of tariffs can be linked with the marketing of crops and livestock. Furthermore, the door-to-door collection by the WSC members, which has proved to be difficult and time consuming in some cases, could be replaced with centralized collection procedures at the village level. The WSI, who is a member of the WSC, makes fortnightly visits to each family for collecting data on diarrheal diseases - the door-to-door collection activity may be better performed by the WSI.

**iii. *Encouragement of the women's participation***

The participation and involvement of women in the collection and management of water tariffs could improve the general situation of tariff collection. Being the primary users and managers of the drinking water supply at the household level, the womenfolk may be better sensitized about the tariff issues. It is also common for village women to have the possession of family income made from household agriculture and other food products such as fresh and dry fruits, vegetables, chicken, eggs etc. It may be more practical to expect the timely payment of tariffs from the womenfolk. In order to allow the women's participation in the management activities, awareness raising campaigns would need to be imparted for the village male members who generally seem not to appreciate the relative importance of the mentioned factor. The delegation of the responsibility of door-to-door collection to the WSI seems more practical and it could help to improve the overall situation with tariff recovery. Despite reservations of the male members towards the idea of collection females *per-se*, the WSI option was an acceptable exception primarily because she was undertaking house-to-house activities.

**iv. *Training of village accountants***

It has been generally observed that the village accountants are not capable enough to manage the village accounts in a professional manner. These accountants, who are members of the WSCs, need further training in accounts and book keeping. By enhancing their professional skills, it would help to ensure establishing proper and transparent means of business at the village level, which may result in the satisfaction of the clients and their adherence to the tariff policies.

## **6.0 CONCLUSIONS**

The following conclusion could be drawn from the above study:

- i. The level of commitment of the volunteer workers in villages may decline over time. Periodic follow-up by the external agency staff can help to motivate these workers and hence improve the effectiveness of communal activities such as tariff collection.
- ii. The villagers can better appreciate the need and importance of tariff collection activities if linked with visible objectives such as paying salaries of village workers. It is generally difficult to achieve adequate commitment if the objectives are seen as an "insurance" with a 2 - 3 year timeframe before an event.
- iii. "A single strategy for all conditions" may not be an effective policy. Alternative strategies and procedures appropriate to the specific socio-economical conditions of an area must be explored and implemented.
- iv. Women can play a vital role in the management of water tariffs at the village level particularly where health and hygiene education sessions are being undertaken. However, this may not be universally acceptable without sensitization of the village male members.

- v. The training, although foreseen by the executing agency as being adequate and appropriate at the village level, the caliber of individuals vary and hence re-training or continuous training is an important component which should be incorporated as a policy of the implementing agency for long-term sustainability of WSCs.
- vi. The performance of the WSC members in a professional and a transparent manner leads to the users' trust in the financial systems and their improved participation.

## **Paper # 5**

Presented in WEDC Conference, Dhaka, Bangladesha (2000)

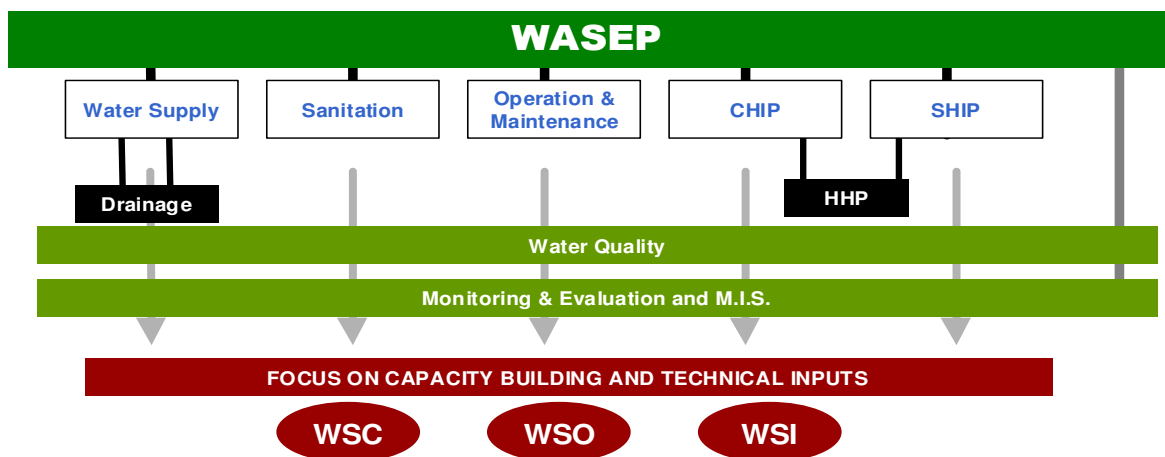
### **ENSURING SUSTAINABILITY THROUGH TECHNICAL MONITORING AND EVALUATION**

*By Latif Jina, Karim Alibhai, and Naik Alam*

#### **INTRODUCTION**

The Aga Khan Planning and Building Service, Pakistan initiated the Water and Sanitation Extension Programme (WASEP) in 1997 in rural Northern Areas and Chitral (Pakistan). The “WASEP approach” (illustrated in the figure) to rural water and sanitation is an integrated programme of piped water supply, water quality assurance, grey water drainage, adequate sanitation, health and hygiene education, and community based operation and management.

WASEP provides technical assistance, external materials such as pipes, health and hygiene education, and community capacity training. The community provides local materials, unskilled labour, and all land required for the scheme. The community establishes an operation and maintenance fund, which is used to purchase a spare parts inventory and invest in an account to generate profits to pay a local Water and Sanitation Operator (plumber) and Implementer (health promoter). Their contribution accounts for over 45% of the scheme’s costs. Intervention sees WASEP providing adequate hardware and software inputs to ensure that communities can sustain the intervention and obtain on going health benefits.



**Figure - The “WASEP Approach” to RW&S**

1998 saw partnerships being formed with 15 villages across Gilgit, Baltistan, and Chitral. Schemes were designed and constructed over a period of one year and were commissioned through the winter of 1998 and spring of 1999. Technical monitoring and evaluation exercises carried out in these villages between November 15, 1999 and February 21, 2000 provided WASEP with valuable insight into the sustainability of their interventions with respect to physical operation of water networks and operation and maintenance being performed by communities.

## **MONITORING AND EVALUATION**

WASEP's targets are ambitious and require that the programme be implemented with optimised results. WASEP's objectives and purposes are embodied in its Logical Framework Analysis (LFA) where quantifiable performance indicators allow for WASEP's success and shortcomings to be measured. Specific LFA benchmarks include:

- Reduction of waterborne diseases (a 50% reduction in diarrhoeal morbidity in the area)
- Continuous supply of safe drinking water (at 45 to 70 liters per capita per day [lcpd] for no less than 325 days a year)
- Hygienic disposal of human faeces (60% coverage of programme homes with sanitation facilities)
- Healthy and hygienic behaviours practiced in the programme area (60% of women know the cause, prevention, and treatment for diarrhoea, 70% of homes using latrines, 55% prevalence of hand-washing amongst women and children)
- Development of functioning water and sanitation schemes including village based operation, maintenance, and management
- People are aware of the connection between health, water, and sanitation

The integrated nature of the programme means that the interplay between disciplines and the extent to which each component performs needs to be in keeping with the programme's specific objectives and targets. To keep WASEP in line and focused on meeting its performance criteria, monitoring and evaluation has been integrated into almost every implementation activity. WASEP's monitoring and evaluation programme incorporates a series of dynamic concepts:

- Tracking of progress vis-a-vis programme objectives (*are we doing what we said we would do ?*)
- Quantification and qualification of the results with those envisaged (*are the outcomes as we said they would be ?*)
- Appropriate feedback into the programme (*what do we have to do to get to where we want to be ?*)

- Implications for the programme (*what can we learn from the M & E to make the intervention optimized ?*)

WASEP's Health and Hygiene Unit maintains a through monitoring programme which measures the effectiveness of their education programme, health status of partner communities, and effect on the community health. (Ahmed and Alibhai at WEDC 2000) The Water Quality Unit implements a full cycle testing programmes to ensure that WHO standards are being met vis-à-vis water quality. (Raza et al at WEDC 2000) This paper presents the objectives, activities, and findings of WASEP's Technical Monitoring and Evaluation Programme.

## TECHNICAL MONITORING AND EVALUATION

Specific objectives of the technical monitoring and evaluation were:

- To determine the level of service being provided to villagers
- To quantitatively assess the performance of the water system with respect to the design criteria
- To comprehend the processes and effectiveness of operation and maintenance
- To understand villagers' relationships with their system
- To evaluate key aspects of the village Water and Sanitation Committee

The technical monitoring and evaluation programme entailed both hardware (engineering and design) and software (community awareness and capacity) components to reflect the true nature of any water and sanitation intervention. The programme was developed during a thorough planning and preparation phase, which included the following components:

- **Stakeholder Analysis**
  - Identifying key stakeholders' (from donors to beneficiaries) interests and information requirements while involving them in M & E
- **Process Modeling**
  - Outlining the intervention processes and determining where M & E is possible
  - Identifying when M & E should occur and where a feedback loop can be inserted
- **Tool Development**
  - Determining the types of data that are available and configuring appropriate tools
- **Testing Tools**
  - Evaluating and adjusting the tools for practicality (Valdez, 1994)

## **TECH M & E PROGRAMME**

WASEP criteria states that systems should be designed at 1.8 liters per minure (lpm) with a residual pressure no lower than 5 metres with all taps open. Therefore, with a flow and pressure oriented design criteria to work with, the Tech M & E programme evaluated both level of service and the design criteria through flow and pressure tests. These tests were designed to show the level of service experienced by a user and the change in level if additional users were added. A more qualitative survey was taken of structures and appurtenances including intakes, reservoirs, break pressure tanks, meters, valves, and valve boxes.

WASEP's involvement in latrine construction was limited to providing technical advice, incentive and social marketing without direct implementation. Therefore, sanitation facilities were evaluated on the quality of construction and the extent to which they facilitated use. The better the quality of construction, and the more they accounted for privacy for women and access by children, the more the potential benefit.

Measuring water consumption required WASEP to use a two fold strategy:

- a) Village level water consumption was determined using the bulk flow meter at the reservoir - than comparing to
- b) Actual consumption using a participatory tool in the home

WASEP's Community Liaison Assistant (CLA) and Health and Hygiene Promoter (HHP) teams administered household surveys in 30% of the village households. The impetus for this exercise was the realization that a successful O & M programme depends on the participation of the community. Questions were asked about the villagers' notions of the Water and Sanitation Committee, tariffs, meeting and the performance of the village's female implementer and male plumber. Surveys utilized direct questioning, semi-structured interviews, and observation methods.

The remainder of the Tech M & E programme assessed two of the instruments of sustainability established in the communities: the Water and Sanitation Committee (WSC – for daily administration), the Water and Sanitation Operator (WSO – local village plumber), and the Water and Sanitation Implementer (WSI – health promotion). It was WASEP's submission that if these instruments were tuned properly, the chances for long-term operation of the intervention were high. The Tech M & E looked at work logs / administrative records and used direct questioning to determine the performance of the WSC, WSO, and WSI.

## RESULTS AND DISCUSSION

- **Level of Service**

Overall, the average levels of service being delivered in partner communities were: a flow of 24 lpm for one tap open or about 17 lpm with two taps open with a static pressure of 84 psi and delivery pressure of 50 psi with one tap or 33 psi with two taps open. A reduction in the level of service with an addition of users resulted due to the branch configuration of the networks. Level of service was compromised vis-à-vis out of service time in colder reaches of the mountains of the Northern Areas and Chitral. Tap stand freezing and fear of freezing at the Yuno water treatment plant meant that some villages did not have access to safe drinking water for days, and sometimes a few weeks.

Although actual monitoring results showed water consumption to be below 25 lcpd during the winter time, when compared to a similar study conducted in the spring, water consumption for drinking, kitchen use, and latrine use were in line. After accounting for the seasonal reduction in bathing and cold water ingestion showed that people were availing themselves to the 45 to 70 lcpd presented in the LFA. (Samji, 1999)

**Table- Water Consumption Spring Vs. Winter**

(Lcpd)	Kitchen	Bathing	Latrine	Laundry	Total
Spring (Samji)	26	14	3	2	45
Winter (M & E)	9	3	7	4	23

- **Engineering Design Criteria**

The nature of the water supply system design criteria did not allow for its use as meaningful evaluation criteria. Having been stated as “all taps open” - a practical or feasible test could not be performed on the network. Instead, by using “level of service” as a criterion to assess performance - a better picture was derived of the adequacy of design. This process in itself, however, does not allow for a direct evaluation of the system from engineering principles.

Flows and pressures results were as above, with some areas in the mountainous zones experiencing high pressures. Appurtenances and associated structures were performing as envisaged. Intakes, reservoirs, and tanks were in good conditions. Latrine coverage in the programme area was above 70%. The quality of construction of over 95% of latrines allowed for privacy of women and access by children – a key factor in achieving health benefit from sanitation.

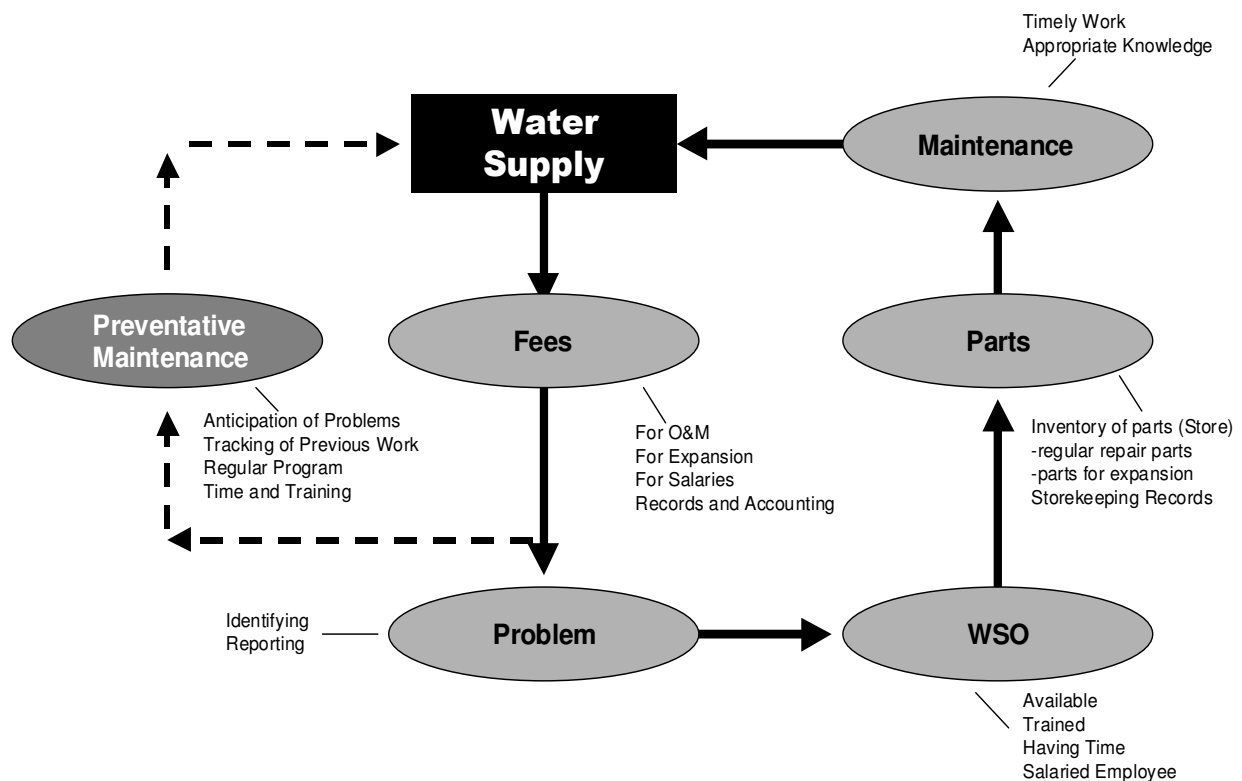
- **Operation and Maintenance**

The O & M Continuum shows how the provision of clean water and the accrual of health benefits is a result of a cycle of O & M, administration, and capacity. Tech M & E showed that WASEP's schemes have key strengths in this cycle and create an environment for its circulation. The O & M fund collected up-front sets up a store of spare parts, which is used on a revolving basis. The funds created for the WSO's salary, coupled with the training provided by WASEP, ensures that a skilled person is available to carry out the necessary



work. Villagers communicate their problems directly to the WSO who is able to fix most of the problems and continue the flow of clean water.

There are also areas where WASEP can strengthen certain portions of the cycle through its interventions. Clarifying the need for regular fee collection and appropriate record keeping is essential to maintaining a steady flow of funds for long-term work that may be required. Tracking of work performed on the system will aid in determining where reserves can be spent and where additional attention needs to be paid. By adding in a preventative measures component, problems in the network can be preempted and a considerable savings can be realized by WSCs.



**Figure - The O & M Continuum**

- **People and the System**

Women have been active in community sessions. Access to villagers and rapport with the community allows WASEP to convey messages of health, hygiene, and operation and maintenance with ease. The WSI has been an effective tool to reinforce WASEP's messages and collect morbidity data.

The most encouraging result of the household surveys was that the women of the village knew that maintenance work should be performed, whom to call when assistance was needed, and that they were using the WSO. The direct link between users and operator is well established. Having villagers accept that O & M is important and availing themselves to the local "plumber" will serve to sustain the physical infrastructure in the long-term.

- **Instruments of Sustainability**

Water and Sanitation Committees have been active in discussing issues and addressing problems as they arise. As per WASEP's objectives, formal village management structures have been created and are administering their communities' schemes. Fees are being collected and salaries are being paid.

Challenges for some committees include achieving 100% collection of fees for 1999, and now, collection of fees for 2000. Some of the reason for non-payment has been lack of committee and community awareness of the importance of the fees and lack of information on what happens with the collected tariffs. It has also been difficult in convincing villagers to pay for water that they have a natural "right" to. These fees are to be used to plan and save for contingencies, and may be in jeopardy if communities cannot collect. Planning for growth and financing expansion are the other prominent issues associated with fee collection.

### **FEEDING-BACK INTO THE PROGRAMME**

Mitigating technical shortcomings in 1998 partner villages and bringing their system performance back on track included reducing delivery pressures with the use of orifice plates and balancing water flows by readjusting system valves. WSOs were briefed on preventative maintenance and additional record keeping was added to regular assignments. WASEP's finance and administration unit conducted audits to follow-up on village financial practices and worked with communities to develop more appropriate financial reporting mechanisms.

1999 and 2000 designs were modified to reflect lessons learned during the Tech M & E. In addition to looped networks, minimum pipe sizes for transmission and distribution lines were adopted to allow for a more even and stable level of service throughout the villages. Pressures are now regulated using pressure-reducing valves and prevention of air entrapment is achieved using air release valves. Tap stand freezing is being mitigated with an evolution in the design from concrete blocks with galvanized iron pipe to hollow insulated reinforced concrete using uPVC pipes and fittings. These changes will assist in developing networks, which allow for a suitable level of service to be maintained.

Formal preventative maintenance procedures were incorporated into the O & M process with WSO's being trained in line flushing and valve exercising. Record keeping and monthly tracking of systems were instituted and a formal reporting procedure was developed. Strengthening the links of the O & M continuum will assist in ensuring the long-term sustainability of the schemes constructed.

At the programme level, Tech M & E highlighted key issues to be addressed through changes in WASEP's implementation strategy. One of the key findings was that if the sustainability of physical infrastructure is highly dependant on the communities ability to manage it - then additional inputs have to be invested in community capacity building and a revamping of WSO and WSC training is required. WASEP's training unit was assigned to refocus training activities and the management unit was brought in to assist in developing appropriate courses for WSCs. Additional financial and human resources have been directed to this programme component.

Assisting the communities to achieve financial solvency meant examining the financial partnership entered into with the village. To address tariff collection and long-term contingency needs, WASEP's Terms of Partnership now includes a minimum tariff amount and programme staff work closely with the WSC to formulate a financial vision for their scheme. Financially secure and independent communities have a greater chance of being able to take responsibility for their schemes with limited external inputs.

WASEP's concept of design criteria and the benchmarks it sets for water system performance needs to be clarified and stated in a manner allowing for meaningful design and evaluation of the design. A more appropriate method of setting a performance benchmark may be to start by establishing a "level of service" and say, "In each branch, two users may have their taps open and each receive enough water to fill a bucket in 5 minutes, with sufficient pressure to sustain flow." This may translate into a design criteria (target) of 5 l/min at 35 psi. As design guidelines are a series of assumptions made by engineers, a more suitable set of assumptions can be determined which is specific to the Northern Areas. Such standards also allows for WASEP to effectively and practically test for when it has reached an appropriate level of service.

## **CONCLUSIONS**

1998 villages provided WASEP with the opportunity to technically assess its interventions. Tech M & E showed WASEP that:

- A satisfactory level of service is being provided, however, the level of service needs to be explained clearly and perhaps can be used as a benchmark to assess system performance in the future
- The design criteria is being met, but needs to be stated in a manner which allows for meaningful design and evaluation of constructed systems
- O & M is being undertaken successfully by the WSO and can be strengthened by adding preventative maintenance activities people are using the and obtain maintenance assistance, when required
- WSIs are reinforcing health and hygiene messages
- Although the WSCs are functioning, additional efforts need to be made in strengthening managerial and planning capacity.

Tech M & E showed that sustainability of infrastructure (thus health impact) is a result of both hardware and software. Although the deliverable may be physical in nature, health impact is the result of all investments and accompanying measures functioning in an optimised manner. Health and hygiene promotion, community capacity building, and water and sanitation scheme construction are complimentary activities, which work in unison – not as silos.

The monitoring and evaluation programme collected and analyzed information that provided WASEP's senior management with technical and social data to make necessary changes in programme strategy. Regular Tech M & E exercises will aid in continually improving schemes to ensure that infrastructure is sustained and that communities are able to avail themselves to health benefit well into the future.

## **REFERENCES**

Samji, Tameeza, 1999. *Datuchi Field Research Report*, Water and Sanitation Extension Programme, Gilgit.

Valadez, Joseph and Bamburger, Michael 1994. *Monitoring and Evaluating Social Programmes in Developing Countries – A Handbook for Policymakers, Managers, and Researchers*, Economic Development Institute of The World Bank, Washington.

WASEP 2000. *Technical Monitoring and Evaluation Programme*, Water and Sanitation Extension Programme, Gilgit.

## **Paper # 6**

Presented in WEDC Conference, Dhaka, Bangladesha (2000)

<p style="text-align: center;"><b>HEALTH AND HYGIENE EDUCATION PROGRAMME NORTHERN PAKISTAN</b></p>
--

*Dr. Tameez Ahmad and Dr. Karim Alibhai*

### **INTRODUCTION**

The mortality rate in Pakistan for children under the age of five (5) is 165 deaths per 1000 children, which is 20 times higher than those of the United States, France, and the United Kingdom. Deaths due to water and sanitation related diseases are the major contributing factors to this high mortality (UNICEF, 1997). Water and sanitation related diseases are responsible for 60% of the total number of child mortality cases in Pakistan (Editorial, Daily Dawn, November 19, 1999). In Pakistan, about 700,000 children die every year due to diarrhoea, tetanus, acute respiratory infections, malaria, diphtheria, measles, tuberculosis, polio and others preventable diseases. It is alarming to note that out of 700,000 deaths, diarrhoeal diseases alone kill 228,000 children. A national survey shows that every child in Pakistan can expect on an average five episodes of diarrhea per year (Iliyas, 1997). The situation of water and sanitation related diseases in Northern Pakistan (Northern Areas and Chitral) is even more acute than the rest of Pakistan. Data collected from hospitals located in the Northern Areas revealed that 47,152 cases of cholera were reported resulting in more than 100 deaths during the cholera outbreak that struck in the summer of 1999. If we include the number of non-reported cases and deaths, these figures would probably increase by 2 to 5 times. Examination of data of the District Headquarter Hospital, Gilgit alone showed 7,109 cases of typhoid, malaria, trachoma, and hepatitis and 56,641 cases of worm infestations.

In order to improve health conditions and hence, the quality of life in the Northern Areas and Chitral, Pakistan, the Aga Khan Planning and Building Service, Pakistan launched the implementation phase of the Water and Sanitation Extension Programme (WASEP) in 1997. The main objective of the WASEP is to substantially reduce the risk of food and water-borne diseases (specifically diarrhoeal diseases) as a public health problem in Northern Pakistan. WASEP is expected to complete its interventions in 105 villages by the end of 2001 and at present WASEP is working in more than 40 partner communities.

Past experience and research carried out in different parts of the world has shown that maximum impact on reduction of waterborne diseases can be achieved by adopting an integrated approach towards water and sanitation intervention (Cairncross, 1990; Esrey et al., 1997). Provision of safe water supply and sanitation facilities can help in preventing water and sanitation related diseases but it is also strongly influenced by hygiene behaviour (Boot & Cairncross, 1993; UNICEF, 1995; Gorter et al., 1997). Therefore, in order to achieve programme objectives, WASEP's strategy is to work with partner communities by

providing safe drinking water supply systems, sanitation facilities, and health and hygiene education. Health and hygiene education programme of WASEP primarily consists of three components:

- i) Community Health Intervention Programme (CHIP)
- ii) School Health Intervention Programme (SHIP)
- iii) Monitoring and Evaluation

This paper will throw light on the main characteristics of each component and will also discuss results achieved and lessons learnt during the implementation of the programme.

### **COMMUNITY HEALTH INTERVENTION PROGRAMME (CHIP)**

By gender roles at the household level, WASEP initiated CHIP in July 1998 and identified women as the target group where its activities can achieve the most significant impact on improving community health and hygiene. The main objectives of the programme are to create awareness on health and hygiene, facilitate the target group to adopt and sustain healthier behaviours so as to reduce occurrence of water and sanitation related diseases and to ensure proper usage and maintenance of the hardware (water supply and sanitation facilities) implemented by the WASEP. The main topics of the hygiene education programme include latrine promotion and the usage and / or safe disposal of human faeces; domestic, environmental, and personal hygiene; safe water; food hygiene; transmission routes of water and sanitation related diseases; prevention and cure of diarrhoeal diseases and intestinal worms; and water usage and management issues related to operation and maintenance (O & M) of the water supply systems.

In order to reach the target group (women) in more than 40 communities located in all three regions (Gilgit, Baltistan, and Chitral) of Northern Pakistan, WASEP has employed female health and hygiene promoters (HHPs) who have relevant professional backgrounds and can speak local languages. Typically, hygiene education is conducted with a group of women using different techniques such as group discussions, posters, role-playing, demonstration, and relating anecdotal information as communication tools. These sessions focus on finding local solutions to a given problem based on mutual discussion. In addition, household visits for monitoring purposes provide unique opportunities both for HHPs and families for sharing experiences on a given hygiene behaviour. The process of hygiene education starts soon after the selection of partner communities (villages) for intervention and continues for a period of two years. At the initial stage a female member from each village is also selected by the communities for the position of Water and Sanitation Implementer (WSI) to take care of the health and hygiene activities being undertaken in her village. WSIs, being members of the Water and Sanitation Committees (WSC), enjoy the support of the WSC in particular and other community members in general. Apart from WSC's support other actors in the communities like schoolteachers, religious leaders, health workers and other groups provide invaluable support to the health and hygiene activities undertaken.

### **SCHOOL HEALTH INTERVENTION PROGRAMME (SHIP)**

In order to further maximize the benefit of water, sanitation, and hygiene interventions, WASEP launched the School Health Intervention Programme (SHIP) in September 1999 to facilitate school going children to plan and take action to improve health and hygiene status. The curriculum developed for SHIP consists of eight topics *viz.* clean hands; safe disposal of faeces / latrine usage; diarrhoea; worms; clean and safe water; safe food; personal hygiene; and water usage and management issues related to water supply systems. The Institute for Education Development (IED) of the Aga Khan University also provided guidance on the development of the curriculum. The direct target groups of SHIP are the children in class III to class V while the indirect target groups are children in other classes, younger siblings and parents; and other non-school going children in the communities. The HHPs facilitate hygiene education sessions in schools located in the partner villages. Use of active methods like group discussion, posters, stories, role-plays, surveys, demonstration, painting, and poems etc. is central to teaching methods used in SHIP. WASEP has adopted the Child to Child (CtC) approach for SHIP.

The six steps of CtC approach include

- i) Choosing the right idea and understanding it well
- ii) Finding out more
- iii) Discussing what we are finding and planning for action to be taken
- iv) Taking action
- v) Evaluating the results and
- vi) Doing it better next time.

These six steps are incorporated in lesson plans prepared for each topic mentioned above. It usually takes three days (about 44 to 60 minutes per day) to complete one topic. On the first day, step 1 is done in school while step 2 is completed by the children in their home / village. Step 3 is carried out in schools on the second day while step 4 in homes / villages on the same day. On the third day, steps 4 and 5 are done in schools. Step 6 is continued until a new topic is introduced during the next round of visit by HHPs. Preliminary analysis shows that the CtC approach has been very effective in facilitating children to take and plan actions in their schools, homes and villages to improve hygiene status.

### **MONITORING AND EVALUATION**

In order to assess the impact of health and hygiene activities undertaken in programme villages, WASEP has established an elaborate monitoring and evaluation system. Information on various domains of hygiene behaviour *viz.*, water storage practices, food hygiene, cleanliness of houses and general environment outside houses, presence of faeces around the houses, condition and use of latrine, and other parameters of domestic and

personal hygiene is collected periodically (on average in every six week) from every household located in the partner villages. Surveys are also carried out to measure changes in knowledge and attitude of target groups (women and school going children in partner villages) related to water, sanitation, hygiene, and diseases. Incidence of diarrhoeal diseases is monitored to evaluate impact of the interventions. Information on each indicator collected through spot and rating checks are transformed into numerical scores such that the sum of the score / weightage becomes 100. This is done to determine the overall level of hygiene status, which is a function of a number of selected individual indicators and this can have a score in the range of 0 to 100. In order to locate each household in the village and monitor it within WASEP's Management Information System (MIS), every household in a particular village has been assigned a unique number code.

## RESULTS AND DISCUSSION

While implementing CHIP and SHIP interventions in over 40 partner communities (15 in 1998 and 26 in 1999) over 20,000 household visits, 600 hygiene education sessions in more than 60 schools and 560 hygiene education sessions with women have been conducted. Apart from these improved water and sanitation facilities have been put in place. As a result of both hardware (water and sanitation) and software (hygiene education and capacity building) interventions, significant improvement in health and hygiene status has been achieved in the programme area. Figure 1 shows the typical variation of overall hygiene status at a programme level (based on the average score for all partner villages selected in 1998) with respect to baseline data. It can be seen from this figure that the hygiene status increased from a baseline value of 44.1 in July 98 to 83.6 in May 2000 resulting in a 90 % improvement. Table 1 shows a comparison of the baseline data for some selected indicators to those collected after 8 months. This table shows significant improvement despite the fact that interventions have not as yet been completed. Similarly the results of KAP (Knowledge, Attitude and Practice) surveys carried out after 8 months of the baseline survey in five schools are shown in Table 2. The positive change in children's knowledge as results of SHIP interventions is visible from the data presented in this table.

Data on the incidence of diarrhoeal diseases (periodically collected over a period of one year) from different partner villages was analyzed both internally (pre and post comparison or longitudinal study) and externally (case-control / with and without interventions/cross-sectional study) to see the degree of reduction. Pre and post comparison after one year of intervention for the same period of the year (in summer with peak diarrhoeal incidence) unveiled an average reduction of 50.4% for the partner villages implemented in 1998. Figure 2 shows typical situation for one of the partner village (Datuchi) located in Gilgit region. Individual reduction for different partner villages ranged from 2% to 97 %.

A review of literature on impact of water and sanitation facilities on diarrhoeal morbidity (Briscoe, Feachem, and Rahman, 1985; Esrey *et al.*, 1991; Gorter and Sandiford, 1997) indicate "measuring impact of water and sanitation is a challenging job and more or less all available for this purpose are not free from biases and subjected to complicated confounding variables and it becomes increasing difficult when it comes to quantification of the impact of individual component of interventions viz. water, sanitation, and hygiene".



**Table1 : Pre and Post comparison of Selected Indicators**

Name of indicator	Gilgit Region (% prevalence)		Baltistan Region (% prevalence)		Chitral Region (% prevalence)		Overall Situation (% prevalence)	
	Before	After	Before	After	Before	After	Before	After
Use of clean utensils	32	81	0.87	78	0.4	20	15	55
Covering of utensils against dust and flies	5	62	1	65	4	20	4	45
Provision of cover on water storage vessel	27	49	4	72	31	63	23	60
Presence of human faeces in courtyard	11	3.8	90	2.7	37	10	37	6
Presence of human faeces outside of houses	38	5	91	2.5	88	72	65	32
Presence of animal faeces in courtyard	80	50	99.6	57	100	99	90	72
Cleanliness of courtyard	31	64	1	44	1	1	23	60
Hand-washing before eating	66	87	Data for last survey as yet not processed.					
Hand-washing after defecation	21	50	-do-					
Knowledge that dirty water may cause diarrhoea	6	39	-do-					
Knowledge that flies may cause diarrhoea	19	39	-do-					
Knowledge that germs may cause diarrhoea	2	18	-do-					
Knowledge that open defecation (faeces) may cause diarrhoea	4	37	-do-					
Knowledge that dirty hands may cause diarrhoea	46	64	-do-					

**Figure 1: Profile of overall hygiene status for 1998 Partner villages**

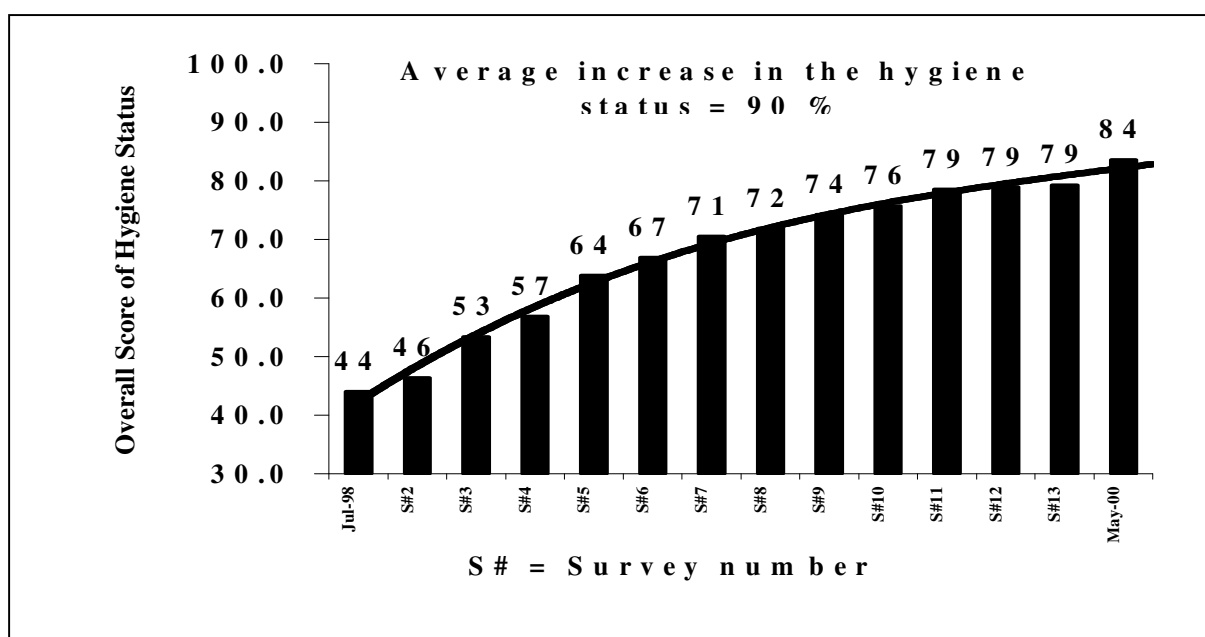
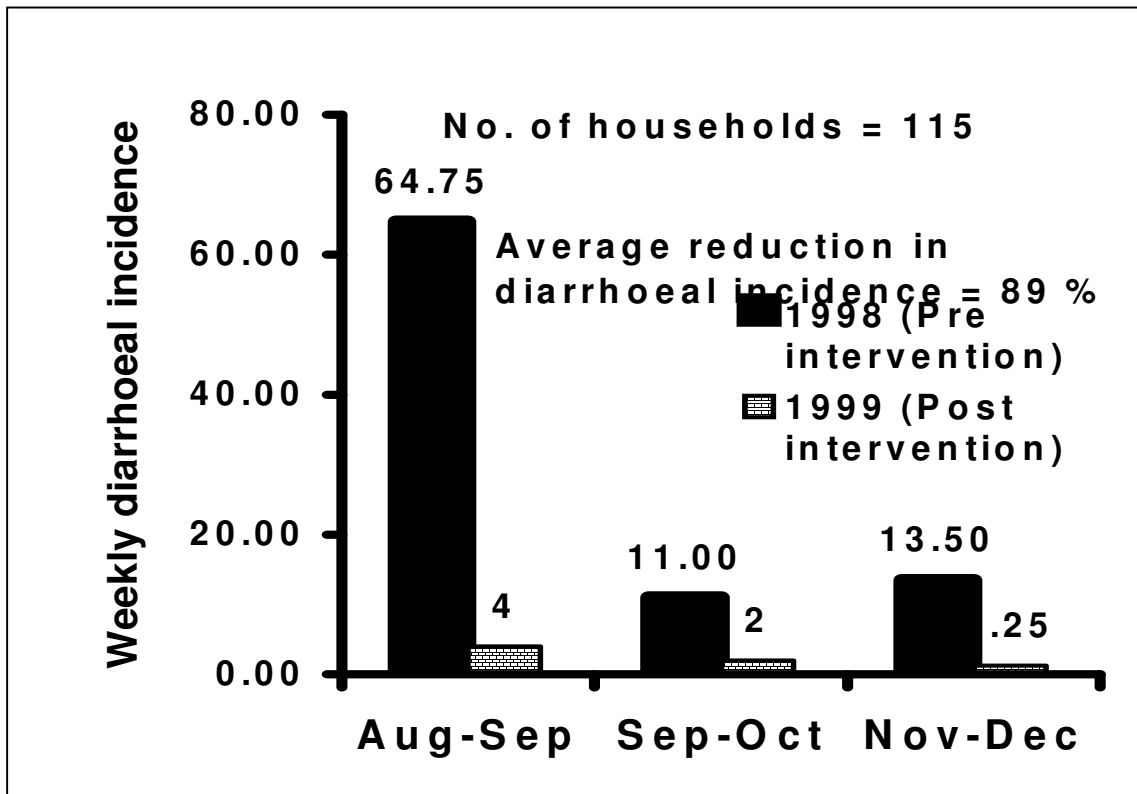


Figure 2: Comparison for pre and post diarrhea incidence for Datuchi



**Table 2: Summary of results of KAP survey conducted in Primary Schools**

<b>Questions asked during KAP survey (inherent prevalent old notion)</b>	<b>Before (% agreed)</b>	<b>After (% agreed)</b>
We do not need to wash our hands when there is no visible dirt	66	9
Sweets may cause diarrhea	70	40
Less sleep may cause diarrhea	46	17
Too much handwork may cause diarrhea	64	17
Open defecation is a good practice during diarrhea	56	29
Sweet things may cause worm infestation	87	56
Running water is always safe	84	10
Only during illness clean water should be used	93	18
I know how to make ORS	3	82

As mentioned above, in one of the village despite the fact that safe water and sanitation facilities and hygiene education were provided, there was little reduction (only 2%) in the diarrhoeal incidence. The possible justification for this might be attributed to the possible influence of hygiene behaviour of the target group under consideration. Comparison of programme villages (with WASEP interventions) with non-programme villages (without intervention) for 21 sets of data obtained from 16 pair of villages on diarrhoeal incidence (cross-sectional studies/case-control) indicated that villages with no intervention are on average seven times more likely to have diarrhoeal diseases as compared to villages with interventions.

WASEP through integrated approach towards water, sanitation, and hygiene interventions produced significant change at grass root level. WASEP's approach of building a close rapport with the communities through six weekly household visits and a series of hygiene education sessions provided impetus for adoption of healthier behaviour at the household level. The gradual improvement in hygiene status (Fig. 1) supports the view that hygiene education is not a one-time job but requires regular reinforcement. Feedback given to communities on the outcomes of monitoring surveys proved to be very a useful mechanism for establishing two-way flow of information to achieve desirable results. Making issues on management of water supply system integral part of education both for women and school going children greatly improved O & M of the system through better tariff collection and proper usage of the facilities provided. Involvement of WSC's (in particular) and others key activist (e.g., teachers, religious leaders) in the process of hygiene education reinforces and helps adoption of hygiene behaviours.

## CONCLUSIONS

As a result of an integrated approach towards water, sanitation and hygiene education and proactive involvement of women and school going children more than 50 % reduction in diarrhoeal diseases was achieved after one year of interventions. Other benefits of hygiene education included improvement in management of the water supply systems through better tariff collection and increased and proper usage of water and sanitation facilities. The current experience of WASEP suggests that without involving women in the process of behavioural changes, expected health benefit of the water supply and sanitation projects will be limited. Apart from this sustainability of such projects is also at risk if the important stakeholders (men, women, children) of the water and sanitation projects are not involved in identification, planning, implementation, operation and maintenance of the systems.

## REFERENCES

- BOOT, M.T. AND CAIRNCROSS, S., (EDS). 1993. Actions Speak: The study of hygiene behaviour in water and sanitation projects. IRC, The Netherlands and London School of Hygiene and Tropical Medicine
- BRISCOE, J., FEACHEM, R.G., and RAHMAN, M.M., 1985. Measuring the impact of water supply and sanitation facilities on diarrhoea morbidity: prospects for case-control methods. World Health Organization
- CAIRNCROSS, A.M., 1990. Health impacts in developing countries: New evidence and new prospects. *Journal of the Institution of Water and Environmental Management*. No.4. pp.571-577
- ESREY, S.A., POTASH, J.B., ROBERTS, L., AND SHIFF, C. 1991. Effect of Improved water supply and sanitation on ascariasis, diarrhoea, draccunculiasis, hookworm infection, schistosomiasis and trachoma. Bulletin of the WHO No.69
- GORTER, A. AND SANDIFORD, P. 1997. A literature review of the health impact of water supplies, sanitation and hygiene on the incidence of diarrhoeal disease. Chapter 3 in *Childhood Diarrhoea and its prevention in Nicaragua*. Vormgeving en drukwerk, Uniigraphic, Universiteit Maastricht
- GORTER, A.C., et al. 1997. Hygiene Behaviour in rural Nicaragua in relation to diarrhoea. Section 4.4. in *Childhood Diarrhoea and its prevention in Nicaragua*. Vormgeving en drukwerk, Uniigraphic, Universiteit Maastricht
- ILIJAS, M. (ed), 1997. Community Medicine and Public Health. Time Traders, Urdu Bazar, Karachi, Pakistan
- TONGLET, R., ISU, K., MPESE, M., DRAMAIX, M., AND HENNART, P. 1992. Can improvements in water supply reduce childhood diarrhoea? Health Policy and Planning, No. 7(3): pp. 260-268. Oxford University Press.
- UNICEF, 1997, The State of the World's Children, Oxford University Press.

## **Paper # 7**

Presented in WEDC Conference, Dhaka, Bangladesh (2000)

### **FAECAL CONTAMINATION IN WATER BEFORE AND AFTER INTERVENTION**

*By Haider Raza, Dr. Karim Alibai*

#### **INTRODUCTION**

Microbial contamination is the most critical risk factor in drinking water quality with high potential of causing waterborne diseases. Illness derived from chemical contamination of drinking water supply system is negligible as compared to the number due to microbial pathogens (Galbraith et al., 1987; Herwaldt et al, 1992). However, it is appreciated that in some cases (such as the Arsenic situation in Bangladesh) with chemical contaminant, a major crisis can develop. The World Health Organization (WHO) has estimated that up to 80 % of all sickness and diseases and 30 % of deaths in the developing world is caused by inadequate sanitation, polluted water, or unavailability of water and poor hygiene. A recent survey carried out in the developing countries shows that about 1.2 billion people suffer from diseases caused by unsafe drinking water or poor sanitation, more than 4.0 million children die from waterborne diseases and 15 % of children will die before reaching the age of five to diarrhoea-deaths that might be avoided with reasonable water and sanitation services (Juha I Uitto et al, 1999). Similarly, in Pakistan 60 % of child mortality is attributed to waterborne diseases (Editorial, Daily Dawn, Nov.19, 1999).

Northern Pakistan including Chitral consists of about 1.3 million population. Glaciers and snow deposits are the principal sources of all waters in Northern Pakistan. The melted water enters streams called nallahs, which subsequently feed man-made channels that bring water into the settlements for agriculture, livestock and domestic use. Almost every village in the Northern Areas and Chitral has a network of water channels. Generally, a main channel carries water into the village, which subsequently divides into a network of smaller channels and watercourses covering the entire village. Traditionally, water for domestic use is fetched from the nearest possible source i.e. stream, spring, channel or river. A common practice in the area is the use of water-pits, locally called as Gulko, Sardawai and Chudong. Piped water supply systems (fed by gravity) are now beginning to replace the traditional systems with a gravity fed water supply system. A water quality survey reports shows that 95 % of the traditional drinking water sources including water channels, shallow water pits, storage vessels and as well as pipe water were found to be grossly (>100 E.coli /100 mL) contaminated with faecal material (Raza. et al, 1998).

Keeping in view the research phase findings and the alarming number of waterborne diseases, WASEP initiated its intervention programme in mid 1997 aiming at improving the quality of life in Northern Pakistan by providing safe drinking water, appropriate sanitation facilities, health and hygiene education as well as drainage system. WASEP intends to implement its integrated approach of interventions in 105 villages in Northern Pakistan. WASEP has already completed its interventions in more than 40 communities and work is

in progress in 30 villages at the moment. To meet the overall goal of the programme, WASEP has great interest in bacteriological and as well as chemical quality of the water. WASEP provides water having bacteriological count in the range of 1-10 E.coli / 100 mL as set by WHO as a guideline for developing countries. In order to make sure that safer water is available at tap stands, WASEP has developed a unique and reliable water quality surveillance system. The main objectives of water quality monitoring programme are:

- To investigate a safer source for the water supply system
- To monitor the bacteriological quality of water at different points of the system after intervention
- To check the density of contamination at household storage containers
- To create awareness in the target population on the importance of the water quality

This paper describes the salient features of the system and will present results of the bacteriological water quality before and after the WASEP's interventions as well as the lessons learnt in the process.

## **METHODOLOGY**

The water quality-monitoring programme of WASEP has two main phases. In phase one, the water quality surveys are done before the intervention of the programme components. In the second phase, water quality of given systems are checked for bacterial contamination after commissioning of systems. In both the phases of the monitoring system, water samples are collected from different points of water delivery systems, including storage vessels and reservoirs as well as from the source. The description of each sampling technique is given below:

## **SAMPLING STRATEGY**

- ***Water delivery system***

The service levels are tested pre and post interventions. Pre-intervention water quality survey of the existing systems (traditional and improved) is done once to establish the water quality situation of the village. The water quality analysis of the selected sources for the proposed water supply systems is also carried out during this survey. The post water quality monitoring of the system is done continuously for six months after commissioning of the system and then after quarterly for one year. Water samples are collected from the inlet, taps and storage vessels. The results obtained through monitoring are closely examined and remedial actions are taken accordingly.

- ***Household level***

One of the major activities in the water quality-monitoring programme is the analysis of household storage vessels. Water samples from household storage containers are taken before and after the intervention. In 1998, household water quality surveys, water samples were collected from each household, i.e. 100 % coverage. However, in the second year when the number of villages increased, a statistical analysis showed that 20 to 30 % samples would provide a significant result (Ahmad and Raza, 1999). Water samples from household storage containers are taken twice a year i.e. one before the intervention and then after the commissioning of the system. The reason for looking the water quality in the storage container is to look at any change in the bacteriological quality of drinking water at the point of ingestion since it is the final source from which individuals normally drink.

- ***Sampling technique***

WASEP uses 7 Del-Agua water testing kits. The basic technique used in these kits is the membrane filtration technique in which water samples are passed through a membrane filter of 0.45µm pore size and 0.47 mm diameter by creating a vacuum. The membrane is then placed on a pad saturated with selective a medium for thermo tolerant E.coli (membrane Lauryl Sulphate Broth) and is incubated for 18 hours at 44 °C. After 18 hours of incubation, the yellow color colonies are enumerated and reported per 100 ml (OXFAM Del Agua, 1993).

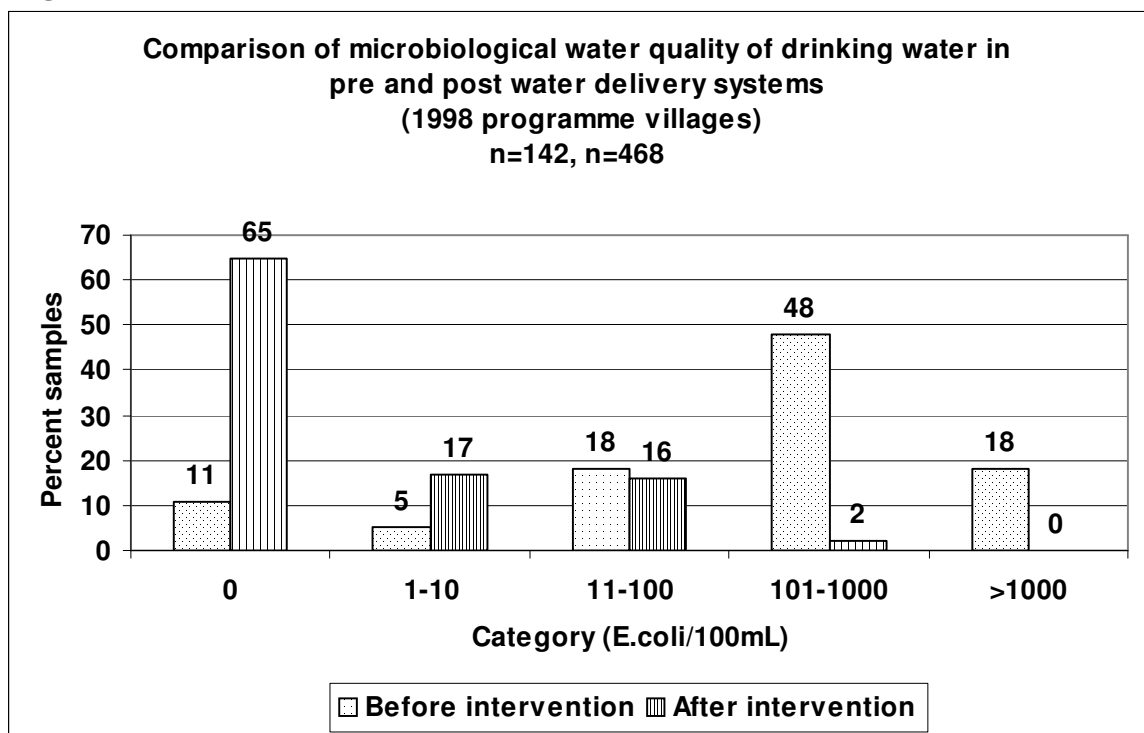
## **RESULTS**

- ***Water delivery system***

The results of pre-water quality analysis of the existing water delivery systems and sources collected from 15 villages of the year 1998 revealed that only 16 % of the 142 water samples matched with the WHO guideline values for developing countries i.e. 84 % water samples were found to be grossly polluted with faecal material and falls in the categories of high to very high health risk. However, the post-intervention water quality monitoring results showed significant improvement in the bacteriological water quality in the system (see Figure-1). Out of the 468 water samples collected from various representative points in the distribution network, 82 % were in the category-1 (0 - 10 E.coli / 100 ml) of the WHO standards for developing countries i.e. no health risk. It is worth mentioning that at tap stand level, WASEP achieved its target already set in the Logical Frame Analysis (LFA), which states that at least 75 % of the total tap stands samples will meet the WHO guideline (0-10 E.coli / 100 ml) for developing countries.

In one WASEP programme village (Hasis), four months of post-intervention water quality monitoring results showed that 90 % of the samples collected from different location of the system did not comply with the WHO guideline values (0 - 10 E.coli / 100 ml), hence the source of the system was changed from nallah to spring. Now 100 % of the water samples collected from delivery system show zero E.coli / 100 ml. Initially, during feasibility stage, the nallah had a low bacterial count (< 10 E.coli / 100 ml) but when the scheme was commissioned, the source characteristic changed with the last summer floods.

**Figure-1**

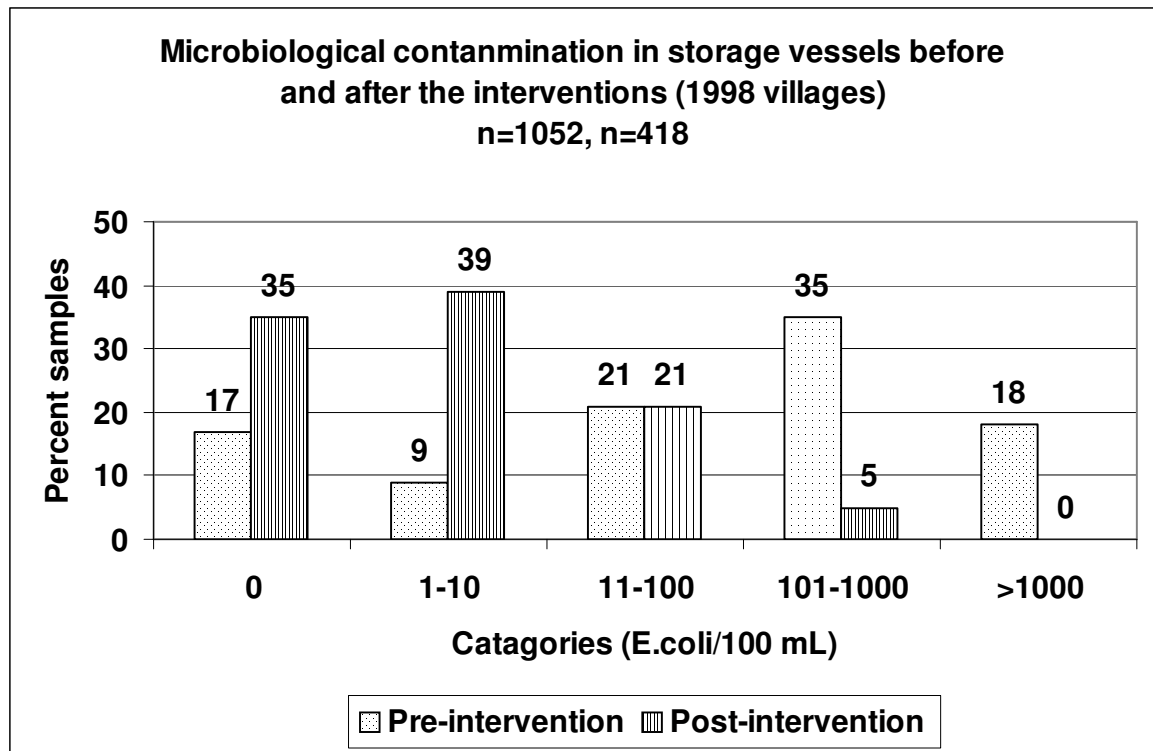


- ***Household level***

1,052 water samples were collected from household storage containers from 15 villages during the pre-intervention water quality survey. The results revealed that before water, sanitation and health and hygiene interventions the density of contamination levels in household containers were very high. Out of 1,052 water samples, only 26 % of the total samples matched with WHO criteria for drinking water for developing countries whilst 74 % of the total samples were highly contaminated with faecal material.



**Figure-2**



The contamination levels in post-intervention samples were significantly reduced towards the lower categories (see Figure - 2). Out of 418 household storage water samples (collected randomly), 74 % of the samples have contamination levels in the range of 0 - 10 E.coli / 100 ml. However, 26 % of the total samples still were in the categories of high to very high health risk. Reasons for this contamination might be poor water handling practices or unhygienic situations of the storage containers or surrounding environment. Secondly, 18 % of the systems samples had contamination levels in the range of >10 E.coli / 100 ml and 35% had the contamination levels > 1 E.coli / 100 ml. The number of E.coli might have increased during the storage time.

## DISCUSSIONS

The post implementation water quality monitoring results reveal that in all of WASEP's programme villages the bacteriological water quality is safer when compared to the systems used for drinking purposes previously. Majority of the pre-intervention samples falls in the categories of very high health risk. (See Figure – 1). Reasons for this high level of faecal pollution was the usage of traditional water sources (channels, shallow water pits) used for drinking purpose. A negligible number of samples (16 %) were in the category of no health risk; mainly because these specific water samples were taken from the sources where the likelihood of contamination levels were very low. The post-water quality monitoring results showed a significant improvement in the bacteriological water quality in the delivery system. Majority of the samples (84 %) comply with the WHO standards set for developing

countries whilst 16 % samples have the contamination levels in the range of 10 - 50 E.coli / 100 ml. Keeping in view the monitoring results, the intake of those water supply systems showing E.coli levels above the WASEP defined limits now have been changed. It would be worth mentioning that at tap stand level, WASEP meets the target set in its LFA, which states that at least 75 % of the total tap stands samples will meet the WHO guideline (0 - 10 E.coli / 100 ml) for the developing countries.

The water samples collected from household storage vessels before and after the intervention also shows significant improvement in the bacteriological water quality at the point of ingestion as compared to the results of the water samples collected before the intervention. The main reason for high bacterial count in the pre-intervention household water samples was their water collecting points that were already highly contaminated with the faecal material. However, the contamination levels in the post-intervention samples were significantly reduced towards lower categories (see Figure-2). Reason for this significant reduction in the contamination levels is two fold. Firstly, the quality of water at the point of collection is improved as compared to the previous water collection points (traditional sources) and secondly the frequent visits of health and hygiene promoters improve behavioral practices especially with regard to water handling and storage practices. Significant improvement has been achieved in reducing the incidence of waterborne diarrheas in the partner villages. On an average, a 50 % reduction been observed in incidence of diarrhoea when compared to the baseline data acquired before the implementation of the WASEP Programmes.

## **CONCLUSIONS**

It is evident from the results that WASEP is providing safer water to their partner villages as compared to previous drinking water sources. WASEP experience indicates that a water quality monitoring programme is an essential component to ensure the drinking water quality is maintained; and must be in place for the provision of safe drinking water especially where the surface water is used for the supply systems and where the possibility of sudden change exists in the bacteriological contamination. The presence of an effective water quality programme is vital to take immediate and practical measures well in time to keep the quality in the defined limits of the programme. WASEP's experience shows that water quality results can be used as an effective tool to sensitize and create awareness in the target population through health and hygiene education. One of the important finding of the monitoring system is that only provision of safe water at tap stand levels does not mean that users are consuming the safe water. (See Figure - 2). It is worth mentioning that the contamination levels in household storage vessels directly reflects the behaviors of some of the household towards water handling practices. WASEP's health and hygiene education section is using this data to improve the existing handling practices of water. WASEP's experience proves that this type of monitoring programme can play a vital role to achieve the intended programme goals that aim to provide safer water to the target population. One of the major achievements of WASEP's water quality mentioning programme is that now other sectors involved in the water supply systems are willing to adapt WASEP strategy and requesting to do water quality tests for them.

## **REFERENCES**

- Galbrath, N.S., Barnelt N.J. and Stanwell-Smith R., 1987 water and disease after Croydon: A review of water associated diseases in the United Kingdom (1937-1980), Journal of the institution of water and environmental management,1,7-21
- Herwaldt,B.L., et al 1992, Out breaks of water disease in the united states:1989-1990, Journal of the American water works association, 84,129-35
- Raza,H. Hussain, H, Alibai,K.(1998) “Seasonal Investigation of Drinking Water Quality” 24<sup>th</sup> WEDC Conference Islamabad, Pakistan
- Ahmad, T, and Raza, H. (1999), “Health Impact Assessment in Northern Areas and Chitral: Implications for WASEP”, Internal Report, WASEP, AKHBP, Gilgit, Pakistan.
- OXFAM DELAGUA, Users Manual, Portable water testing kit, Robens Institute & WHO; University of Surrey, Guildford GU2 5XH , United Kingdom, 1993

## **Paper # 8**

Presented in WEDC Conference, Lusaka, Zambia (2001)

### **HEALTH IMPACT OF WATER SUPPLY AND SANITATION PROJECTS IN NORTHERN PAKISTAN**

*By Dr. Tameez Ahmad, and Dr. Karim Alibhai*

#### **INTRODUCTION**

It is well established that lack of access to safe water, inadequate sanitation, and poor hygiene practices are responsible for the high prevalence of preventable diseases in the developing countries. According to WHO / UNICEF, about 4 billion cases of diarrhoea are reported in the world every year, with approximately 2.2 million deaths annually, mostly among children under five. However, it has always been a major challenge to quantify the extent of impact of water, sanitation, and hygiene education interventions due to methodological complexities and confounding variables (Briscoe, Feachem, and Rahman, 1985; Cairncross, 1990; Esrey *et al.*, 1991; Gorter and Sandiford, 1997). Major methodological flaws identified included the problems of (i) comparability of treatment and control groups, (ii) sample size required, (iii) misclassification bias, and (iv) recall bias in ascertaining disease status amongst others. Measurement the impact of water, sanitation, and hygiene interventions becomes even more difficult when implementing agencies set objectives / targets based on health impact e.g., reduction of water and sanitation related diseases. These difficulties stem from lack of resources both human and financial, operational difficulties, time limitation, and inability in implementing proposed plans due to factors falling beyond organisational control. The Water and Sanitation Extension Programme (WASEP) of the Aga Khan Planning and Building Service, Pakistan (AKPBS,P) is one implementing agency in Pakistan whose major objective is to reduce diarrhoeal diseases. WASEP has been implementing water and sanitation projects in Northern Pakistan since 1998. This paper will describe how health impact is being measured at WASEP and share issues and problems encountered in the process.

#### **DESCRIPTION OF INTERVENTIONS**

Northern Areas and Chitral (a district of North West Frontier Province) is a mountainous region consisting of over 1,200 villages scattered throughout the region. Sizes of these villages vary from few households to 1,000, mostly in the range of 60 to 150 households. Average family size range from 7 to 10 per household. Traditionally, each village has a separate identity in terms of water sources and village geography. Majority of these villages still do not have access to safe water and adequate sanitation facilities and therefore heavily rely on the traditional sources of water. Traditional systems that provide drinking water include nallahs, springs, rivers, man-made channels, and watercourses arriving from distant sources. Water is either collected directly from these sources or conveyed to individual or communal traditional water pits for storage and subsequent use. These traditional sources

are grossly contaminated as far as bacteriological quality of water is concerned (Raza *et al.*, 1996). Common defecation practices include open defecation, usage of cattle sheds for defecation by women, and traditional latrines without safe disposal.

WASEP interventions include implementation of water supply and sanitation projects in close partnership with communities; provision of intensive hygiene education both at community and school levels, establishing and building capacities of water and sanitation committees. Hygiene education starts with the selection of villages for intervention, while implementation of projects take about 9 months. Mostly tap water is provided to the communities through household connections by gravity flow water supply systems connected to springs located at the base on mountains. As a result of latrine promotion by WASEP, on an average 80 % of the households build improved latrines at programme level while individual coverage in the partner villages ranges from 50 % to 100 %.

## **METHODOLOGY**

The methodology used to evaluate the health impact is given below in terms of data collection, analysis, and approaches.

### ***Data Collection***

With the selection of a village for intervention, WASEP through its female HHPs (Health and Hygiene Promoters) collect baseline information at household level covering the whole population i.e., census approach. Data collected during the baseline surveys include information on weekly incidence (i.e., recall period of one week) of diarrhoeal diseases, and various domains of hygiene behaviours such as water storage practices, cleanliness of houses and general environment outside houses, hand-washing practices, presence of faeces around the houses. In addition, information is also collected on knowledge of diarrhoeal diseases. Following the baseline surveys, monitoring data on the same parameters are collected from every household in the partner villages at intervals of 4 to 6 weeks.

### ***Data Analysis***

For measuring the direct impact of water, sanitation, and hygiene interventions on reduction of diarrhoeal diseases, two methods are adopted:

- (i) Pre and post comparison or internal comparison and
- (ii) With and without intervention comparison or repeated case controlled studies

In case of the former, diarrhoeal incidence after completion of interventions is compared with the baseline data for matching months of the year for each intervention village e.g., baseline data collected in a village in July 99 is compared with post-intervention data collected in the same village in July 2000. Diarrhoeal incidence in the villages with intervention is compared with those of villages without intervention, located in the same vicinity, thought to have more or less similar communal characteristics such as economy, topography, weather, and sectarian composition. The population in non-intervention villages is apparently exposed to the same risk factor as thought to be existing in the villages with intervention prior to intervention.

For measuring the impact using proxy indicators for change in hygiene behaviours, baseline data collected at the household levels is analysed at village, regional, and programme levels for individual indicators, and compared with those of the post-intervention. Using observation techniques during the inspection of hygienic conditions at household level, baseline and monitoring data was collected.

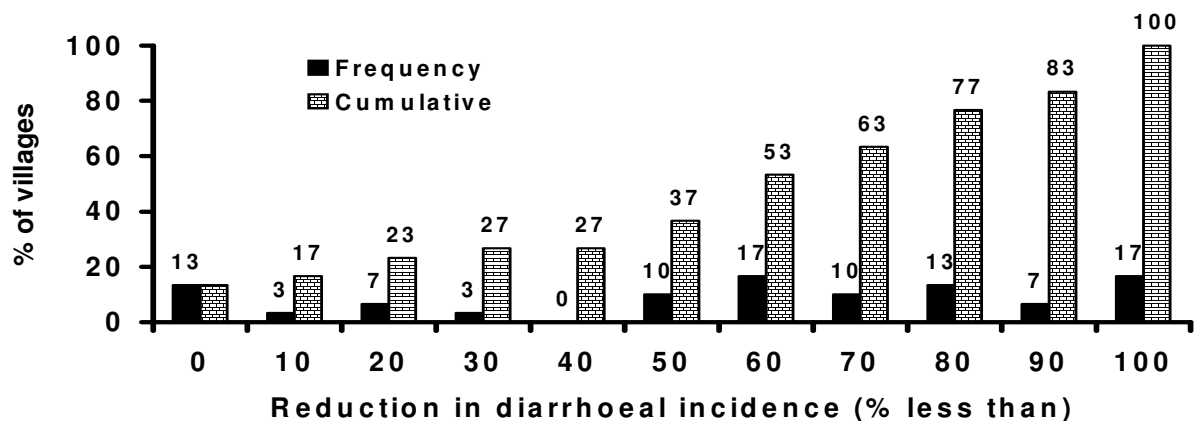
## RESULTS AND DISCUSSION

It is beyond the scope of this paper to evaluate the overall impact of water, sanitation, and hygiene interventions in the context of social, economical, and health benefits. Health benefits could be reduction in diseases other than diarrhoeal e.g., worms infestation. It is also known that about 80 % of the diseases in developing countries are directly or indirectly related to water, sanitation, and hygiene practices (Cheesbrough, 1993). However, in the present study, reduction in diarrhoeal diseases is used only as an indicator of the overall health impact. Whilst interpreting the results given below, it should be noted that WASEP provided safe tap water to the whole population in the partner villages, (mostly meeting WHO the guideline values for bacteriological contamination i.e., E-Coli in the range of 0 - 10 per 100 ml is a suggested relaxation for small water supplies), helped in building household latrines leading to an overall coverage of over 80 %, and implemented its full package of health and hygiene promotion.

### *Pre and Post Comparison*

Pre and post comparison of diarrhoeal incidence in the 30 partner villages revealed diarrhoeal reduction ranged from 0 to 100 % with median reduction of 58.2 % while mean average reduction and standard deviation were found to be 55.1 % and 33.1 % respectively. In case of the four partner villages, analysis of data revealed no reduction at all despite improvement in the water and sanitation facilities showing either complex nature of relationship between diarrhoeal diseases and water, sanitation, and hygiene behaviour or possible shortcomings of data collection methodology in registering diarrhoeal incidence at household level. Figure 1 shows the pattern of diarrhoeal reduction for 30 villages.

**Figure 1: Consolidated results for the reduction of diarrhoeal diseases in 30 partner villages**



This figure shows the cumulative percentage of villages having a reduction less than a given value shown along the x-axis. For example, 23 % of the villages have experienced a reduction of less than 20 % for diarrhoeal diseases. This also means that in 77 % of the villages, the impact was more than 20 %. As WASEP's hardware component of interventions (water supply and sanitation projects) are more or less the same as far as the quality of water and construction are concerned, the large variation of results among the villages may be attributed to differences in critical hygiene behaviours, methodological faults, and / or compounding variables such as living conditions, nutrition, poverty, and education etc. In addition, the variations may also be due to temporal movement of the target population in the region. This may include taking unsafe food and water while paying short visits to relatives in nearby non-intervention villages, drinking unsafe water while working away from the village (for work or schooling) during the day. In order to establish possible link of all these factors with pattern of diarrhoeal reduction, WASEP plans to carry out rigorous study of the impact in close collaboration with the Aga Khan University, Karachi, in summer 2001. Although the present results suggests that a significant impact has been achieved, we cannot be 100 % sure that these are due to WASEP intervention alone. However, it may be helpful to mention that as a result of WASEP's intervention, bacteriological quality of drinking water at the system level (i.e., at tap stand) has significantly improved i.e., more than 80 % of the samples matched WHO guideline for developing countries (below 10 Ecoli per 100 ml) as compared to 20 % at pre-intervention. Similarly, sanitary inspection in all the partner villages revealed that the overall score of sanitation status (e.g., presence, usage, and cleanliness of household latrines etc.) increased from a baseline value of 5.25 to 20.24 in a scale graduated from 0 to 25.

### ***Case Controlled Studies***

Results of diarrhoeal reduction as mentioned in the previous section provide limited information about the situation of diarrhoeal incidence in villages with no intervention. Therefore, case-controlled were carried out to compare the incidence of diarrhoeal diseases prevailing in non-intervention villages (control) to those villages having WASEP intervention (case). Analysis of 40 sets of data revealed that relative risk (i.e. ratio of disease incidence in exposed group to non-exposed group) ranged from 0.8 to 30 giving an average value of 6.5 with standard deviation of 6.4 while median value of relative risk came out to be 4.3. These results again show that significant impact has been achieved in intervention villages as compared to non-intervention villages. For example, a median risk of 4.3 means that population in non-intervention villages are 4.3 times more likely to have diarrhoeal diseases as compared to those in villages with intervention. It should be noted that cross-sectional studies were repeated 2 to 3 times for some cases, in most of the cases giving consistent results.

### *Analysis Using Proxy Indicator*

Comparison of pre and post intervention data collected from about 1,500 households located in the 25 partner villages revealed a significant change in hygiene behaviour at a grass root level as a result of intensive hygiene education. Adoption of healthier behaviour is thought to be an indirect indicator of health impact of water and sanitation projects.

Figures 2 and 3 shows the typical change in hygiene behaviour with time for two of the indicators; cleanliness of utensils and presence of human faeces in courtyard in the partner villages located in Gilgit region only (11 partner villages).

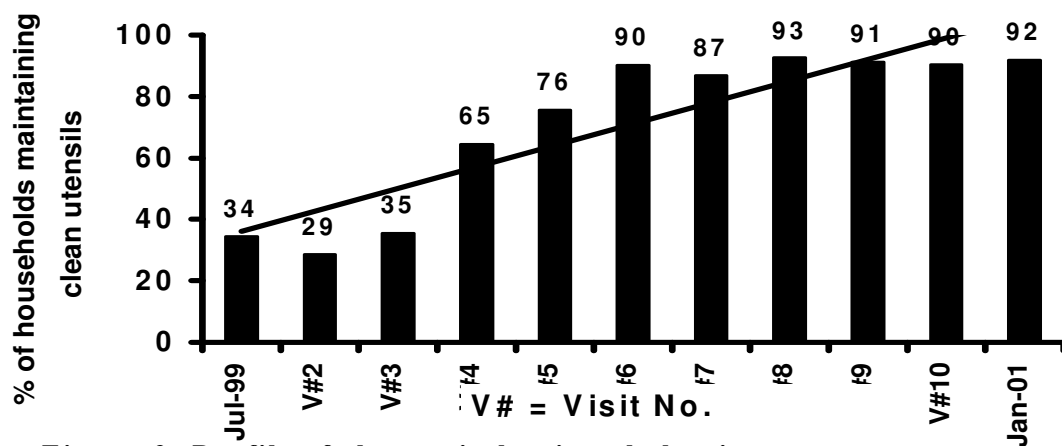


Figure 2: Profile of change in hygiene behaviour (cleanliness of utensils in Gilgit region)

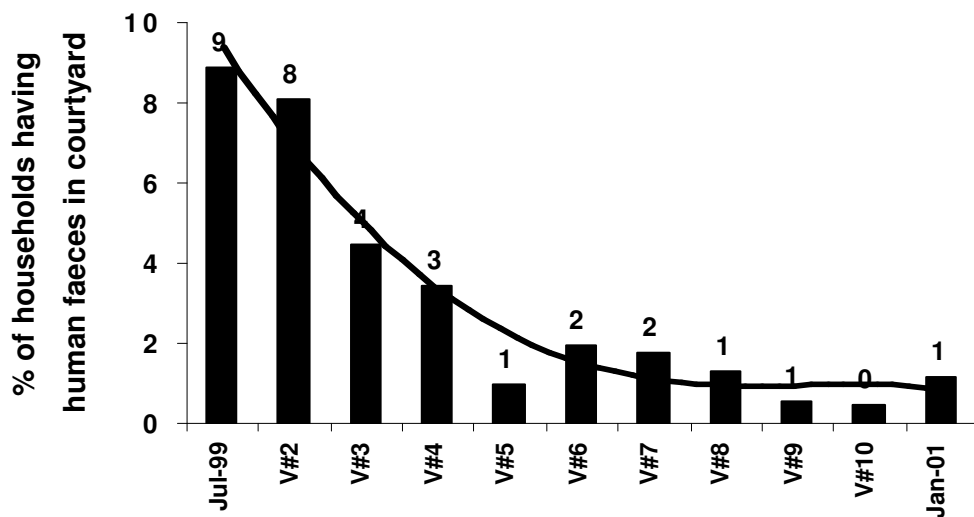
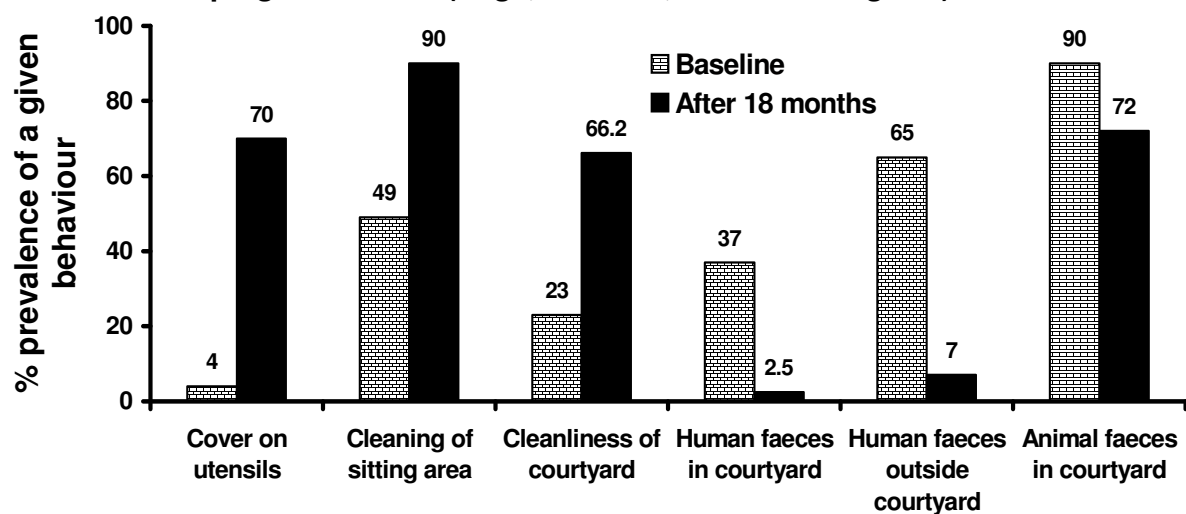


Figure 3: Profile of change in hygiene behaviour (presence of human faeces in Gilgit region)



It can be seen from Figure 2 that prevalence of clean utensils increased from 34 % to almost over 90%. The drastic change of 35 % to 65 % (at visit four i.e., V # 4) is due to the fact that hygiene education on domestic hygiene was conducted during the third round of visits to communities by HHPs. Similarly, a small reduction in the presence of human faeces from 8 % at visit # 2 to 4 % at visit # 3 also shows immediate adoption of healthier behaviour as a result of hygiene education on the topics of transmission routes and prevention of diseases during visit # 2. It should be noted that hygiene education on latrine promotion and safe human faeces handling and transmission routes and prevention of diseases are conducted during the first and second rounds of visits (Ahmad and Alibhai, 2000). Cleanliness of water storage container increased from 44 % to 85 % and provision of cover on storage container to prevent dust and flies increased from 23 % and 70 %. Figures 4 shows pre and post comparison for other selected indicators in 25 partner villages in all three regions (i.e., 11 villages in Gilgit, 6 villages in Baltistan, and 8 villages in Chitral). As can be seen, the presence of human faeces in the courtyard of houses and outside houses decreased from 37% and 65 % to 2.5 % and 7.0 % respectively. It should be noted that the presence of human faeces in courtyard in Gilgit region only was significantly less than the overall situation in the programme area (see Figure 4). However, similar reduction in presence of animal faeces in courtyard was not achieved (i.e., reduced from 90 % to 72 %) because of close location of cattle sheds to houses, suggesting that without tackling the enabling factors (i.e., currently beyond WASEP's mandate) sustainable change in hygiene behaviour is not possible. On the other hand, hand-washing before eating and after defecation increased from 69 % and 18 % to 99 % and 61 % respectively. The overall hygiene status (i.e., combined effect of 23 indicators) increased by 90 % at the programme level. The significant reduction in diarrhoeal reduction may be attributed to the improvement in hygiene behaviour in partner villages.

**Figure 4: Pre and post comparison of hygiene behaviours at programme level (Gilgit, Baltistan, and Chitral regions).**



## CONCLUSIONS AND RECOMMENDATIONS

Although a strong impact of water, sanitation, and hygiene interventions on the reduction of diarrhoeal incidence was observed in the partner villages (i.e., 58 % median reduction), a large variation in the range of 0 - 100 % reduction shows the complexity and uncertainty in quantifying impact in terms of health benefit. Therefore, assessment using this approach may underestimate the overall impact especially in a situation where methodological flaws may give rise to an apparent lack of reduction in diseases. Secondly, project implementation may start in a season where incidence of diarrhoeal diseases (e.g., October to April in Northern Pakistan) would be negligible, in such cases, there would be insufficient baseline data for measuring the health impact. Use of proxy indicators that are observable and verifiable appears to be a better option for assessing indirect health impact.

## REFERENCES

- AHMAD, T. and ALIBHAI, K. 2000. "Health and hygiene education programme: Northern Pakistan". Water, Sanitation and Hygiene: Challenges of the Millennium, 26<sup>th</sup> WEDC Conference, Dhaka, Bangladesh
- BRISCOE, J., FEACHEM, R.G., and RAHMAN, M.M.. 1985. "Measuring the impact of water supply and sanitation facilities on diarrhoea morbidity: prospects for case-control methods". World Health Organisation
- CAIRNCROSS, A.M., 1990. "Health impacts in developing countries: New evidence and new prospects". *Journal of the Institution of Water and Environmental Management*. No.4. pp.571-577.
- CHEESBROUGH, M. 1993. Medical Laboratory Manual for Tropical Countries. Vol 2. p. 206. Butterworth-Heinemann. University Press Cambridge, UK
- ESREY, S.A., POTASH, J.B., ROBERTS, L., AND SHIFF, C. 1991. "Effect of Improved water supply and sanitation on ascariasis, diarrhoea, draccunculiasis, hookworm infection, schistosomiasis and trachoma". Bulletin of the WHO No.69
- GORTER, A. AND SANDIFORD, P. 1997. "A literature review of the health impact of water supplies, sanitation and hygiene on the incidence of diarrhoeal disease". Chapter 3 in *Childhood Diarrhoea and its prevention in Nicaragua*. Vormgeving en drukwerk, Uniigraphic, Universiteit Maastricht
- RAZA, H., HUSSAIN, M., and AHMAD, K. 1996. "Seasonal investigation of drinking water quality in Northern Pakistan". WSHHSP, AKHSP, Gilgit, Pakistan

## **Paper # 9**

Presented in WEDC Conference, Lusaka, Zambia (2001)

### **PROMOTION OF HEALTHIER BEHAVIOURS THROUGH SCHOOL CHILDREN IN NORTHERN PAKISTAN**

*By Dr. Karim Alibhai and Dr. Tameez Ahmad*

#### **INTRODUCTION**

Field experience and research carried out worldwide has shown that provision of safe water and sanitation facilities can only optimize reduction of water and sanitation related diseases if sustainable changes in hygiene behaviour are achieved. Adoption of new behaviour means surrendering old ones, which is a difficult task in itself. The major objective of the Water and Sanitation Extension Programme (WASEP) of the Aga Khan Planning and Building Service, Pakistan is to significantly reduce diarrhoeal incidence in the partner villages located in Northern Areas and Chitral. In order to achieve its objective, WASEP has been striving hard to bring about behavioural changes at grass-roots level, in addition to assisting communities to establish safe water and sanitation facilities. One of the most important initiatives towards this end has been the promotion of healthier behaviour through primary schools. This paper will describe and share the need, development and implementation, impact, and issues related to this initiative in the context of Northern Pakistan.

#### **RATIONALES FOR INVOLVING CHILDREN IN PROJECTS**

With the full implementation of water and sanitation projects, WASEP initiated a health and hygiene education programme focussing mainly on women. Under this programme, a full package of health and hygiene education programme was implemented in all the partner villages. Post-evaluation of the initiative after one year of implementation, revealed a significant impact on adoption of healthier behaviours and reduction in diseases (Ahmad and Alibhai, 2000). However, monitoring results supported by feedback from the community (especially women) showed that special attention had to be provided to school going children as certain unhealthy behaviours were common among them.

Some of these behaviours were:

- (i) Reticence in using latrines
- (ii) Lack of hand-washing after defecation
- (iii) Drinking from open channels despite availability of tap water nearby
- (iv) Eating unwashed fruit, and
- (v) Eating without washing hands

Majority of women expressing their views on the above issues said that their school-going children were not adopting health and hygiene education messages that were conveyed to them. One of the major reasons cited was the perception of children that they apparently have more knowledge than their mothers “who were uneducated.” Keeping in view the demand of the communities for educating and involving school going children in the process of behavioural change, and recognising that promotion of healthier behaviours through school children will maximise the benefits of water and sanitation projects, WASEP launched an initiative of the School Health Improvement Programme (SHIP) in its partner communities.

The promotion of hygiene behaviour through SHIP is based on the following assumptions:

- (i) Children can act as role models
- (ii) Children can take action to prevent ill health
- (iii) Children can easily spread their knowledge to others
- (iv) They can influence their parents and siblings
- (v) It is easier for children to adopt new behaviours than older people and hence they can bring sustainable changes in future

In addition, children in the age group of 8 to 15 years are traditionally responsible for helping mothers in taking care of younger children. Therefore, adoption of healthier practices by younger children, especially girls, is highly desirable to reduce the risk of water and food borne diseases among children under five years of age. Analysis of baseline data collected in partner villages for age-wise distribution of diarrhoeal cases revealed that 58 % of the total diarrhoeal cases (i.e., 500 cases in the population of 6,885) affected children under five years of age i.e., most vulnerable age group. If we include the next age group, then 80 % (i.e., 58 + 22) of all diarrhoeal cases are in the age group below 15 years and only 20 % in age group above 15 years. This data clearly depicts the need to include young children in the process of promotion of healthier behaviours.

## **CURRICULUM DEVELOPMENT**

A curriculum for SHIP, at primary school level, was developed based on Child-to-Child (CtC) approach in close collaboration with the Institute for Educational Development (IED), Aga Khan University, Karachi. The overall objective was to facilitate adoption of healthier behaviours by involving children in all phases of behavioural change from planning to evaluation.

The curriculum consists of the following eight topics:

- (i) Clean Hands
- (ii) Children’s Stools and Hygiene
- (iii) Clean, Safe Water
- (iv) Diarrhea: Causes, Prevention and Cure
- (v) Intestinal Worms
- (vi) Clean, Safe Food
- (vii) Personal Hygiene
- (viii) Management Issues related to O & M of WSS (Ahmad and Jina, 2000)

The curriculum is designed to make use of active teaching methods such as group discussion, stories, role-playing, and cartoons. SHIP allows children to plan and take actions to improve the hygiene conditions at their homes, schools and villages. Each topic is objective oriented and designed to disseminate its message based on *knowing, doing and feeling*. One of the important characteristics of the curriculum is that it allows children to determine the problems by themselves and subsequently think, plan, take action and monitor the outcome. The curriculum allows children to translate ideas into creative activities and understand health and hygiene. In order to implement the curriculum, intensive training was provided to Health and Hygiene Promoters (HHPs) of WASEP, who were previously responsible for conducting hygiene education in the partner communities for women.

### **IMPACT OF SCHOOL HYGIENE EDUCATION**

In the last 19 months, SHIP was implemented in more than 100 schools located in the partner villages, where more than 1,500 sessions were conducted. As a result of this initiative, different actors such as teachers, parents, communities, and WASEP staff felt that a positive impact had occurred by involving children in the promotion of healthier behaviours. For measuring the impact of the initiative, various methods such as KAP surveys before and after intervention, interviews with mothers and school teachers, independent evaluation by teachers themselves, and direct observation of certain behaviours were employed.

#### ***Disseminating the Message***

Observations made during the household visits revealed that children had shared their new knowledge with other community members such as siblings and parents. Students had also shared stories that they had learned during the sessions with their friends while playing outside.

During a household visit, a mother said:

*"...although my 6 years old child was not attending your sessions, he told me everything about what you taught other children in the school as he learned all these from other children."*

A village girl narrated to the HHP:

*"what do you teach in schools; my brother always give advice to family members about cleanliness of house and personal hygiene. He keeps soap near water channel and washes his hands with soap and forces others to use soap for hand-washing. He says that we get diseases if we eat food without washing our hands".*

More or less in all villages, children conveyed messages to others especially non-school going children through role-plays, posters, and stories. It is also interesting to note that in some of the villages, children also conveyed messages to women and men through role-plays. Students from non-projects villages also shared messages with others in their respective villages. During a recent baseline KAP survey in Orghuch (a village selected in 2000 for intervention), when a woman was asked how did she know causes and prevention of diarrhoea and intestinal worms, she said:

*"I learnt all these from my child who is going to a school located in other village called Gram" (a partner village selected in 1999 for intervention where SHIP was implemented a year ago).*

Sample pre and post KAP surveys conducted in six schools indicated that health knowledge of children greatly improved: knowledge of making ORS increased from 6.5 % to 75.4 %; the percentage of students considering running water entirely safe dropped from 66.3 % to 23.2%. Table 1 shows results of the pre and post intervention for some of the indicators. While interpreting the results, it should also be noted that post KAP surveys also include students who had not directly participated in SHIP sessions (i.e., they were at Class II while SHIP sessions included students from Class 3 to Class 5).

Table 2: Summary of results of KAP surveys conducted in Primary Schools

Questions asked during KAP survey (inherent prevalent old notion)	Before (% Agreed / Yes)	After (% Agreed / Yes)
I know how to make ORS	6.5	75.4
Running water is always safe	66.3	23.2
Only during illness, clean water should be used	64.6	13.9
Open defecation is a good practice during diarrhea	62.8	23.3
Sweet things may cause worm infestation	87.3	60.6
Less sleep may cause diarrhea	48.4	12.7
Too much handwork may cause diarrhea	62.0	20.6
We do not need to wash our hand when there is no visible dirt	64.5	19.3

### ***Transforming knowledge into action***

As part of their independent research activity, students observed many incidences of open field defecation and human faeces in the streets around their homes. In Hopay, SHIP students organized a campaign to safely dispose of the faeces (burial) and improve the village environment. A group of girls in Broshal initiated a community beautification project following a SHIP session by collecting and sanitarily disposing of solid waste from the village and sweeping the streets around their homes. In Shishkat, children brought soap to the school after attending session on hand-washing on the previous day, and said:

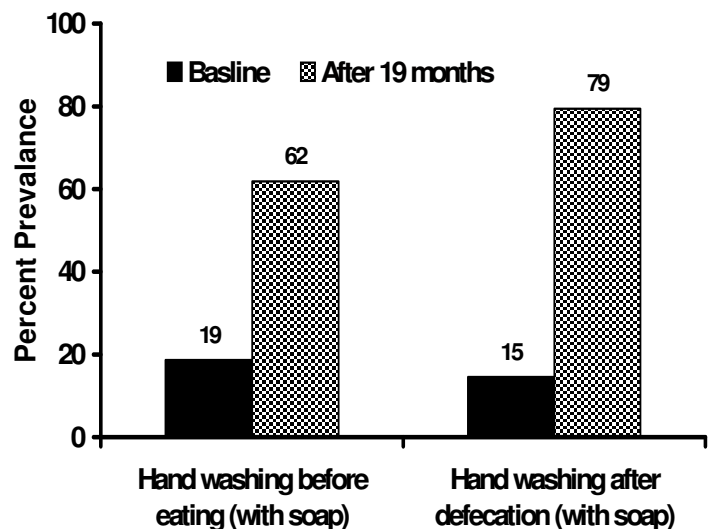
*"at home we wash our hands with soap but what would we do in the school, that is why we have brought soap with us."*

In Datuchi, students have been maintaining cleanliness of streets and general environment on a regular basis. In Barkolti a child motivated his father and elder brother to dig a pit for defecation and in just one day, they dug a pit and covered it with wooden sticks, making squatting hole in the middle as an immediate solution to open defecation. Later on, this family constructed a permanent structure for pour flush latrine. In some schools, teachers reported that students played active roles in the construction of latrines for schools. Interviews with parents revealed that children also tried to motivate their parents to build household latrine. However, it should be appreciated to quantify how many extra latrines

were built at community level due to promotion efforts undertaken by children alone. Latrine coverage at community level increased from an average value of 70 % for 1998 partner villages (with no SHIP intervention) to 85 % in the case of 1999 partner villages (with SHIP intervention) despite reduction in subsidy for 1999 partner villages. The near 20% increase in latrine coverage in the case of 1999 partner villages partially could be attributed to efforts undertaken by school-going children to promote sanitation at community level.

### ***Monitoring of Hygiene Behaviour***

As a result of SHIP, children proved themselves effective monitors of hygiene behaviour at household and community level. In many villages when WASEP compared monitoring data collected through interviews with women to that collected by children using observational technique, it was found that children's findings presented relatively true picture of the prevailing situation. For example, group discussions with women on hand-washing practices during baseline surveys revealed that a huge majority of family members washed their hands with soap after defecation and before eating. In contrary, children data collected at household level on a previous day recall revealed a different picture i.e., only 6% of people washed their hands with soap. As a result of sharing children findings with them, women altered their answers to provide a picture more consistent with the children's findings. Realizing the effectiveness of children in monitoring, WASEP provided an opportunity to children to conduct pre and post surveys on hand-washing practices. The data collected by children from six schools located in three partner villages on hand-washing practices at baseline and after 19 months of intervention is shown graphically in Figure 1. As can be seen from the figure hand-washing with soap before eating and after defecation increased from a baseline value of 19 % and 15 % to 62 % and 79 % respectively showing significant increase in the usage of soap.



**Figure 1: Result of surveys carried out by school children on handwashing practices.**

### ***Teachers' Reflections***

About 9 months after the implementation of SHIP, teachers representing 20 schools participated in a workshop to evaluate the effectiveness of the initiative. For this purpose, 10 indicators were selected and each teacher graded change in selected indicator using a scale graduate from 1 to 5 to represent the situation before and after SHIP. The results of the evaluation for the selected indicators are shown in Table 1. As can be seen from the table, children's cleanliness increased from 2 to 4 giving 100 % improvement. The overall improvement came out to be 76 % including 33 % increase in children attendance.

However, it should be noted that the results presented in table are based on subjective judgment of teachers and, therefore, should not be interpreted in absolute terms. A teacher expressing his feeling about the impact of SHIP said:

*"now children are stopping their parents going to traditional healers for preventing diseases by explaining how diseases are spread in the villages".*

It is also interesting to note that officials from education departments (other than school teachers) also expressed their satisfaction with the initiative. *"we have been working with this school for many years, we had not seen such a rapid change in children's practices"*, said an official after attending SHIP session.

**Table 1: Teachers' Evaluation of the Impact of SHIP**

<b>Selected Indicators to measure effectiveness of SHIP</b>	<b>Situation Before SHIP</b>	<b>Situation since SHIP</b>	<b>% change</b>
1. Children's cleanliness	2	4	100
2. Village environment cleanliness	2	3	50
3. School environment cleanliness	2	4	100
4. Proper use of latrine	2	3	50
5. Hand-washing	2	4	100
6. Links with community	1	3	200
7. Childrens' interest	2	3	50
8. School attendance	3	4	33
9. Change in health behaviour of families	2	3	50
10. Change in health behaviours of staff	3	4	33
<b>Overall Change</b>	<b>76 %</b>		

### ***Unanticipated Impact***

WASEP, as well as teachers in schools, realized benefits resulting from SHIP that were not initially planned for. These benefits included increase in children's confidence to express their views and share their feelings through the use of dramas, role-playing, and songs; expression of creativity through the use of non-traditional teaching methods such as posters and art; development of skills for data collection and analysis from the use of homework assignments and exposure of teachers to alternate methods to engage children in the learning process.

### ***Overall Impact***

WASEP, through an integrated approach (i.e., water, sanitation, hygiene education both in communities and schools), managed to significantly improve the hygiene status and reduce diarrhoeal incidence by over 58 %. However, it is hard to attribute how much impact was received due to children's involvement.



## **ISSUES AND CHALLENGES**

No doubt, significant impact has been achieved as a result of SHIP initiative; WASEP faces a lot of issues and challenges, some of which are:

- (1) Sustainability of SHIP initiative
- (2) Barrier in traditional teaching systems
- (3) Inability to cope with high demand
- (4) Lack of coordination among different stakeholders
- (5) Socio-economic hurdles

Due to resource limitations and increase in number of partner villages in each year, WASEP usually continues SHIP activities in partner schools for a maximum two years. Initially, it was thought schoolteachers would be able to take over SHIP activities after the withdrawal of WASEP. Follow-up visits to some schools suggest that teachers are more active in promoting and sustaining healthier behaviours but due to lack of training and communication support materials are not following the systematic procedure to teach a topic to involve children in the process rather they are using traditional approaches. Unfortunately, teachers, generally in the Northern Areas and Chitral, are more accustomed to traditional teaching methods that are didactic, authoritative, and dictatorial and affecting changes in teaching methodology and government and private education policy is beyond the scope of WASEP. For example, in many schools children, especially those of government were not able to participate in discussion and activities when their teachers were presents in the class.

In order to improve, WASEP has planned to carry out training, in its second phase, for teachers in collaboration with other stakeholders and will make sure that each school gets communication materials and appropriate manual. Due to success of SHIP, demand of initiating SHIP activities in schools in non-partner villages (i.e., non-WASEP villages) is also growing. At present, WASEP is not capable of coping with this demand due to resource constraints.

Finally, there are certain socio-economic hurdles for adaptation of certain behaviours: e.g., young children from playing bare feet in dirty lands if there are no other safe places for them to play around; they cannot wash their hands with soap due to restrictive family budgets. In one of the school during SHIP session, it was observed that a girl in Class V kept her newly bought shoes on her lap and removed dust on it by her bare hands even after attending all SHIP sessions. But it shows how the economic conditions affect hygiene behaviour, as it may be possible that leather shoe was purchased for this child for the first time in her life and, therefore, she wanted to preserve its newness. Similarly, at the beginning of SHIP activities, there were no water tap and latrines in schools and attempt to reduce open defecation was not fully successful unless facilities were built as a result of WASEP initiative showing that both hardware and software are equally important for changing behaviour and for impact.

## **CONCLUSIONS**

Significant impact in health and hygiene status was achieved by involving children in the process of behavioural change at school and community levels. The Child-to-Child (CtC) approach proved to be very effective in providing opportunities to children to use their inherent knowledge and skills in a way they wanted. This created a great interest among children to participate in all activities. In order to make the process sustainable, there is a serious need to include health topics in curriculum (i.e., textbooks) based on CtC approach, building capacities of teachers and taking joint efforts by all stakeholders.

## **REFERENCES**

- AHMAD, T. and ALIBHAI, K. 2000. "Health and hygiene education programme: Northern Pakistan". Water, Sanitation and Hygiene: Challenges of the Millennium, 26<sup>th</sup> WEDC Conference, Dhaka, Bangladesh.
- AHMAD, T. and Jina, L. 2000. "School Health Intervention Programme", Programme Report, WASEP, AKBPS, Gilgit, Pakistan.

## **Paper # 10**

Presented in WEDC Conference, Lusaka, Zambia (2001)

### **AN ANALYSIS OF WASEP'S ROLE IN IMPROVING WOMEN'S PARTICIPATION IN WSS PROJECTS**

*By Tanya Barnett, Yasmin Baig, and Dr. Karim Alibhai*

#### **INTRODUCTION**

The Water and Sanitation Extension Programme (WASEP) has been working with rural villages in the Northern Areas of Pakistan and Chitral since 1997. The provision of drinking water, sanitation facilities and health and hygiene education are the primary components of intervention in the villages. The ultimate goal of adopting this three-pronged approach is the reduction in diarrhoeal morbidity by 50 %. WASEP plans to complete 100 project schemes in remote, mountainous villages by the end of 2001. It is anticipated that this first phase of intervention will be followed by a second phase with 180 new interventions over the next five years.

The sustainability of project work is of utmost priority for WASEP. One of the main criteria for sustainability is user satisfaction. In an effort to make projects more responsive to users interests, WASEP has recognised the need to document women's experiences with the schemes and to determine what is necessary to increase their satisfaction with project delivery. "Women are most often the users, providers and managers of water in the household" (Wakeman, 1995, 7). Additionally, they are the primary caregivers in the household and therefore, are given the responsibility of family hygiene. In this sense, women represent a significant portion of the demand that must be measured if water and sanitation schemes are to be effective in improving village quality of life.

**Over the past year, WASEP staff conducted a gender impact study of village initiatives. The purpose of the study was to record the experiences of women with the project in terms of their village scheme. The study focused on five themes of women's experience:**

- (1) Time saving issues
- (2) Women's participation in all stages of the project
- (3) Women's knowledge of project aspects
- (4) Benefits identified by village women of project aspects
- (5) Challenges faced with behavioural changes related to health and hygiene

The findings were reviewed with WASEP's field and management staff to develop a preliminary plan of action for mainstreaming gender in WASEP's second phase. This involved a critical assessment of the current operations in terms of gendered participation. Based on this assessment, WASEP staff identified the problem areas and finally developed

potential strategies for ‘filling the gaps’ on the gender component of field interventions. The concept of gender was relatively new for most of the staff members, requiring an initial training workshop to introduce major tools and concept of gender planning for project development.

## **METHODOLOGY**

The gender impact study consisted of a number of stages, beginning with initial observations in the project villages to talk informally with village women, men and children about their impressions of WASEP’s intervention and to document village activities. This resulted in the development of a flexible set of questions for the purpose of interviewing women about their experiences with WASEP. Questions were open-ended and unstructured to allow participants to choose the direction of the interviews. This was particularly useful as it allowed the research team to determine what was most important to village women. A final questionnaire was developed after these initial interviews were conducted and was pre-tested in two WASEP villages before its implementation. The final questionnaire was administered in six villages across the three regions where WASEP is active.

Two villages were selected in each region; one scheme from 1999 and one from 2000. Construction of the water supply system and latrines was still underway in two of the 2000 villages, while facilities have been completely installed in the other four villages in the study. Depending on the size of the village, between 10 and 20 interviews were conducted with women. A total of 86 interviews were completed, along with discussions with the water and sanitation committee, the village plumber and the village health and hygiene promoter.

Data was analysed using a combination of qualitative and quantitative analysis. The Statistical Package for Social Sciences (SPSS 10.0) was used to organise and summarise the quantitative data. Quantitative information was supplemented by relevant descriptions of findings.

## **RESULTS AND DISCUSSION**

Women benefit from water and sanitation facilities in terms of improvements in socio-economic and health conditions. The precipitous location of most Northern Areas and Chitral villages generally means that travel to traditional water sources is extensive and often hazardous. The study revealed that most women (79 %) interviewed in the villages made over four trips daily for water collection, taking anywhere from ten minutes to two hours per trip. As a result of the extensive time commitment in water collection, women tended to minimise their efforts in other activities such as domestic hygiene, child-care and handicrafts. Handicraft work such as sewing, spinning wool and decorative stitching often represent the only source of personal income for village women (WASEP, 2000).

The accessibility of a safe and abundant source of water represented extensive timesavings for many women in the survey. As a result of hygiene education, an increase in time, and the accessibility of water, many women were placing greater emphasis on household cleanliness (45 %). Those women who reported spending more time on handicraft work (18

%) also stated that they were able to produce more items for sale, which subsequently enabled them to increase their personal income. A further 14 % of the sample population reported that they were spending more time on child-care. Few women (10 %) found that they had any extra leisure time, suggesting that the intensity of women's other work responsibilities was more than enough to fill the time freed from water collection.

Women's participation at all stages of the project is considered a priority in scheme interventions. In the Northern Areas and Chitral, women are limited in their mobility. As a result, their involvement in project initiatives is limited. The extent of women's participation in the communities visited depended on a number of factors including:

- (1) Local culture and institutions, which can permit, prohibit or discourage an individual's actions in a given context (White, 1961 reprinted in Kates and Burten, 1985, 151)
- (2) The intensity of women's daily responsibilities
- (3) A woman's household status (WASEP, 2000)
- (4) Women's control over resources; and
- (5) The value women place on their own participation (Moser, 1993)

In order to achieve real consultation in WASEP project initiatives, separate meetings are held with women for participatory rural appraisals (PRAs). This is accompanied by house-to-house visits to acquire in-depth information on the particular needs and preferences of all women. Despite these efforts, participation of women with the exception of the health and hygiene component remains minimal in project activities traditionally prescribed to men. For example, the Terms of Partnership (ToP), signed by the community, stipulates that at least one woman is expected to become a member of the Water and Sanitation Committee (WSC), which manages the scheme for the village. Despite this clause, there is only one village (Hasis) where the secretary is a female and whilst the WSIs are supposed to be part of the committee, their participation is often non-existent. Consequently, it would appear that women are excluded from the management of the scheme. Resistance to this stipulation in the ToP stems from the presence of conservative cultural attitudes that prevent extensive public interaction between men and women in this strong "*pardah*" practicing culture. Thus, though greater emphasis needs to be placed on including women in the decision-making activities of schemes, at the same time, however, it is important for the project managers to be conscious of the cultural and institutional barriers that exist in project villages. In this sense, there is a need for some middle ground where women are able to contribute to project decision-making in an environment that is not threatening to the community's beliefs.

Women are not only excluded at the community level, but also at the household level. In most communities, the head woman of a family controls household activities. Therefore, when women's participation is required in the project, it is usually this woman or another female she has selected that attends. Younger women often do not have the luxury of choosing whether they will attend project activities. Furthermore, they are often overburdened with their household and agricultural duties to afford the time to participate. Whilst it would seem that WASEP may not be reaching a significant portion of the community with their educational messages and participatory sessions, this situation is

mitigated during each household visit by Health and Hygiene Promoters (HHP's) where messages are reinforced.

The ability to affect decision-making at the household level and inevitably at the community level is often dependent on a villager's contribution to household income. The study revealed that there was a significant relationship between earning personal income and access to decision-making. Of those women who had no personal income (67 %), most responded that their husbands made the household decisions (53 %).

A final component to consider is the value women place on their own participation. When women are so effectively excluded from real decision-making, they often choose to withdraw rather than participate in the project planning (Moser, 1993). Therefore, not only are women disconnected from project decision-making, but they may also choose to exclude themselves from the process voluntarily. This point is illustrated by examining women's knowledge of project components (ie. application process, tariff collection, PRAs). In most cases, women were unable to describe many of the project components suggesting that they had not participated in the discussions and decision-making. This was especially noticeable when women were asked to describe the role of the WSC. Half of the sample was unaware of the role of the WSC. This probably stems in part from the "silent" female representation on the committee.

While knowledge among women interviewed was relatively weak in areas where they are not traditionally involved, they demonstrated a strong awareness of health and hygiene issues. Most women (88 %) were able to identify common waterborne diseases such as diarrhoea and worms and the majority of survey participants (77 %) had internalized the key messages from the health and hygiene sessions (domestic and personal hygiene and disease prevention). Furthermore, women in the sample demonstrated a clear understanding of the principal benefits of having clean water and using latrines.\* Three responses were most frequent when women were asked to identify the main benefits of having a clean water supply. Safe water (50 %), accessibility of water (48 %) and health benefits (44 %) were most commonly identified as benefits of having water supply system. Reduction in open defecation was the most commonly given response (59 %) when asked about latrine benefits, followed by privacy (36 %) and a decrease in diseases (24 %).

As with any change in behaviour, difficulties may arise that prevent immediate adoption. This suggests that long-term monitoring of behavioural changes is necessary to determine the inevitable impact of a project. With regard to hygiene behaviours, the adoption of new practices in the household is primarily the responsibility of women. Most women in the Northern Areas and Chitral divide their time between numerous activities each day, leaving little time for domestic hygiene. Therefore, of those that found domestic work challenging, it is not surprising that time constraints proved to be the most challenging aspect to adopting domestic hygiene behaviours (54 %). This is especially the case in the summer, when women are working full days in fields that are often far from their homes. Many (22 %) also found some hygiene behaviours difficult to maintain in the winter. For example, WASEP's Health and Hygiene message recommends villagers to remove their shoes before entering their houses. Obviously in winter, people prefer to leave their shoes on to keep warm.

Another example of a health and hygiene recommendation is the covering of dishes to prevent contamination. Traditionally, rural villages in Northern Pakistan and Chitral store their dishes and utensils on open shelves or in piles on the floor. As a result, dust and flies contaminate dishes. In some villages, the adoption of this new behaviour was difficult. Dishes and utensils are considered important status symbols in a home and are displayed for guests. This behavior was particularly evident in Baltistan and Chitral. Other challenges included the necessity of washing the covers frequently, awkwardness in opening and shutting the covers, and children leaving them open. In general, however, most women (69%) did not feel that covering their dishes was a challenging behavioural change to adopt. Rather, they were appreciative of the health benefits related to covering their dishes.

The encouragement of women's active involvement in development projects such as WASEP schemes may result in increased female participation in other spheres of life. "Participation in projects is seen as an important mechanism to 'overcome apathy' and 'lack of confidence' and can make women visible in the community" (Moser 1993, 102). Furthermore, it may raise awareness in the community that women can play an important role in solving village problems.

## **FOLLOW-UP**

After the research phase of the study, gender-planning workshops were held with field and management staff at WASEP.

The workshop objectives were:

- (1) To develop an understanding of gender, planning, and development as they relate to water and sanitation
- (2) To introduce gender-planning tools (e.g., gender roles identification, gender need assessment, disaggregated data, WID / GID policy matrix) to help staff evaluate project activities
- (3) To integrate gender planning into operational planning and the institutional structure (Moser, 1993)

After an initial session, where the main aspects of gender-planning were introduced, staff members were able to apply gender-planning tools to WASEP activities. Gender diagnosis was selected as the primary means of analysing WASEP interventions. In the first stage of gender diagnosis, several tools were used for assessment. These included the identification of gender tools, conducting a needs assessment and using Women in Development (WID) and Gender and Development (GAD) policies to determine where WASEP fits in gender planning. In the second stage of gender diagnosis, the barriers of gendered participation were analysed and addressed in terms of what is feasible within the cultural constraints. Workshop discussions revealed that WASEP interventions provide several opportunities for women to become more involved in community management. However, it was also agreed that the culture of the Northern Areas and Chitral creates several barriers to effectively implementing full gendered participation. A combination of restricted mobility, poor education, a gendered division of labour and the undervaluing of women's involvement in development by the community are some of the key barriers identified by staff members. As a result of these barriers, women are unaware of project activities. Furthermore, their heavy workload creates a sense of apathy toward improving their participation.

The use of gender diagnosis demonstrated that development work is dependent on the cultural environment. When development workers are considering women's participation, approaches must be limited to what is technically and socio-culturally feasible within the current community system. The example relating to women's participation on the WSC provides a good illustration of this point. As mentioned earlier, the ToP stipulates that women should be on the WSC. Currently, this component of the project is generally not being adhered to. Staff members recognized that it is generally difficult to enforce women participation on the WSC and the development of a separate committee for women would only aggravate current constraints. A final option suggested was to include the spouses of committee members as passive participants, which could lead to greater involvement in the future. This is considered to be a more culturally appropriate approach to gendered participation. While women will not be able to relay women's issues directly to the WSC, they can discuss issues and concerns to their husbands who in turn can communicate them to the WSC.

It is clear from this example that there needs to be greater communication between staff and community members in order to prevent unnecessary barriers from developing. The gender component of WASEP initiatives must be transparent from the initial contact with the community. Along with effective communication and transparency of activities, women need to be exposed to the project from the entry point in the villages. It was suggested that women should be required to sign the Terms of Partnership (ToP) to ensure their commitment and participation from the beginning of the project. Additionally, other channels of communication must be put to use so that women remain informed and involved in project activities. For example, radio and advertisements can be used to deliver messages to women. Also, there needs to be greater communication with WASEP's sister NGOs working in the same communities to ensure that activities are co-ordinated and communication methods are shared.

As a final recommendation, WASEP staff agreed that there is a need for ongoing monitoring of women's involvement in the project. This will require a commitment at the policy level, the measurement of gender-based indicators in the field and further gender training at the staff level.

## **CONCLUSION**

WASEP has entered the transitional phase of its cycle. While fieldwork continues to occupy much of the staff resources, it has become necessary to establish a framework for the next five years of operation. Gender has always been a component of projects, but it is now being recognised as a necessary consideration for project sustainability. Women represent a considerable amount of the demand for water and sanitation facilities and cannot be ignored in the development of schemes. After extensive field visits and planning meetings with WASEP staff, it was concluded that greater emphasis on women's participation in project activities was necessary. At the same time, it is also important to consider and understand current barriers that restrict women from participating in the project more actively. With a firm commitment to gendered participation in schemes from both staff and communities, it is anticipated that the project impact will increase and inevitably result in a greater long-term effect on the quality of life.



## **REFERENCES**

DFID, 2000, Strategies for Achievement the International Development Targets: Poverty Eradication and the Empowerment of Women. Department for International Development: U.K

KATES, Robert W. and Ian Burton, 1986a, Geography, Resources and Environment, Volume I: Selected Writing of Gilbert F. White. Chicago, Illinois: University of Chicago Press

MOSER, Caroline O.N., 1993, Gender Planning and Development. London, England: Routledge

WAKEMAN, Wendy, 1995, Gender Issues Sourcebook for Water and Sanitation. World Bank: International Bank for Reconstruction and Development

WASEP, 2000, Case Studies from the Field. Internal document

\*Women tended to present more than one benefit making figures sum to over 100%.

## **Paper # 11**

Presented in WEDC Conference, Lusaka, Zambia (2001)

### **EVOLUTION OF WOMEN'S INVOLVEMENT IN WATER AND SANITATION PROJECTS IN NORTHERN PAKISTAN**

*By Dr. Karim Alibhai, Dr. Tameez Ahmad and Ms. Nahida Aziz*

#### **BACKGROUND**

The Water and Sanitation Extension Programme (WASEP), an initiative of the Aga Khan Planning and Building Service, Pakistan, has been actively involved in improving the quality of life of the target population in the Northern Areas and Chitral (Northern Pakistan) through access to safe water, sanitation facilities and improvement in hygiene behaviour. WASEP in its five year implementation plan (1997 - 2001) is expected to complete its integrated interventions in 105 partner villages. So far, WASEP has completed intervention in over 40 communities and similar a process has been initiated in more than 30 communities for the year 2000. Research carried out on the role of women in water and sanitation projects in different parts of the world including Northern Areas of Pakistan has established that without proactive participation of women, maximum impact and sustainability of water and sanitation projects can not be ensured (1994; von de Korput et al., 1995; Wakeman, 1995; Halvorson, 1996; IRC / PROWESS, 1997; van Wijk-Sijbesma, 1998; World Water Vision, 1999; IIAV, 2000). Keeping in view this fact, WASEP carried out elementary gender specific analysis to determine the roles of women in the Northern Pakistan with special reference to water, sanitation, and hygiene. The results of the analysis showed not surprisingly that women were traditionally responsible for collection, storage, and handling of water for household consumption in addition to other tasks like cooking, looking after children, washing, cleaning of household environment, disposal of wastewater, solid wastes, and children's faeces, and maintaining livestock. In some parts of the Northern Pakistan, women also contribute in collecting firewood, harvesting, and processing of crops.

In order to achieve its main objectives and make water and sanitation projects sustainable, WASEP, taking prevailing socio-economic, cultural and religious factors into account, has involved men, women, and children in water and sanitation projects based on their respective roles and responsibilities. The paper will briefly describe the evolution of women's involvement in water and sanitation projects in Northern Pakistan from the traditional system to-date and will show how the real success of water and sanitation projects also depends upon the proactive participation of women along with men.

### **Phase 1: Women and traditional water supply systems - experiences from the North**

Majority of the population in Northern Pakistan still do not have access to safe water and adequate sanitation facilities and therefore heavily rely on the traditional sources of water. Traditional systems that provide drinking water include nallahs, springs, rivers, man-made channels, and watercourses traversing from distant sources. Water is either collected directly from these sources or conveyed to individual or communal traditional water pits for storage and subsequent use. Traditionally construction and maintenance of open channels is the sole responsibility of men while women, and sometime children, ensure that water is available in the house for drinking and other domestic consumption. Rarely do men help in fetching water for domestic use.

In many cases, water sources are located far from the village. In some of the villages, it takes about 1 - 2 hours for the women to make one trip and thus make water collection a full time job for some of the women. During the winter season all the available channels freeze and cannot be used to convey water to the village. In Northern Pakistan, water collection from a typical glacial source located at the base of mountain or from a distant river is a hazardous job for women especially in the freezing cold winter in temperature upto minus 25 ° C. Walking tracks to the water source are covered with ice and snow, and many women receive severe injuries; some have lost their lives while fetching water.

Women of Aanderab describing their hardships regarding water collection said:

*"Water collection is our biggest problem, we have to carry jerry cans (container that can hold about 22 litres of water) on our shoulders to fetch water from a distant river which takes more than two hours for one trip and sometime we receive injuries while walking over dangerous tracks packed with ice."*

In the same meeting, at least 20 women reported receiving severe injuries and showed the permanent marks of injuries. In some villages donkeys are used for carrying water from a very distant sources.

One women from such a village (Teru) reported:

*"One day in freezing cold weather I was guiding a donkey loaded with containers filled with water to walk over a sloppy and rocky track covered with ice, suddenly the donkey slipped and fell upon me that resulted in breakage of my arms and ribs. Even after a year of this incident, I still have the pain in my ribs."*

### **Phase 2: Women and Piped Water Supply**

Due to efforts of various government agencies working in water supply since late seventies, traditional water systems in some of the villages were replaced with piped water supply systems, which alleviated the hardships of women in fetching water to a great extent. However, despite their crucial roles in water and sanitation, implementing agencies in the regions did not, to a great extent, involve women in different stages of project implementation i.e., from problem identification to the management of the new systems. It may be relevant to add that the implementing agencies also did not play an effective role in

ensuring proactive and broad participation even of male members of the community. Consequently, most of the projects faced failure mainly due to lack of community involvement and technical problems (Ahmed and Langendijk, 1996).

In 1994, IRC, The International Water and Sanitation Centre, The Netherlands, initiated a four year (1994 - 1998) Participatory Action Research Project (PAR Project) in four villages (all having piped water supply systems) in Northern Areas on "*The Role of Communities in the Management of Rural Water Supplies*". The overall objective of the project was to improve the community management of rural water supply systems. This project was also initiated in 5 other countries (Columbia, Guatemala, Cameroon, Kenya, and Nepal). The partner organisation in Pakistan was Water, Sanitation, Hygiene and Health Studies Project (WSHHSP). In 1997, WSHHSP moved into an implementation phase under the name of WASEP. In the initial phase, the PAR project concentrated on building the capacities of target groups so that they can identify, prioritize and solve problems related to their existing water supply systems. Some of the important outcomes of PAR interventions are as follows:

- ***Formation of women's committee***

Due to interventions of the Aga Khan Rural Support Programme (AKRSP) since 1982, village women started to form Women Organisations (WOs) all over the Northern Pakistan. In general, AKRSP through WOs concentrated on areas that were considered to be gender specific (e.g., nursery development, livestock, food processing and handicraft) and involved Village Organisations (VOs) (parallel organisations of men) in carrying out activities thought to be specific to men (e.g., link road, irrigation channel, micro hydel power plant and water storage reservoirs). As mentioned earlier, construction and management of rural water supply systems was thought to be a man's job and women had no roles except fetching water and using it for domestic purposes. The PAR project, for the first time, recognized the need of actively involving both men and women in rural water supply sector in Northern Areas. In order to transform it into local actions, the PAR project in all the four communities managed to develop consensus on this issue. Consequently, parallel to the men's water committees, women selected members for water committees giving representation to every ethnic group and *mohallah* (separate cluster of houses in a village). The two committees (of men and women) are considered to be an integral part of a single body called the Community Research Team (CRT).

- ***Enhancement of women's skills***

A series of workshops, exchange visits, and meetings were arranged to build the management skills of the local women, especially members of the women committees. These workshops helped women in defining roles and responsibilities for the committee, identifying drinking water related problems, analysing and prioritising these problems and finally proposing solutions and strategies for identified problems. After understanding the dynamics of problems related to existing water supply systems, women's committee initiated the process of raising awareness among other women of the community through meetings and household visits. It should be noted that men's committee also carried out similar activities in villages. Male and female staff of the PAR Project filled the gap between the men and women as in some villages it was not possible to have a joint meeting for men and women due to cultural constraints. However, with the passage of time, this gap reduced significantly in some of the

villages and men started directly listening to the women on pertinent issues and the process of working together started to take root under the umbrella of CRT.

- ***Increased roles of women in water***

Due to the PAR initiatives, the role of women in the rural water supply system increased significantly. Women in all the four communities played far reaching and results oriented roles by proposing strategies and making crucial decisions in the rehabilitation of the rural water supply systems under PAR project and reshaping and improving the community management of water supply system. For instance, in one of villages (Hoto) both men and women came up with final but different solutions to improve their water supply system: men wanted to extend the existing distribution line to provide access to all the households in the village while women thought it was useless to extend the service without building a new water storage tank as some of the households despite having stand post were not getting water due to inappropriate location and design of the existing tank. At the end, a new water tank was built based on the women's strategy, which benefited 70 % of the community members and cost only Rs. 20,000 (390 US \$).

As a result of PAR, communities introduced water tariff to generate funds to meet operation and maintenance (O & M) costs. This concept, being new in the region, did not work well. The men's committee faced great difficulty in collecting tariff from users and so the women's committee was approached to tackle this issue. The women's committee, after chalking out different strategies, visited all those households who were not paying tariff and listened to them and explained the importance (why they are paying, where will this money will be used, what benefit they are going to receive if they pay and otherwise what impact will it have on the water supply system). In this way, women's committee became successful in motivating families who were opposed to water tariff payment. The success of women's committee in collecting water tariff not only improved the management system but also influenced the traditional thinking of male members of the community towards women's involvement in water supply projects.

### **Phase 3: Women, Water, and WASEP**

Based on the experiences of the PAR project and findings of WSHHSP (Halvorson, Aziz, and Alibhoy, 1998), WASEP ensured proactive participation of both men and women in the water and sanitation projects being implemented in the Northern Pakistan. The nature of participation of women in WASEP projects is different from that of the PAR project in a sense that WASEP involved women in all phases of interventions (i.e., identification, planning, selection of appropriate options for hardware, implementation and in the management of the new systems) while in PAR, a water supply project (built by the government agencies without involving women) was already there. Apart from the above, WASEP proactively involved women in sanitation and hygiene education components, which were absent in the PAR, project. PAR project aimed at improving the management of the rural water supplies system while WASEP interventions aimed at giving the real ownership of the improved systems to the communities. The following sections will briefly describe the mechanisms and strategies used to proactively involve women in water and sanitation projects and the outcomes of such measures:

- ***Women's involvement in planning***

In the process of village selection for interventions, a series of Participatory Rural Appraisals (PRAs) are conducted in the potential villages both with men and women separately and where possible jointly. The first step for the communities to qualify themselves for the WASEP's interventions is to raise maintenance fund in advance at the rate of Rs. 1,000 per household. Results of hundreds of PRA sessions with men and women indicates that women



**Fig. 1 Women through village mapping exercise determining pipeline**

take tremendous interest in having access to the improved water and sanitation facilities as compared to the men. In many villages, women motivated their husbands to deposit the compulsory O & M fund. In a meeting, a lady of about 40 years old, representing the women of her village said, *"Our men are not taking interest in the projects because we make water available in the home for their use. They do not feel our hardships in fetching water from*

*distant source They (men) are used to open defecation even during the day but we women cannot...If they are not paying the money, we*

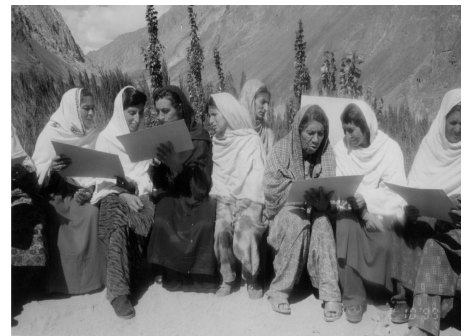
*are ready to raise it by selling our cattle..."*. Just after this meeting, two women were reported to deposit their shares of Rs. 1,000 each and many asked community leaders (male) to sell their cattle. During the planning phase, women are asked to prepare a village map showing the location of their houses, water sources, and possible routes of pipelines to be laid amongst others details. Similarly, they are consulted to make site selection for their proposed tap stand and choose the type of sanitation facilities to be installed. Different tools like group discussion, household visits, interviews, preference ranking, seasonal calendars and daily routine are used to understand women's problems related to water, sanitation, and hygiene so that practical measures can be taken in the implementation phase to address these problems.

- ***Women's involvement in management***

At the onset of interventions, the communities select members for the Water and Sanitation Committee (WSC). In order to ensure women's representation in the WSC, WASEP has created a position of Water and Sanitation Implementer (WSI) for women only. This female (WSI) receives proper training and manual, and represents women in the management committee. She implements and monitors health and hygiene activities in the villages by visiting every household fortnightly. Besides the WSI, in some of the villages, women in collaboration with WSC have developed voluntary sub-committees to ensure proper water tariff collection, proper usage of water and sanitation facilities and adoption of healthier behaviours. In order to create general awareness and make women take action to improve the management of their own project, WASEP conducts education with women on various management issues (e.g., tariff collection, breakage and repair of the system, who is to report in case of problems with water supply, consequences of misuse of water). After having such an education session, women in Gulshanabad and Ahmadabad agreed to monitor misuse of water and to impose fine in the range of Rs. 50 - 100 (1 to 2 US \$) on those who misuse drinking water (e.g., for irrigating vegetables).

- ***Women's involvement in hygiene education***

In order to reduce water and sanitation related diseases, WASEP has a unique health and hygiene education programme for women in the partner communities in addition to school health intervention programme of school going boys and girls at primary school level. Hygiene education sessions are regularly conducted with women once in every six week continuously for two years after the onset of the interventions in that village. Besides education sessions, WASEP's HHPs also regularly visit every household to discuss various issues and to gather data on the status of water, sanitation, KAP, and hygiene. The outcomes of the data analysis are also shared with the women.



**Fig. 2 Women participating in hygiene education.**

## **WOMEN MAKING IMPACTS**

Although women, water, sanitation and hygiene are inseparable, it has been extremely difficult to involve women in water supply and sanitation projects. The main reasons for this have been the gender specific role of women and religious-cum-cultural constraints. In most of the Northern Areas it is not even possible to have a joint meeting of men and women. For WASEP, it was crucial to involve women in projects because its main objective is based on health benefit of the projects rather than making water accessible. It has an integrated approach towards water, sanitation, and hygiene, which cannot work without involving all stakeholders in the villages, especially women; the major stakeholders. Through its culturally acceptable unobtrusive approach towards women's participation, WASEP successfully involved women in all phases of project implementation and thereafter in the management of the system. This involvement provided an opportunity for women to make decisions about the location and type of facilities being provided, occupy a permanent seat in the water sanitation committees, and form voluntary sub-committees to assist in management. These initiatives produced significant impacts. Women involvement in the management of the system improved O & M through better tariff collection and proper usage of the water. Making hygiene education an integral part of water and sanitation projects resulted in adoption of healthier behaviours thus significantly improving hygiene status, resulting in reduction of diarrhoeal diseases by more than 50 %. Other impacts include users satisfaction (both men and women) with services provided, creation of a sense of ownership and acceptance of the crucial roles of women in the projects by men. Based on WASEP's experience it can be concluded that without involving women in water and sanitation projects expected health benefits and the chance of long-term sustainability of the community based rural water and sanitation projects cannot be guaranteed.

## REFERENCES

- AHMED, J, AND LANGENDIJK, M.A.M. 1996, A water and sanitation inventory of 862 villages in Northern Areas and Chitral. Issue Paper8, WSHHSP, AKHSP, Gilgit, Pakistan
- BOLT, E. 1994. Together for water and sanitation-Tools to apply a gender approach: The Asian experiences. IRC, The International Water and Sanitation Centre, The Netherlands
- HALVORSON, S.J. 1996. Defining gender approach to guide the future actions of the Water and Sanitation Extension Programme", WSHHSP, Aga Khan Health Service, Northern Areas and Chitral, Pakistan
- HALVORSON, S.J., AZIZ, N, and ALIBHOY, K. 1998. Strategies to involve women in water and sanitation. 24<sup>th</sup> WEDC Conference, Islamabad, Pakistan
- IIAV, 2000. Gender 21: Women's recommendations to the 2<sup>nd</sup> ministerial conference on water. International Information Centre and Archives for the Women's Movement. Amsterdam, The Netherlands
- IRC/PROWWESS/UNDP. 1997. Women, Water, Sanitation. Special issue on gender-related considerations for training and education. IRC, The International Water and Sanitation Centre, The Netherlands
- VAN DE KORPUT, J.A., MUNEEBA, AND LANGENDIJK, M.A.M. 1995. Hygiene Behaviour in North Pakistan: The results of a quantitative and qualitative study. Issue Paper 6. WSHHSP, Aga Khan Health Service, Northern Areas and Chitral, Pakistan
- Van WIJK-SIJBESMA, C. 1998. Gender in water resource management, water supply, and sanitation: Roles and realities revisited. IRC, The International Water and Sanitation Centre, The Netherlands
- WAKEMAN, W., 1995. Gender issues sourcebook for water and sanitation projects. UNDP/WB/PROWWESS. Washington, DC: The World Bank
- World Water Vision, 1999. Mainstreaming gender in water resources management: Why and how. Background Paper for the World Vision Process