

## Environmental Effects of Post Disaster Rehabilitation

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### **Abstract:**

*2010 monsoon rains caused devastating floods affecting 82 districts and over 20.25 million people with widespread destruction of infrastructure resulting in threats of water-borne diseases. To protect peoples' health from water, sanitation and hygiene related diseases and ensure sustainable resettlement of the affected peoples, a project was implemented with specific objective to reach out 3.5 million people in nineteen flood affected districts. It focused on; Institutional linkages & Capacity Building; Campaigning for Improved Hygiene Behaviour and Polio Eradication; Attaining Total Sanitation; and Monitoring, Evaluation and Learning. Each of the components was subdivided into a measureable indicator and Participatory Rural Appraisal (PRA) tool was used for collecting baseline information regarding Knowledge Attitude and Practices (KAP) of community and sanitation coverage/open defecation status, with a sample size of 10% households of 10% of selected communities. Overall 60 % increase in the targeted districts has better access to sanitation activities. Strong mobilization and coordination between stakeholders was required. Once communities are provided with knowledge they can bring change in their lives. Children and women are the best change agents. Major issues that need to be addressed include creation and sustaining of sanitation demand through a multitude of options including communities' approaches to total sanitation, creating institutional capacity and mechanisms, and a dedicated cadre of volunteers and field level functionaries. Positioning women and children as community leaders, hygiene promoters and sanitation activists is critical not only in terms of consolidating development gains, but also in making the sanitation agenda truly inclusive and community led. Implementation of total sanitation into Resettlement/rehabilitation ensures minimum burden on ecosystem over extended time period. However, the program needs to be stemming from the government planning process for sustainability.*

**Key Words:** KAP, Flood, Water and Sanitation

### **1. Introduction:**

During 2010 monsoon season, Pakistan suffered heavily due to the worst floods in its recorded history. The flood was caused by unprecedented high intensity rainfall, which is associated with climate change phenomenon called, freezing jet stream. Over 20.25 million people in 82 districts were affected with widespread destruction of infrastructure. At the height of flooding, one fifth of Pakistan's territory was submerged by the water (NDMA, 2011) damaging 40% and 60% dry toilets, 30% and 50% flush toilets in urban and rural area respectively, which resulted in threats of water-borne diseases (Lewin et al., 2007). Developing countries are already facing severe problem of water-borne diseases which is a leading cause of morbidity and mortality in children. Water-borne diseases (WBDs) primarily stems from the poor water management and sanitation practices, approximately 88% of diarrhoeal diseases are attributed to unsafe water supply, and inadequate sanitation and hygiene (WHO, 2004). Further, absence or inadequacy of environmental legislation in these countries has worsened the situation. On the contrary, Pakistan has policy and legal framework for environment as well as emergency response plans. However, there is still ample scope to strengthen its practice (Naureen, 2009).

On the other hand, a healthy decline has been reported in WBDs using simple intervention like 47% reduction in diarrheal morbidity by washing hands with soap (Luby et al., 2005) 35% by point of use microbial water treatment (Clasen et al., 2006) and 32% by improving sanitation (Minamoto et al., 2012). Considering conditions of flood affected area, it became imperative to take early measures at national level to minimize the effects of disaster. In this connection a project was implemented at federal level (Ministry of National Disaster Management), entitled “Scaling up Rural Sanitation in Flood Affected Areas of Pakistan” in collaboration with international agencies. The project was implemented with main objective to reach out 3.5 million people in flood affected districts to protect their health from water, sanitation and hygiene related diseases as well as sustainable resettlement of affected peoples. This was achieved by means of undertaking a series of measures.

The aim of this paper is to examine the link between socioeconomic status, awareness and behavioral attitudes of the flood affected population, regarding water, sanitation and hygiene using KAP.

## 2. Materials and Methods:

### 2.1. Study area and population

The project was carried out in 19 most flood affected districts of Pakistan (table 1). 5054 Households (HHs) were surveyed using two-stage Stratified Random Sampling Design. In the first stage 361 flood affected villages were randomly selected. Selection of the 361 Villages was made with probability proportional to size among all the 19 Districts to ensure adequate representation of each District. In the second stage, 14 households from each of the sampled 361 villages were selected through systemic random technique.

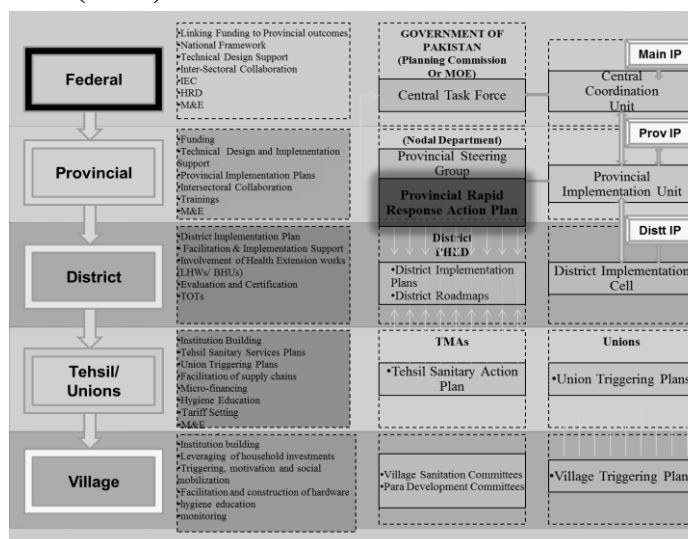
Table 1. Main districts covered under the project.

S.No	Province	Districts
1.	Sindh	Ghotki, Jacobabad, Thatta
2.	KPK	Charsada, DI Khan, Kohat, Mardan, Swabi
3.	Balochistan	Jaffarabad, Naseerabad
4.	AJK	Bagh, Kahuta, Neelum
5.	GB	Gilgit; Skardu, Astore, Ghanche, Ghizer, Hunza Nagar

Average HH of the study area was 6-7 persons with overall 52% and 48% gender distribution of males and females respectively. Literacy rate is generally low, half of the men and two-third of the females are illiterate. Access to Electricity, Mobile Phone, Radio and Television is 63%, 54%, 25% and 17% respectively. Sixty percent of the total populations fetch water from outside sources like river, streams, canals etc. for washing, bathing and cooking. Women and children are responsible for the water supply in their houses.

### 2.2. Knowledge, attitudes and practices (KAP)

The baseline and post disaster status was determined by collecting information of key indicators like sanitation, water, hygiene, mortality and morbidity, socio-economic and demographic status etc. in the target districts. Each of the components was segmented into a measureable indicator and PRA tool was used with a sample size of 10% households of 10% of selected communities (Minamoto et al., 2012).



Focus group discussions (FGDs) and In-depth interviews (IDIs) were also conducted in each of the selected communities for understanding the attitudinal and behavioral aspects of the people regarding hygiene, sanitation (Mahmood et al., 2011) and the type of latrine being used and options that are feasible for the affected communities to improve their sanitation conditions.

Fig. 1. Schematic diagram of project implementation structure

### **2.3. Project implementation structure**

The project focused on multiple dimensions including; Institutional linkages & Capacity Building; Attaining Total Sanitation; Campaigning for Improved Hygiene Behaviour and Monitoring, Evaluation and Learning. Each of the components was implemented independently but with overlapping of many activities and were coordinated at federal level (fig. 1).

### **2.4. Statistical analysis**

Data were fed and analyzed using SPSS for Windows version 13.0 (Banda et al., 2007). To test the difference between the different sub-groups,  $\chi^2$  tests and two-tailed Fisher's exact test were used for categorical variables, and Student's t-test was used for continuous variables.

## **3. Results:**

### **3.1. Socio-demographic status**

Most of the people (90%) liked to live in their own homes as before floods. Three-Fourth (78%) peoples own 2 or less than 2 rooms irrespective of having before floods. Two third people suffered mental trauma due to loss of their beloved ones or property. Significant difference in trauma severity was observed in different age groups whereas children were most affected group followed by women and men.

### **3.2. Water availability and treatment practices**

Peoples (90%) are generally of the view that they have sufficient water availability for domestic use and over 56% people are aware of the contamination sources and their consequences i.e. WBDs. However, one in ten HH doing any treatment (Boiling: 23%, Filtration with Cloth: 10%, Sunlight Exposure: 7%).

### **3.3. Hygiene Behaviors**

Health & hygiene awareness raising activities resulted in lifting hygiene behaviors among all age groups (table 2). Active school children (91% girls and 62% boys) were disseminating knowledge to peers. Seventy percent of the children are practicing hygiene and washing their hands after latrine use, and before eating as compared to 26% before the floods (fig. 2). The street theatres for health and hygiene promotion was generally found effective and appreciated by the community.

### **3.4. Toilet and defecation practices**

Project was successful in realizing the importance of the toilet use, in response, 23% people (who can afford) started to build toilets. Eighty six percent of the HHs which has latrines responded that they are using latrine and 3% said that they are not using the latrine. 94% of the HHs responded that they wash their hands after latrine use, before & after eating etc. The project has been successful in declaring 24 villages out of total (361) as ODF. However, 47% of the total population is still practicing open defecation against 89% before the floods (fig. 3).

Knowledge on hazards of open defecation and relationship of WBDs with OD is observed in 78% and 54% respondents respectively. Interestingly, it was observed that 44% people have intentions to build toilets, out of them 95% conveyed financial barriers for not having the toilets (table 2).

Table. 2. Percentages of some important indicators of sanitation, hygiene and media coverage

Indicator	Percentage (%)
<b><u>SANITATION</u></b>	
Knowledge on Hazards of Open Defecation	78
Knowledge on Relationship of WBDs with OD	54
Practice Covering Feces in the Field	23
HH Latrine	
• Intentions to Build	44
• Finances as the Main Reason	95
• Willingness to Contribute Financially	50
• Willingness to Participate Physically	85
HH Toilet Waste Disposal:	
• Throw into Garbage	50
• Throw onto Fields	27
• Put into Drain/ Ditch	13
HH Waste Disposal:	
• Throw into Open/ Backyard	88
• Others	12
HH Water Disposal:	
• Drained Out to Open Space/ Field	75
• Drained Out to Streets	15
<b><u>HYGIENE</u></b>	
Knowledge about Hand-washing Technique	
Reported Hand-washing Practices	
• Before Eating (Women, Men, Children)	87, 85, 76
• After Defecation (Women, Men, Children)	85, 84, 68
Hand-washing Facility in/ near HH Toilet	
• None	44+
• Water	32
• Water & Soap	22
Hand-washing Facility in/ near School Toilet	
• None	36
• Water	86
Oral Hygiene (Men, Women, Children)	35, 39, 22
Skin Care (Men, Women, Children)	52, 73, 64
Foot Care (Men, Women, Children)	22, 59, 69
<b><u>ACCESS TO MEDIA</u></b>	
None	55
TV	26
Radio	16
NEWS paper	1-2
Others	1-2

### 3.5. Media

Television was preferred media in all the program districts however, the project uplifted the awareness level and motivated to get access to the media (table 2).

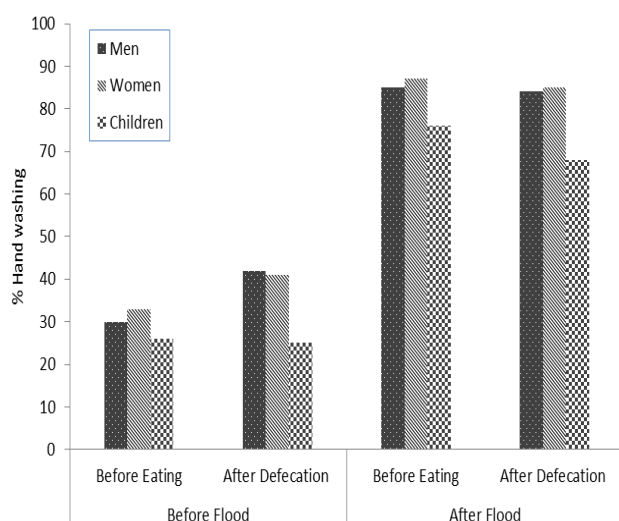


Fig. 2. Comparison of hand washing percentages among men, women and children before and after the flood

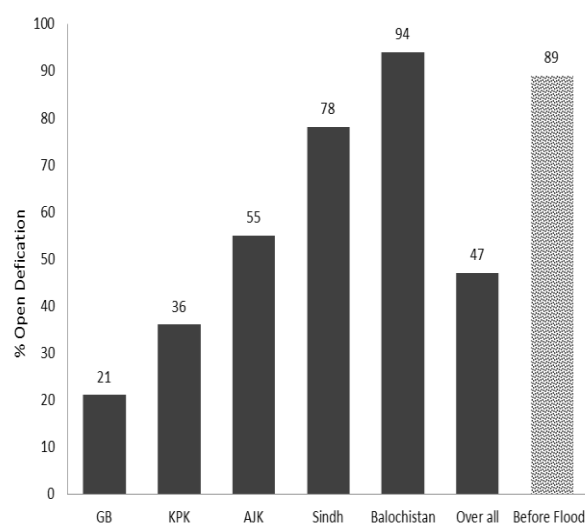


Fig. 3. Comparison of open defecation status before and after flood

## 4. Discussion:

Socioeconomic and traditional behaviors (i.e. affection towards family land) led the affected people to occupy the same space as they had before the floods. A significant difference was observed in the attitudes and practices towards the water consumption and usage after the flood. Children and women emerged as agents of change in the society by adopting and replicating the positive hygiene behaviors however, men require longer time to adapt to the change because they are dominant in the society and hesitate to change their practices for which are they use to.

Beside strong awareness level among general public and school children towards sanitation they are compelled to practice open defecation, either due to lack or non-functionality of toilet facility. A strong correlation emerges between households where open defecation was higher and occurrence of diarrhea amongst men, women and children (Ugbomoiko et al., 2009). This gap between knowledge and practice explains the reason for commonness of WBDs among the surveyed communities (Winkler et al., 2012). Most of the target population has limited financial resources and therefore require linkages with the resources available in the respective areas. Improved sanitation awareness, appropriate assistance by the government and local organizations and easy availability of local building materials and construction skills have been known to increase the demand for household latrines (Banda et al., 2007).

Lack of proper mechanisms regarding solid waste disposal has major implications on water quality and quantity (Scott et al., 2002) which is relatively neglected part. However, people have strong urge to manage the solid waste but the financial conditions after the flood does not permit to practice.

Due to mobilization of national and international welfare organizations and awareness raising campaigns the communication facilities has been geared up.

## 5. Conclusion and Recommendations:

Effective awareness raising among the affected peoples is important to uplift their motivation level which is a positive step towards the resource conservation and the protection of water sources from contaminations and cut in the carbon emissions due to wastewater management and ODF. It was strongly felt that a second step is needed to facilitate people financially and technically for actualizing the awareness in to practices by reducing the gap between awareness and practices.

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