



Autobiography of Mr. Karamat Ali

Karamat Ali, did his masters in development economics from University of Punjab, Lahore, Pakistan has more than 29-year experience of monitoring, evaluating and coordinating water resources, storage/hydropower development and surface/sub-surface drainage projects in Pakistan Water and Power Development Authority (WAPDA), Lahore. Associated with Global Water Partnership (GWP) at Country and Regional levels since 1999.

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Abstract

Pakistan is a country of 173.51 million people (2010) of which 63.05 million live in urban and 110.46 million in rural areas. The country is experiencing growth in urbanization as more than 36% population now lives in urban areas as compared to 33% in 1998-99 (Ref. Economic Survey 2009-10). Its population growth rate of 2.05% is the highest in South Asia region. Pakistan has high infant mortality rate of 65 per 1000 deaths and under-five child mortality rate is 95 per 1000 deaths. UNICEF estimates that some 20-40 percent of hospital beds in Pakistan are occupied by patients suffering from water and sanitation-related diseases. USAID reports that 60 percent of the total number of child mortality cases in Pakistan is caused by water and sanitation related diseases. The World Health Report (2010) points out that 16% of all under-five children death occur because of diarrhea alone. This situation may be attributed largely to poor water and sanitation conditions in the country.

Pakistan being a signatory to the MDGs declaration is committed to extending improved sanitation to 67% of its population by 2015. The PSLM Survey 2010 shows that 78% households had access to flush or dry latrines in Pakistan in 2008-9 compared to 57% households in 2001-2¹. Further, the number of households without any toilet facility decreased from 43% to 22% during this period. However, devastating floods of 2010 and 2011 have changed the situation altogether. The current level of sanitation coverage in Pakistan has gone down to 45% (WaterAid UK). This shows a significant decline in the sanitation facilities available in Pakistan. This decline in sanitation coverage is not totally attributed to the devastating floods but there are some measurement and methodology issues as well, which needs to be taken care. The Water and Sanitation Authorities (WASAs) in major cities and Tehsil Municipal Authorities (TMAs) in small towns/rural areas are responsible institutions for water and sanitation provisions. However, WASAs and TMAs are subject to lack of technical expertise, funds, equipment and other logistical support. Understaffing is a common problem at the local level and available staff is not well-trained in community mobilization, participative planning, monitoring & evaluation and other technical aspects of their jobs.

Southern Pakistan, Tharparkar especially has been a victim of drought and severities of climate change and therefore water availability is extremely low which has resulted in human and livestock life, health and livelihood problems in the area. Drinking water supply and sanitation are the most affected areas. Great struggle is required to cope with the problems arising in the area.

The paper will highlight problems emerging due to lack of clean drinking water and safe sanitation, suggest cheaper and practicable sanitation especially dry toilet methodologies, identification of areas where dry toilet concept can be introduced, suggest improvements in services of WASAs and TMAs for promotion of dry toilet concept, propose measures to enhance full participation of community organizations in the dry toilet drive as a mean of sanitation provision and thereby improving the living standard of communities in drought hit areas of Tharparkar.

KEYWORDS: Rural sanitation, improved living standards, improved sanitation services, new dry toilet sanitation methodologies.

¹ PSLM 2006-7, PSLM 2009-10, Federal Bureau of Statistics, Government of Pakistan.

Background

Pakistan can be classified as one of the most arid countries of the world with average rainfall of 240 mm a year. Its population and economy heavily depends on the annual influx into the Indus System (including the Indus, Jhelum, Chenab, Kabul and some un-captured flows by India of Ravi, Sutlej and Beas rivers) of about 190 BCM of water mostly derived from snow melt in the Himalayas. In addition, Pakistan has 16 Mha of aquifer with a total potential of 68 BCM of groundwater, mostly getting recharged through canals network and partially through some limited structural arrangements. Season wise 81% of the surface water is available in the wet season (Kharif) which runs from April to September. Seventy seven percent (77%) of Pakistan's population is located in the Indus basin – 40 million people in Pakistan depend on irrigation water for their domestic use especially in areas where groundwater is brackish. In general Pakistan is a water scarce country, has high precipitation variation, high water stress indicators, high ecosystem deterioration, extremely low water use efficiency, poor access to clean drinking water and sanitation, poor conflict-management capacity and deferred maintenance of water infrastructure. Trans-boundary aquifer mining and trans-boundary surface water pollution are factors which adversely affect water resources of Pakistan. Pakistan therefore, falls in the category of high vulnerability to climate change.

Pakistan is a country of 173.51 million people (2010) of which 63.05 million live in urban and 110.46 million in rural areas. The country is experiencing growth in urbanization as more than 36% population now lives in urban areas as compared to 33% in 1998-99 (Ref. Economic Survey 2009-10). Its population growth rate of 2.05% is the highest in South Asia region. Pakistan has high infant mortality rate of 65 per 1000 deaths and under-five child mortality rate is 95 per 1000 deaths. UNICEF estimates that some 20-40 percent of hospital beds in Pakistan are occupied by patients suffering from water and sanitation-related diseases. USAID reports that 60 percent of the total number of child mortality cases in Pakistan is caused by water and sanitation related diseases. The World Health Report (2010) points out that 16% of all under-five children death occur because of diarrhea alone. This situation may be attributed largely to poor water and sanitation conditions in the country.

Pakistan being a signatory to the MDGs declaration is committed to extending improved sanitation to 67% of its population by 2015. The PSLM Survey 2010 shows that 78% households had access to flush or dry latrines in Pakistan in 2008-9 compared to 57% households in 2001-2². Further, the number of households without any toilet facility decreased from 43% to 22% during this period. However, devastating floods of 2010 and 2011 have changed the situation altogether. The current level of sanitation coverage in Pakistan has gone down to 45% (WaterAid UK). This shows a significant decline in the sanitation facilities available in Pakistan. This decline in sanitation coverage is not totally attributed to the devastating floods but there are some measurement and methodology issues as well, which need to be taken care. The Water and Sanitation Authorities (WASAs) in major cities and Tehsil Municipal Authorities (TMAs) in small towns/rural areas are responsible institutions for water and sanitation provisions. However, WASAs and TMAs are subject to lack of technical expertise, funds, equipment and other logistical support. Understaffing is a common problem at the local level and available staff is not well-trained in community mobilization, participative planning, monitoring & evaluation and other technical aspects of their jobs. The Water and Sanitation Agencies (WASAs) were established under commitment to provide drinking water of unquestionable quality in sufficient quantity and to treat the sewage generated to the required parameters and to provide water and sanitation services to make WASAs as effective instruments of change through adopting state-of-the-art technologies for improving the quality of its services to the general public. Similarly the Tehsil Municipal Authorities (TMAs) in small towns/rural areas were setup with an ideal objectivity in view by the planners and policy-makers.

However, these institutions could not deliver even after a long period of working their areas. This is perhaps due to their organizational structure which are becoming very heavy without improving their services to the general population. Some of the WASAs and TMAs are delivering to some extent but

² PSLM 2006-7, PSLM 2009-10, Federal Bureau of Statistics, Government of Pakistan.

the ideal situation which was foreseen at the time of their creation is not attained. Mostly these institutions focus on water supply at bulk supplies and trade of solid wastes. These are little concerned about the clean drinking water supply and safe sanitation facilities especially to water short areas. Concept of the WASAs and TMAs is based on water drain sanitation. Dry toilet or dry sanitation is not yet in the vision of these institutions.

During the past decade, Pakistan has suffered a number of major disasters. Major sanitation and water supply disasters are seen in those areas where drought situation prevailed round the year. All desert areas like Thar, Thal, Cholistan and Kharaan are subjected to face severe water shortages and have worst sanitation conditions. Before we review the sanitation situation in the focused area of Tharparkar, it is quite necessary to have some basic information on its population, hydrology, soil chemistry, vegetation, rainfall details, inhabitation, etc.

Thar Desert

Thar Desert, also called Great Indian Desert, is extremely arid region of rolling sand hills located partly in Rajasthan state, northwestern India, and partly in Punjab and Sindh provinces of Pakistan. It covers about 77,000 square miles (200,000 square km) of territory and is bordered by the irrigated Indus River plain to the west, the Aravalli Range to the southeast, the Rann of Kachchh to the south, and the Punjab Plain to the north and northeast. The subtropical desert climate results from persistent high pressure and subsidence at this latitude. The prevailing monsoon winds that bring rain to the rest of India in summer tend to bypass the Thar to the east. The name Thar is derived from *t'hul*, the general term for the region's sand ridges. (Source: Wikipedia)



Fig. 1: Life in Tharparkar³

The desert presents an undulating surface, with high and low sand dunes separated by sandy plains and low barren hills, or *bhakars*, which rise abruptly from the surrounding plains. The dunes are in continual motion and take on varying shapes and sizes. Older dunes, however, are in a semi-stabilized or stabilized condition, and many rise to a height of almost 500 feet (150 meters). Several playas (saline lake beds), locally known as *dhands*, are scattered throughout the region.

The amount of annual rainfall in the desert is generally very low, ranging from about 4 inches (100 mm) or less in the west to about 20 inches (500 mm) in the east. Precipitation amounts fluctuate widely from year to year. About 90 percent of the total annual rainfall occurs during the season of the southwest monsoon, from July to September. During other seasons the prevailing wind blows from

³ Photo courtesy the Dawn newspaper.

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the northeast. May and June are the hottest months of the year, with temperatures rising to 122 °F (50 °C). During January, the coldest month, the mean minimum temperature ranges between 41 and 50 °F (5 and 10 °C), and frost is frequent. Dust storms and dust-raising winds, often blowing with velocities of 87 to 93 miles (140 to 150 km) per hour, are common in May and June.

The desert vegetation is mostly herbaceous or stunted scrub; drought-resistant trees occasionally dot the landscape, especially in the east. On the hills, gum arabic acacia and euphorbia may be found. The *khajri* (or *khejri*) tree (*Prosopis cineraria*) grows throughout the plains. The thinly populated grasslands support black bucks, chikara (gazelles), and some feathered game, notably francolins (partridges) and quail. Among the migratory birds, sand grouse, ducks, and geese are common. The desert is also the home of the endangered great bustard.

Most of the desert's inhabitants reside in rural areas and are distributed in varying densities. Both Islam and Hinduism are practiced, and the population is divided into complex economic and social groups. However, majority of the population is Hindu.

Due to severe shortage of water in this area and/or availability of highly contaminated water, the population is subjected to heavy rate of water borne diseases and casualties. There is high rate of infant mortality in this area because of two major reasons. Firstly, non-availability of sufficient food because of food grain growing problems of the area and secondly non-existence of provision of safe drinking water. Catastrophic situation always prevail in the area which dominates their all other activities. Table 1 shows some basic facts and figures about Tharparkar.

Population	1,251,455 Nos.
Total Area	19,653 Sq.Km
Talukas/Tehsils	04 Nos.
Union Councils	44 Nos.
Villages	2,188 Nos.
Health Facilities	37 Nos.



Fig. 2: Drinking Water is taken from ponds.⁴

The ongoing drought has had highly negative impacts on the food security and nutrition situation of rural and urban communities of this area. Several factors are contributing to this fast spreading food insecurity. The multiplying factors of insufficient access to food, acute lack of access to clean water, lack of adequate and hygienic sanitation, low level of health services have already worsen the high rate of malnutrition and has resulted in outbreak of diseases in the area.



Fig. 3: Living in Thar Desert.

Unhygienic sanitation practices caused a great issue in this area. Open defecation is practiced in most part of Tharparkar which is spreading human excreta all around these areas. A recently

⁴ Photo courtesy the Dawn newspaper.

conducted survey of the area by Pakistan Water Partnership (PWP) shows high rate excreta existence in the water being used for drinking by four communities of Mithi, Diplo, Chachro and Nagarparkar Tehsils. There is provision of developed latrines to only about 16% of the houses whereas rest of the population uses open defecation as sanitation mean.

What are the Solutions to Tharparkar Problems?

Thorough study of the problems of Tharparkar area reveals that due to some unknown reasons this area is extremely neglected of the fruits of development. Government of Pakistan as well as the Provincial Government of Sindh have planned and announced many welfare projects and programmes for social uplift and livelihood improvement in Tharparkar but most of these could not be implemented on ground. One can simply say that the root cause of all issues of the area is scarcity of water. Not only drinking water for human being but also for agriculture, livestock and environment. Only ad hoc provision of water supply for human being was planned but it was never delivered. Some water treatment plants along with supply lines were constructed but never been operationalized to benefit the communities.

PWP extensively surveyed the whole areas of Tharparkar and prepared a problem identification and solution report in April 2014. Basing on its direct interaction with the communities and field research, following major solutions proposed to the Government of Pakistan:

- 1) The government may commission detailed design of water interventions in the 4 areas (rainwater harvesting, emergency pond excavation, small dams, provision of safe drinking water) and village well maintenance and finally a major **Canal to irrigate**, provide drought security and transform Thar's economy and bring it at par with the bordering areas where a clear model has already been established.
- 2) It is proposed that the government take a comprehensive look into the resources of Tharparkar and put in place a Tharparkar Development Authority with strong representative of local population to tap opportunities that will meet the aspirations of their people.
- 3) NGOs are doing some good work but it is rather isolated and unlikely to create much impact. The government may facilitate a focused response from those NGOs that are working in Thar by providing them a forum that allows monitoring and evaluation of activities in line with national interests and provision for up-scaling their works.
- 4) The government convenes a meeting with key stakeholders from Sindh, Tharparkar and the Federal government to share the concept proposed for Water Development in Tharparkar- Desert Canal initiative to ensure a permanent long term solution to the desert ecologies.
- 5) Basic investment in health infrastructure and actions to address infant mortality in all desert areas is taken up in a manner similar to the polio campaign in other parts of Pakistan. Essential vaccination and nutrition along with immediate proposals to cut water borne diseases be taken up. It is rather shameful for Pakistan to be maligned in the national and international media for infant mortality due to malnutrition. Pakistan is a food surplus country mismanagement of food security loop holes should enable the whole population to receive an adequate diet. Creating opportunities to purchase and grow own food (especially vegetables) is a short term goal that requires little investment but needs mass scale awareness campaign and demonstration on ground.
- 6) Comprehensive planning should be carried out for provision of clean drinking water and safe sanitation on long term basis.

Interventions carried out by PWP

In line with the situation analysis and demands of the communities observed during situation analysis visit of April 2014, following interventions were carried out by PWP to help improve water scarcity situation and health improvement in Tharparkar areas:

- 1) Construction of rainwater harvesting ponds
- 2) Installation of Bio-sand filters (indigenous design) for clean drinking water and training
- 3) Training on domestic soap making for personal hygiene improvement

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- 4) Village nurseries for enhancing tree plantation and kitchen gardening
- 5) Provision of medicines to affected communities

Table 2 shows level of interventions and number of beneficiaries in Tharparkar from PWP struggle:

Table 2: Tharparkar - PWP's interventions and benefits				
Sr. #	Intervention	No. of activities	Beneficiaries	Remarks
1.	Rainwater harvesting ponds for livestock	15	200,000	Livestock of 15 villages benefiting
2.	Bio-sand filters (indigenous design)	28	2,800	Clean drinking water is available to 2,800 people.
3.	Domestic soap making and distribution	525	800	Trained people promoting soap making locally
4.	Village nurseries for tree plantation and kitchen gardening	8	7,000	To enhance income and livelihood
5.	Distribution of Napier grass shoots for fodder cultivation	4,000	4,000	Fodder for livestock
6.	Other interventions on hygiene promotion for human and livestock	117	12,000	Healthcare and prevention of diseases
7.	Media workshops for journalists	2	130	Wider dissemination



Fig. 4: Photos of PWP interventions in Tharparkar.

Introduction of Dry Toilet

There has been great scope of introduction of dry toilet system in the Tharparkar areas where water availability and its use for sanitation is already on minimum side. The population can be a happy recipient of this intervention. As per the objectives of **Global Dry Toilet Association of Finland**, an ecologically, socially, economically and culturally sustainable sanitation along a natural nutrient cycle can be provided in the Tharparkar areas.

This area's sanitation problems cannot be solved only by building water latrines and sewerage systems. Apart from water availability, the building and maintenance costs are too high and furthermore this infrastructure cannot ensure clean environment in this very hot desert area. Due to inadequate waste water treatment even more severe health and environmental risks than the use of bushes for defecation purposes can be created. Therefore it is necessary to introduce cheap, technically simple and safe sanitation alternatives, which can be adjusted to meet the needs of different cultures and environments. Dry latrines (Dry toilets, DT) are one good solution for this problem. It is also necessary to increase sanitation and hygiene education for the better understanding of its connection with human and environment health.

Usually when an intervention related to sanitation provision in this area is discussed; the main problem of water availability is faced as an uncopeable issue of the area. Dry toilet would be a solution with many other related benefits. Some of the benefits it carries can be:

- Decrease in contamination of the environment caused by human excretion and prevention of diseases deriving from excreta.
- Human urine and feces are considered as a resource, not as waste.
- Recovery of nutrients from excreta and utilization of the end product as fertilizer and soil enrichment material.
- In situ or close by treatment of the excreta.
- Avoiding utilization of water in the transportation of excreta.
- Use of decentralized waste treatment methods and services (e.g. collecting, recycling and preserving).

The principle of nutrient cycle is shown in Pic. 2. In the nature waste is not generated, but all the products of organisms are used as nutriment or nutrients for other organisms. Plants give directly nutrition to herbivores or indirectly as energy for the animals higher in the food chain. When animals defecate into the nature, the unused nutrients are transferred back to soil for the use of plants and decomposers⁵.

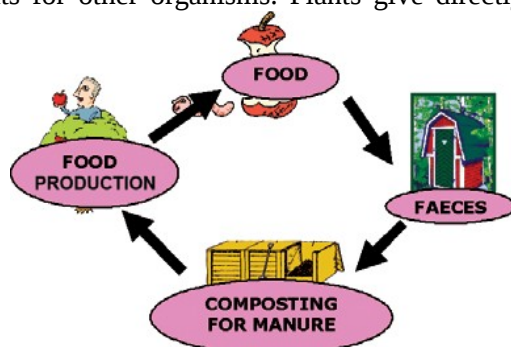


Fig. 5: Principle of nutrient cycle

Social and Religious Aspect

While promoting the dry toilet concept in this area there is a need to take good account of psychological factors, religion factors, gender related factors, economical factors, social factors and institutional factors. Muslim population, which is in minority in this area, has social and religious limitation in use of dry toilet as an alternate sanitation facility. They would be sensitive to it and it is very hard to justify use of dry latrines to them.

However, the majority of the population is Hindu of Bheel cast who do not have any such limitation and they can be focused for the introduction of the dry toilets in Tharparkar. But at the very same time their financial resources are very thin and they may not be interested to any intervention which does not impress them economically.

⁵ A guide to sanitation and hygiene in developing countries, Global Dry Toilet ASSOCIATION of Finland, Tampere University of Applied Sciences, Tampere 2009, Updated version 2.

How to Introduce Dry Toilets?

Pakistan Water Partnership (PWP) has already been working in Tharparkar areas and has initiated some integrated water resources management and safe water use interventions including construction of rainwater storage ponds, bio-sand water filters for clean drinking water, homemade soap for hygienic living and distribution of general medicines and vegetable seeds for kitchen gardening. It has also introduced Napier grass as a fodder for cattle of the area. PWP is also collaborating with the TMAs in this hard to reach area of Sindh Province.

This presence of PWP would be helpful in the introduction of dry toilet concept especially in areas where PWP has implemented its interventions. Following four locations with three dry toilets each can be a good startup activity:

Sr.#	Village/Goth	Population	Household size	Religion	Cast	District DHQ
1.	Kamro Thakur	650	09	Hindu	Thakur	33 KM
2.	Bheel Paro Kamro	460	10	Hindu	Bheel	32 KM
3.	Loondhar Bharoo Bheel	440	10	Hindu	Bheel	39 KM
4.	Meenghwarparo	400	09	Hindu	Bheel	49 KM

These villages/goths are very responsive to our earlier interventions and maintaining those facilities with their utmost efforts. They also have the sense of ownership with communities involvement at all levels of construction and fixing/distribution. This initiative can be very successful if the officials of TMAs of Tharparkar are involved through a capacity building process and implementation of this dry toilet initiative with their ownership. If this experiment is undertaken with the help of TMAs, they would take it as their own struggle and will share the good name to be earned in this area.

Benefits of the dry toilet will force the TMAs and the communities to maintain the facilities and also it will open up avenues of replicating it in other villages, goths and houses.

Anticipated impacts on the Communities

Provision of dry toilet in Tharparkar areas will greatly impact the life and livelihood of the relevant communities. Following impacts are anticipated:

- Better health
- Social uplift
- Economic betterment
- Manure for crops
- Environmental improvement

Collaborators in the Activity

Since initial cost of the provision of twelve dry toilets at 4 villages/goths in Tharparkar would be around US\$ 2500± which is a meager one, it would be feasible to involve only local partners from national organizations for this initial experimental stage. At a later stage, international donor organizations need to be partnered for larger interventions covering more than 100 villages/goths in Tharparkar for replication of successful interventions. Successful implementation of the experiment would also attract UNICEF and World Bank to invest in this area for socio-economic betterment of extremely deprived and quashed communities of Tharparkar.