

## A Comparative Study of Rural Drinking Water Supply Schemes in District Muzaffargarh, Pakistan

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### ABSTRACT

This study was conducted to evaluate the comparison between functional and non-functional rural drinking water supply schemes and to find out the reasons behind the non-functional rural drinking water supply schemes. For this purpose total 13 rural drinking water supply schemes (Functional 10 numbers out of 37 and Non Functional 03 out of 12) were randomly selected in study area. The respondents were the users of these water supply schemes and community based organizations (CBOs). The data were collected through comprehensive questionnaire. The total sample size was 169, out of that 130 respondents represented functional water supply schemes, whereas 39 respondents represented non-functional water supply schemes. The study showed that due to the installation of water supply schemes water borne diseases had been controlled and community improved their health as compared to the area where water supply schemes were found non-functional, as a result health of the inhabitants was poor. Forty one percent respondents were using sweet water, 28% were using contaminated water and 31% were using brackish water before the installation of water supply schemes. The study showed that 88% water supply schemes were constructed on need based and 12% water supply schemes were not installed on need based. The main reason of the non-functioning of the water supply schemes was non-payment of WAPDA dues and power failure. The study recommended that there should be technical and financial assistance by the water and sanitation related institutions like Public Health Engineering Department and TMAs. NGOs should play their role regarding awareness campaigns, training related to management and health & hygiene practices.

**Keywords:** Rural, Drinking water, Supply schemes

### INTRODUCTION

Clean and safe drinking water is an essential component for human beings. Water is second essential component after the oxygen. We can live without food for a few days but can't without water. In the current decade drinking water is an international issue. The Public Health Engineering Department and Local Government and Community Development Department are executing drinking water supply schemes and with the assistance of local communities providing safe drinking water to the masses of Punjab Province. The importance of water could be judged for its mentioning in Quran & Hadith.

The provision of pure and clean water for drinking purpose have always been considered the responsibility of the state instead of community in rural areas of Pakistan, Punjab province. ADB (Asian Development Bank) with the help of people of rural areas has taken this task in to reality through "Punjab Community Water Supply & Sanitation Project" this institution works in the remote and for needy people of the country side areas of the province of Punjab (Raza and Farrukh, 2006).

Pakistani Government formed a National Drinking Water Policy in September, 2009 the task of this policy was make sure the availability of clean water for drinking purpose to all people of Pakistan till 2025. All kinds of users have equal rights to use drinking water. The key actors of piped water users were considered with females (The Nation, 29 September 2009).

After the floods 2010, the underground water of Muzaffargarh region that is district of southern Punjab is not fit for drinking purpose according to the standard of World Health Organization, in this disaster the flooded water that was consisted of stagnant water caused contamination of ground water. Residual of arsenic is in ground water is another problem evident now a days. In Muzaffargarh there are 3 types of underground water like sweet, brackish and contaminated. There are more than fifty industrial units in Muzaffargarh, these industries have discarding waste both water and solid without treating, is also main cause of infecting the quality of underground water with the passage of time. The solution is to be made strict law regarding water to maintain safe water for drinking. Law making is very essential because it is matter of human beings (Water Testing Lab. PHED Muzaffargarh Anonymous, 2010).

Water borne diseases are increasing in the country because of poor quality of water is being provided to the people. The quality of this water is not according to the standard of World Health Organization. In Pakistan approximately 250,000 kids below five years pass away in every year. This is huge human loss and these deadly dysentery ailments are caused materialistic economic crises (The News, 27 November 2012).

Management Information System Cell (MIS Cell) Public Health Engineering Department Lahore 2013,

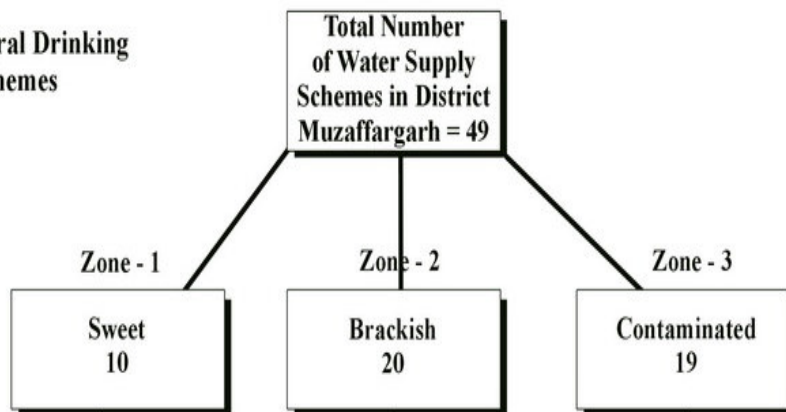
is running piped clean drinking water in the area of contaminated water like brackish and saline areas are on the top priority by PHED. In Punjab province more than 28 hundred piped safe water supplies are being running with the self-help basis of by Community Based Organizations (CBOs) (MIS Cell PHED Anonymous, 2013)

**MATERIALS AND METHODS**

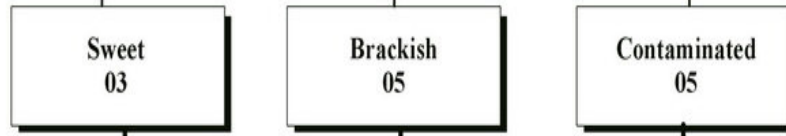
The universe of the present study was based on total number of community based organizations (C.B.Os) running water supply schemes and other local communities where rural drinking water supply schemes were executed in District Muzaffargarh which is an important region of the South Punjab. Four stages systematic random sampling technique was used to get sample from 13 selected rural drinking water supply schemes. Respondents were selected as per following procedure.

**Selection Criteria of Rural Drinking Water Supply Schemes**

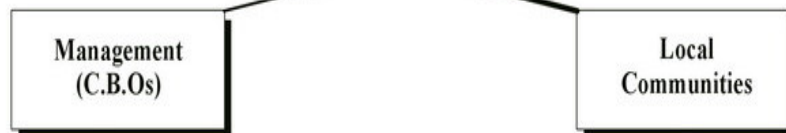
Stage 1  
 Zoning & Schemes  
 Selections of Zones



Stage 2  
 Selection of 25%  
 Rural Water Supply  
 Schemes in Each Zone



Stage 3  
 Selection of Unites



Stage 4  
 Selection of  
 Respondents



**Total Number  
 of Respondents = 169**

## RESULTS AND DISCUSSION

**Table No. 1 Availability of water for the village requirement.**

Category	Functional Schemes		Non-Functional Schemes	
	Frequency	Percentage	Frequency	Percentage
Yes	81	62%	18	46%
No	49	38%	21	54%
<b>Total</b>	<b>130</b>	<b>100%</b>	<b>39</b>	<b>100%</b>

Table No. 1 shows in Functional Schemes, (62%) respondents agree to the provision of water is enough and according to (38%) respondents the availability of water is not enough for their requirements. This table also depicts that the most of the respondents agree to the provision of water as satisfactory in functional schemes. In non-Functional Schemes, (46%) respondents agree with the provision of water is enough and according to (54%) respondents the availability of water is not enough for their requirements. This table also depicts that the most of the people disagree to the provision of enough water when scheme was functional.

**Table No. 2 Education level**

Category	Functional Schemes		Non-Functional Schemes	
	Frequency	Percentage	Frequency	Percentage
Primary	25	19%	6	15%
Middle	32	25%	9	23%
Matric	41	32%	14	36%
Other	32	25%	10	26%
<b>Total</b>	<b>130</b>	<b>100%</b>	<b>39</b>	<b>100%</b>

Table No. 2 Shows in Functional Schemes (19%) respondents education level is primary, (25%) Middle, (32%) having Matriculation and (25%) falls in other education level. This table also depicts that the most of respondent's education level is Matric. In non-Functional Schemes (15%) respondent's education level is Primary, (23%) Middle, (36%) having Matriculation and (26%) fall in other education level. This table also depicts that most of the respondent's education level is Matric.

**Table No. 3 Availability of health services.**

Category	Functional Schemes		Non-Functional Schemes	
	Frequency	Percentage	Frequency	Percentage
RHCs	19	15%	8	21%
BHUs	24	18%	11	28%
Govt. Dispensaries	19	15%	6	15%
Doctors	23	18%	8	21%
Hakeem	45	35%	6	15%
<b>Total</b>	<b>130</b>	<b>100%</b>	<b>39</b>	<b>100%</b>

Table No. 3 shows that (15%) respondents having rural health centers, health facility of RHCs, (18%) BHUs, (15%) Govt. dispensaries, (18%) doctor facility in the village, (35%) have the facility of hakeems in the village of functional schemes. It also depicts that most of the population having the health facilities of Hakeem. In non-functional Schemes 21% having the health facility of RHCs, (28%) BHU, (15%) Govt. Dispensaries, (21%) Doctor facility in the village, (15%) having the facility of Hakeem in the village. It is also evident that most of the population having the health facilities of BHUs are in the area of non-functional schemes.

**Table No. 4 Time spent in fetching water before schemes.**

Category	Functional Schemes		Non-Functional Schemes	
	Frequency	Percentage	Frequency	Percentage
½ Hour	47	36%	10	26%
1 Hour	30	23%	10	26%
2 Hours	3	2%	0	0%
No Response	50	38%	19	49%
<b>Total</b>	<b>130</b>	<b>100%</b>	<b>39</b>	<b>100%</b>

Table No. 4 in Functional Schemes shows that (36%) spent time in fetching water before the scheme was ½ Hour, (23%) respondents spent 1 Hour, (2%) spent 2 Hours and (38%) respondent have No Response because of sweetness of underground water. This table also depicts that the most of the area falls in sweet zone therefore people do not have to go to fetch water outside their houses. Data in non-Functional Schemes shows that (26%) respondents spent time in fetching water before the scheme was ½ Hour, (26%) spent 1 Hour, (0%) spent 2 Hours and (49%) have no response. This table also depicts that the most of the area falls in sweet zone therefore people do not have to go to fetch water outside their houses.

**Table No. 5 Responsibility to get water before scheme.**

Category	Functional Schemes		Non-Functional Schemes	
	Frequency	Percentage	Frequency	Percentage
Male	42	32%	8	21%
Female	65	50%	27	69%
Children	23	18%	4	10%
<b>Total</b>	<b>130</b>	<b>100%</b>	<b>39</b>	<b>100%</b>

Table No. 5 shows that in Functional Schemes (32%) Males are responsible for fetching water before the scheme, (50%) female and (18%) children are fetching water before the scheme. This table also depicts that the mostly female are responsible to arrange water. In non- Functional Schemes (21%) Males were responsible to fetch water before the scheme, (69%) female and (10%) children are fetching water before the scheme. This table also depicts that the mostly female are responsible to arrange water.

**Table No. 6 Quality of water being supplied.**

Category	Frequency	Percentage
Good	80	62%
Fair	46	35%
Poor	4	3%
<b>Total</b>	<b>130</b>	<b>100%</b>

Table No. 6 indicates that (62%) Good quality of water is being supplied, (35%) is Fair quality and 3% Poor quality of water is being supplied. This table also depicts that the most of the population said that the good quality of water is being supplied.

**Table No. 7 Time saved due to water supply**

Category	Frequency	Percentage
One Hour	63	48%
Two hours	14	11%
Three Hours	0	0%
More than three hours	3	2%
Not Applicable	50	38%
<b>Total</b>	<b>130</b>	<b>100%</b>

Table No. 7 shows that (48%) respondents agree one hour that is saved in their time due to installation of water supply scheme in their village, (11%) saved their two hours, (0%) three hours, (2%) saved more than three hours and for (38%) not applicable because of sweet ground water. This table also depicts that the most of population is saving their one hour time due to water supply scheme.

**Table No. 8 Reduction of water borne diseases.**

Category	Frequency	Percentage
10% (Water Borne Diseases)	31	24%
20% (Water Borne Diseases)	41	32%
30% (Water Borne Diseases)	48	37%
More than 40% (Water Borne Diseases)	10	8%
<b>Total</b>	<b>130</b>	<b>100%</b>

Table No. 8 shows that (24%) respondents said there was 10% reduction in water borne diseases reduced, (32%) said 20%, (37%) said 30% and (8%) said more than 40% diseases reduced due to water supply scheme. This table also depicts according to (37%) respondents water borne diseases has been decreased up to 30 percent.

**Table No 9 Reductions in health expenses.**

Category	Frequency	Percentage
Yes	106	82%
No	24	18%
<b>Total</b>	<b>130</b>	<b>100%</b>

Table No. 9 describes that (82%) respondents agree that health expenses has been reduced and (18%) respondents agree that health expenses did not reduce. This table also depicts that most of the respondents reduced their health expenses.

**Table No. 10 Problem facing regarding operation and maintenance of the scheme.**

Category	Frequency	Percentage
Recover Problem	56	43%
Power Failure	35	27%
Water Theft	0	0%
Leakages Problem	32	25%
Not Applicable	7	5%
<b>Total</b>	<b>130</b>	<b>100%</b>

Table No. 10 indicates that (43%) respondents are facing Recovery problem, (27%) power failure, (0%) water theft, (25%) leakages problem and (5%) not applicable due to operating and maintaining of the scheme by TMA. This table also depicts that most of the problem the CBOs are facing is “recovery problem”.

**Table No. 11 Agree to rehabilitate for the nonfunctional water supply scheme.**

Category	Frequency	Percentage
Yes	28	72%
No	11	28%
<b>Total</b>	<b>39</b>	<b>100%</b>

Table No. 11 shows that (72%) respondents agree to rehabilitate the schemes and (28%) do not agree to the rehabilitation of the non-functional schemes. This table also depicts that most of respondents are willing to rehabilitate the non-functional water supply schemes.

**Table No. 12 How long this scheme is not functioning.**

Category	Frequency	Percentage
One Month	4	10%
Six Months	7	18%
One year	9	23%
More than one years	19	49%
<b>Total</b>	<b>39</b>	<b>100%</b>

Table No 12 shows that (10%) schemes are non-Functional from One Month, (18%) from six months, (23%) schemes are non-Functional from one year and (49%) schemes are nonfunctional for the period of more than one years. This table also depicts that the most of the schemes are non-Functional “more than one year”.

**Table No. 13 Reason of non-functioning of water supply scheme.**

Category	Frequency	Percentage
Due to sweet water	7	18%
Due to non-payment of electric bill	14	36%
Due to disinterest of community	7	18%
Major breakdown in the schemes	4	10%
Community conflict	2	5%
Poor quality of water	2	5%
Theft of Machinery	3	8%
Any other	0	0%
<b>Total</b>	<b>39</b>	<b>100%</b>

Table No. 13 shows that (18%) reason of the non-functioning of the schemes is due to sweet water, (36%) due to non-payment of electric bill, (18%) due to disinterest of community, (10%) major breakdown in the scheme, (5%) community conflict, (5%) Poor quality of water, (8%) Theft of Machinery and (0%) are other different reasons of non-functioning of the water supply scheme. This table also depicts that the most of schemes are non-Functional “Due to non-payment of electric bill”.

### Conclusion:

Quality of water being supplied through these schemes was rated good. The brackish and contaminated water affected public health at large before the installation of water supply scheme. Great cut down of water borne diseases have been observed which ultimately leads to decrease the monthly expenditures. Water supply schemes provided the relief to the women because it was their responsibility to fetch water before the installation of the scheme and the schemes that were non-Functional due to non-payment of electric bills, sweet water and disinterest of the community were major reasons of non-functioning of these schemes. Government should provide special funds for that schemes which is poor community and facing problem regarding operation and maintenance. Government should arrange extension of water supply network where population would increase with passage time and without the extension of network community face problem to get house connections from water supply schemes.

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