Impact of Water supply on Social life
A case study of Cholistan Desert, Pakistan

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Abstract

The study has been carried out to measure the impacts of water supply on social life at Cholistan area, using primary data by survey and employing average. This study reviews the government spending on water supply to the people of Cholistan. The study examines the social welfare in Cholistan at what extent it increased in relation to government investment in water supply scheme. The study is also reveals that some people are still depriving of water facility. Overall, there is CDA, PCRWR in Cholistan after the project. The people have better water supply facilities.

Keywords: Social life, Desert, Water born diseases, Water Supply

1. Introduction

Pakistan is the sixth biggest country in the world by population. According to economic survey (2010-2013); it has a population of 176.7 million. According to the population Reference Bureau 2006 by 2025, it would rise to 228.8 million. With the current rate of population growth, the population of Pakistan is likely to double in next 39 years. This increase in population will have direct impact on water sector for meeting domestic, industrial and agricultural needs. Pakistan is on the edging of becoming water deficit country. Of the total annual water resources available to Pakistan 6 percent is used by domestic and industrial sector. Water supply and cleanliness is deserted sector in Pakistan. The government spending in WASTAN (water and sanitation) sector is lowly as compared to other social sectors spending. According to Economic Survey 2004-2005 1.1 billion people lack right of entry to improved water sources. Insufficient water supply destroyed human life. It loses their effectiveness to work and they are distress from various water born disease. This sector needs improvement in Pakistan. According to economics Survey 2008-09, 65 million population of Pakistan out of total 163.76 million is poor of clean drinking water. According to economic survey (2010-2011) in Pakistan people are still suffering from various healths lacking like narrow right of entry to health facilities. The most instant health problems of Pakistan are insufficient hygiene, dangerous water, and poverty and low literacy rate. Pakistan requires progress in economic and policy sector to reduce the number of diseases. In 2007 infant mortality rate was 73% and mortality under 5 was 90%. .

Piped water supply to household can minimize health risks because it improves the quality of drinking water. Diseases associated with poor water have great impact on health significance. During the 1980s and 1990s there were significant improvements in water supply projects in developing countries. In 2004 still a significant proportion of the world's population remained without access to an improved water supply.

1.1 Terms of References:

Chak No 1 DNB (Dera nawab branch), 121 DNB, 131 DNB are situated in Cholistan. Now the villages consist many houses. The villages are surrounded by desert. Most of people are agriculturist and some are poor labor and some are in other fields .villages are not located in plan are. Before the project of (CDA & PCRWR) Morbidity and Mortality rates due to water born diseases like cholera, malaria and diarrhea were very high which was due to unsafe drinking water. Moreover proper health facilities were not provided to their villages.
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1.2 Cholistan:

Cholistan is one of major desert covering an area of about 2.6 million hector, constituting the southern part of Bahawalpur Division. It is located between latitudes 27°42 and 29° North and longitudes 60°57 east. The length of desert is about 480km and breadth is from 32 to 192 km. Cholistan is the part of Great Indian Desert and one of the larger desert of Pakistan. The total area of Cholistan desert is 10,399 square mile (2,693,328hc).Geographically, the Cholistan comprises two natural regions: (1) Great cholistan that comprise an area of 13,630 Km and (2) Lesser Cholistan consisting of 12,370 Km area. Greater cholistan lies to the Southwest of the most recent course of defunct Hakara River and extend to the border of India (Akhter and Arshad, 2006). Lesser Cholistan extend north east from Hakara River to the end along the bank of Sutluj River. This part of Cholistan is arid apart from the presence of intersecting perennial water of Sutluj and Beas rivers. Low laying sand dune, mostly smaller than those found in Greater Cholistan (i.e. less than hundered meters) and extensive flats of exposed alluvial clays (dahar) are present here. In its original form, Lesser Cholistan would have been used as an extension of the grazing land for the Greater Cholistan. However, the extensive low lying flat lands and proximity of perennial water in this part lends itself to the development of irrigation. Thus, from the turn of this century an intensive irrigation system based on canals was constructed along the north fringes of Lesser Cholistan.

1.3 Hypothesis

Water supply contributes to social welfare of people in the area.

a) H_0: There is no association between water supply and expenditure on health.
   H_i: There is association between water supply and expenditure on health.
b) H_0: There is no association between water supply and time of spent on fetching water.
   H_i: There is association between water supply and time of spent on fetching water.
c) H_0: There is no association between water supply and monthly income.
   H_i: There is association between water supply and monthly income.
d) H_0: There is no association between water supply and fetching water for household.
e) H_0: There is no association between water supply and fetching water for household.
   Hi: There is association between water supply and fetching water for household.
f) H_0: There is no association between water supply and water born diseases.

Hi: There is association between water supply and water born diseases.

g) H_0: There is no association between water supply and productivity of women.
Hi: There is association between water supply and productivity of women.

1.4 Objectives

- To study the area where water facilities were provided 4 years ago.
- To find the difference in the socioeconomic conditions of the people
- Who have been provided with this facility and those who have not been provided with this facility?

2. Literature Review

Their research was an attempt to access the access of drinking water by the year 2015. Study used the Pakistan Social Living Standard Measures (PIHS) 2001-02 survey results to evaluate change in access to safe drinking water. This included documents and reports from WHO, UNICEF, ADP, World Bank, UNDP, and CRPRID, Ministry of environment PCRWR and other relevant government and non government institution. The study found direct relationship between water, sanitation, health, nutrition, natural environment and human well being. They also examined that the increase in population will have direct impact on water sector for meeting the domestic, industrial and agricultural needs.

The main objective of their study was to focus upon sources of water quality. Data was taken from the journal of water and health. According to them, public health was depending upon quality of water, vessels used for fetching water, water implication policy and hygienic program. Regression model was applied to measure relationship of cholera and diarrhea with quality of water. In developing countries, people fetch water from wells and rivers which generated water born diseases. The cholera had significant relationship with point-of-use water. Water quality in developing countries was needed to improve.

The objective of their study was to examine the awareness for drinking water among household in Hyderabad. The data was taken from "Pakistan Institute of Development Economics". The data sources were government and non-governmental organizations NGO's and private drinking water companies. For separate effects of different purification methods, bivariate and multinomial models were applied. The study found that quality of drinking water in Hyderabad was very poor at household level.

Most water supply system in Pakistan and other developing countries are not working according to design. Their study was done to examine the effect of chlorination on water supply in a village in Pakistan. The intervention took place in villages A and B of Punjab (PAK). They examined after chlorinating, water in village A improved and was less faceably polluted then in village B. in a recent large multi-country review, the same authors concluded that health benefits from improved water quality occurred only in household where optimal quantity of water was present.

They also examined water management practices at all the investigated points. 180 water samples were collected from 6 villages. They investigated that 80% of all illnesses are linked to poor microbiological quality of water. Their study was conducted in Lungwena, coastal area in southern part of Malawi. Their study was done in order to assess the microbiological quality of domestic water and to investigate water management practices.

The area had 26 villages but data was collected from 6 villages based in their geographical location due to random sampling. Their study has demonstrated that water used for both

drinking and cooking in Lungwena is of poor quality and the contamination is possibly due to poor management of water. The results showed that there was feacal contaminating of stored household water from both protected and unprotected water sources. In Lungwena community, implementation of interventions requires a careful Consideration of local culture.

3. METHODOLOGY

3.1 The process of field research

The research has been undertakes to examine the impacts of water supply on social life (living standard of people) in their villages 1 DNB (Dera Nawab Branch), 121 DNB, 131 DNB, 111 DNB, 111 DNB, 126 DNB. For this purpose, primary data has been used. A sample of 100 people who availed this facility has been investigated through a questionnaire. Furthermore it also has been investigated why some of people in the village have not availed this facility.

3.2 Method of data collection

For an in depth study to see the impact of water supply on social life in cholistan rural Punjab. We use the questionnaire methods to get the proper information. Data has been collected with the help of questionnaire schedule. The data was collected with one week. Data for both dependent and independent variables have been taken from 1 DNB (Dera Nawab Branch), 121 DNB, 131 DNB, 111 DNB, cholistan Tehsil Yazman District bahawalpure of Punjab.

3.3 Function

EOH= f (WS)
TSFW= f (WS)
Y= f (WS)
FWOH= f (WS)
POW= f (WS)
WBD= f (WS)

3.4 Model

To estimate the impact of water supply on social life. We have to regress all those variables through Chi- Square test because the data are attributing and all the results are getting by percentage. The chi-square test for independence, also called Pearson's chi-square test or the chi-square test of association, is used to discover if there is a relationship between two categorical variables,

- **Assumption #1:** Your two variables should be measured at an ordinal or nominal level (i.e., categorical data).
- **Assumption #2:** Your two variables should consist of two or more categorical, independent groups. Example independent variables that meet this criterion include gender (Males and Females), time spent in fetching water (0-2, 2-3, 3-4 hours), fetching water for household (Men, Women, Children) and so forth. .

3.5 Dependent and Independent Variables

An independent variable, sometimes called an experimental or predictor variable, is a variable that is being manipulated in an experiment in order to observe the effect on a dependent variable, sometimes called an outcome variable.

4. Results and Discussions

4.1 Monthly Income before Project

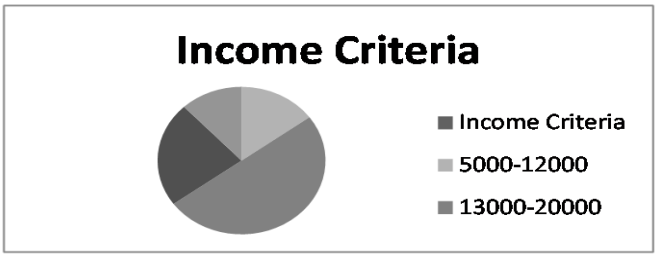
The study has investigated about the monthly income of people earning in different sectors. Study has shown that before project their income was low because only men were participating but also few women were generating for their household members.

The graph shows that people's monthly income is low before project 15% people were earning between 5000-12000 . 50% people were earning between 13000-20000 23% people were earning between 21000-27000 12% people were earning between 28000-34000.

Table No.1

Monthly income before project

Income Criteria	Individuals	Percentages
5000-12000	15	15%
13000-20000	50	50%
21000-27000	23	23%
28000-34000	12	12%



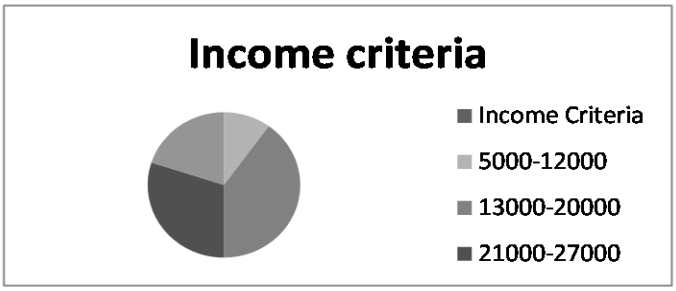
4.2 Monthly income after project

The study has investigated that monthly income of people has increased due to better facilities from CDA & PCRWR. No more women started to take part in income generating activities because of spare time. They helped men. The graph is showing an increase in income of people after project 10% people are earning between 5000-12000 40%people are earning between 13000-20000 .30%people are earning between 21000-27000 and 20% people are earning between 2800-34000.

Table No.2

Monthly income after project

Income Criteria	Individuals	Percentages
5000-12000	10	10%
13000-20000	40	40%
21000-27000	30	30%
28000-34000	20	20%



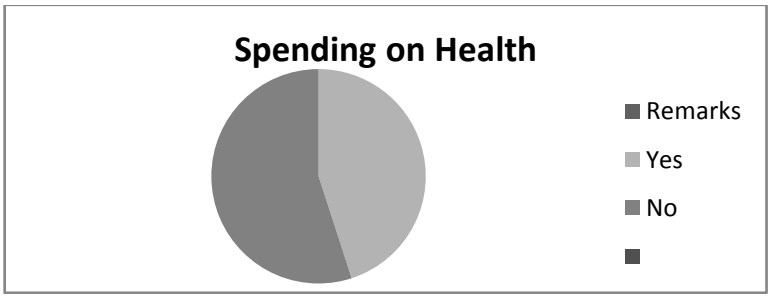
4.3 Spending On Health before Project

The study has investigated the expenditure on health before project. The study has shown that more people spent on health before project because they were suffering from different type of diseases due to inadequate water supply. The graph shown that 45% people spending on health and 55% people were not spending before project .Mostly children were suffering from water borne disease like malaria, typhoid, cholera and stomach problems.

Table No.3

Spending on Health before Project

Remarks	Total Numbers	Percentages
Yes	45	45%
No	55	55%



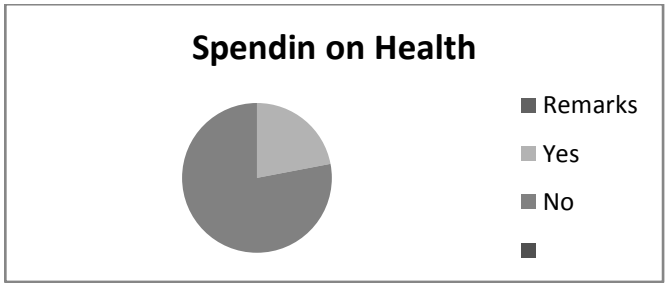
4.4 Spending on Health after Project

The study has investigated that expenditure on health has reduced because of water facilities. This project has controlled many water borne diseases in the area. The graph shows that only 22%people spent on health while 78% people were not spending after project .Better health has reduced expenditures on health.

Table No.4

Spending on Health after Project

Remarks	Total Number	Percentages
Yes	22	22%
No	78	78%



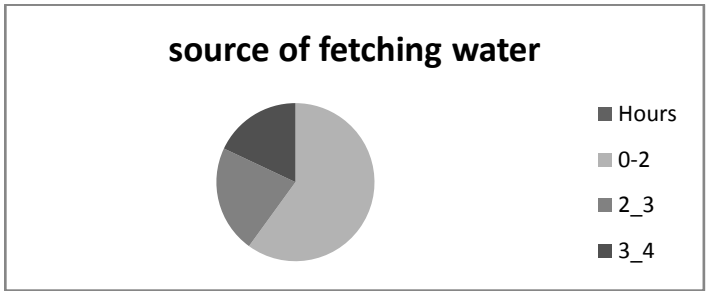
4.5 Source of Fetching Water

The study has investigated that the fetching water was difficult task Women and children were mostly involved in this task because men were engaged in income generating activities .The graph is showing that before project 60% people used to spend 0-2 hours in fetching water. 22% people used to spend 2-3 hour and 18% people used to spend 3-4 hour in fetching water. The time for fetching water is long because people used to bring water from canals out of the village.

Table No.5

Source of fetching water

Hours	Individuals	Percentages
o-2	60	60%
2-3	22	22%
3-4	18	18%

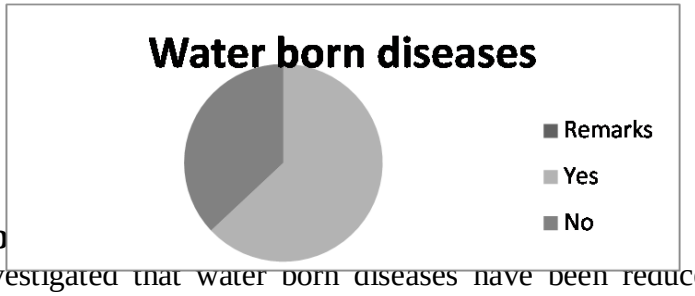


4.6 Water Born Diseases Before project

The study has investigated that before project water born diseases were very high because water was not clean and diseases like cholera, typhoid etc was in excess .Mostly children were suffering from these diseases. The graph shows that 63% people were suffering from these diseases while 37% were free from these diseases.

Table No.6
Water Born Diseases before Project

Remarks	Total Number	Percentages
Yes	63	63%
No	37	37%

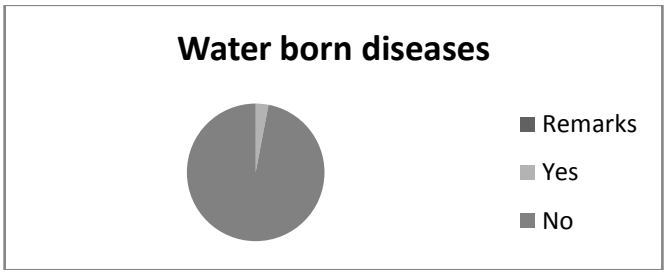


4.7 Water Bo

The study has investigated that water born diseases have been reduced after project. Now drinking water is pure and clean which makes environment better. The graph is showing that 97%people were agree that water born diseases have been reduced but only 3% people are disagreed.

Table No.7
Diseases after Project Water Born

Remarks	Total Numbers	Percentages
Yes	3	3%
No	97	97%



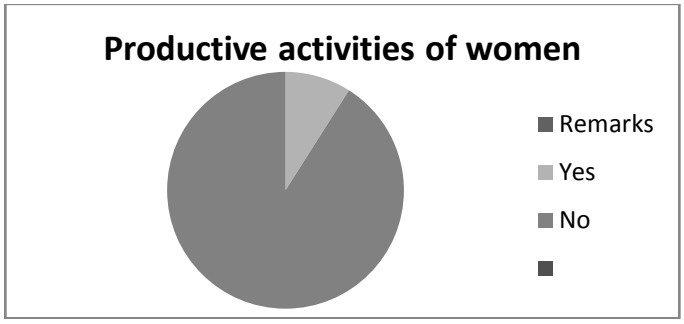
4.8 Productive Activities of Women before Project

The study has investigated the productive activities of women. Before project women were not able to participate in any type of productive activities because most of their time was wasted in fetching of water. Even they cannot properly pay attention to their children. The graph is showing that only 9%women were taking part in income generating activities while 91% women were not taking part in such type of activities.

Table No.8

Productive Activities of Women before Project

Remarks	Total Number	Percentages
Yes	9	9%
No	91	91%



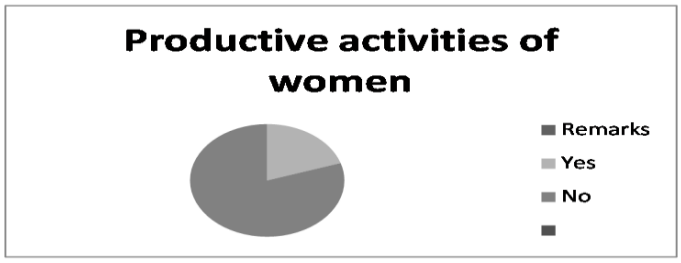
4.9 Productive Activities of Women after Project

The study has investigated that productive activities of women has increased to some extent after project because of saving time. Now women started to take part in income generating activities .They started to pay attention to their family and other domestic work .Their health improved .But still majorities of women do not work because some people do not like their women to take part in such activities and some women do not have awareness about time saving. The graph is showing that after project 20% women started to take part in income generating activities and 80% are still not taking part.

Table No.9

Productive activities of Women after Project

Remarks	Total Number	Percentages
Yes	20	20%
No	80	80%



4.10 No of Ill People before Project

The study has investigated about the number of ill persons before project .Before project there were many people suffering from diseases .Mostly children were suffering from these diseases. The graph shows that 31% people were ill before project while free from diseases.

Table No.10
No of Ill Person before Project

Remarks	Total Number	Percentages
Yes	31	31%
No	69	69%

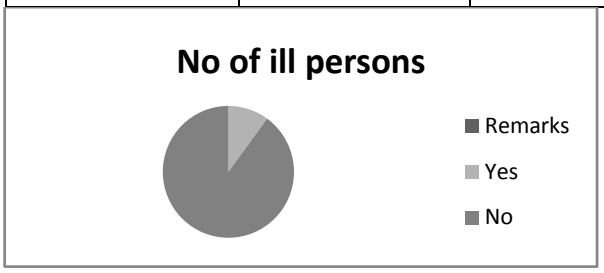
4.11 No of Ill persons after Project

The study has investigated about the no of ill person after project .It has shown that this project proved to b helpful in reducing diseases. After project the no of ill persons reduced and people feel better.

The graph shows that10% people are still ill while 90% people are healthy and are busy in their field.

Table No.11
No of Ill persons after Project

Remarks	**Total Numbers**	**Percentages**
Yes	10	10%
No	90	90%



4.12 Water Facilities

The study has investigated about water facility for people say that there are water facilities because water is at their door step .This facility has reduced their physical hardships There are also some people who still do not use this water. There are many reasons for it some people say that water of this project is not clean and good for health it is mixed with sewerage water system. They say that it causes diseases. Some people are so poor that they cannot pay for this water .The cost of the water was 60 rupees in the starts then it rise to 80 and now it is 110 rupees per month. People at the end of village also do not use the water they say that we do not have the access to safe drinking water because the home in the start of village get water but

when it reaches at the end, its pressure becomes low. The graph shows that there are 20% people who are still not using this water and 80% people are availing this opportunity.

Table No.12

Water Facilities

Remarks	Total Number	Percentages
Yes	80	80%
No	20	20%

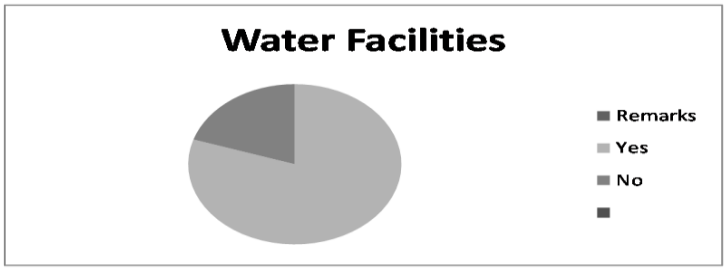


Table No.13

CHI-SQUARE TEST:

		values	df	Asymp. Sig.
Expenditure on health	Pearson Chi-Square	20.455(b)	1	.000
	Likelihood Ratio	18.245	1	.000
	Fisher's Exact Test	27.977	1	.000
	Linear-by-Linear Association	20.250	1	.000
	N of Valid Cases	100		
Monthly income	Pearson Chi-Square	67.391(a)	3	.000
	Likelihood Ratio	70.360	3	.000
	Linear-by-Linear Association	53.525	1	.000
	N of Valid Cases	100		
Time spent in fetching water	Pearson Chi-Square	88.636(a)	2	.000
	Likelihood Ratio	86.676	2	.000
	Linear-by-Linear Association	71.445	1	.000
	N of Valid Cases	100		
Fetching water for household	Pearson Chi-Square	100.000(a)	2	.000
	Likelihood Ratio	100.080	2	.000
	Linear-by-Linear Association	63.643	1	.000
	N of Valid Cases	100		
Water born diseases	Pearson Chi-Square	42.568(b)	1	.000
	Continuity Correction(a)	39.256	1	.000
	Likelihood Ratio	49.091	1	.000
	Linear-by-Linear Association	42.142	1	.000
	N of Valid Cases	100		

Productivity of women	Pearson Chi-Square	2.473(b)	1	.116
	Continuity Correction(a)	1.290	1	.256
	Likelihood Ratio	4.234	1	.040
	Linear-by-Linear Association	2.448	1	.118
	N of Valid Cases	100		

Interpretation:

Expenditure on health: In this table we are given the Chi-Square obtained the degree of freedom [df = (2-1) (2-1) =1] which is significant at least at the level of 0.01 alpha level. In this table we can see here that Chi-Square = 20.455[b] and P= 0.000 and P is less than alpha error term 0.05, the probability of the Chi-Square test statistic was P<0.05. The hypothesis that differences in lack of water facility are related to difference in expenditure on health is supported by this analysis. We can see the strength of association between the variable is moderate (.412) 0.000

Month income: In this table we are given the Chi-Square obtained the degree of freedom [df = (2-1) (2-1) =1] which is significant at least at the level of 0.01 alpha level. In this table we can see here that Chi-Square = 67.391[a] and P= 0.000 and P is less than alpha error term 0.05, the probability of the Chi-Square test statistic was P<0.05. The hypothesis that differences in lack of water facility are related to difference in expenditure on health is supported by this analysis. We can see the strength of association between the variable is moderate (.635) 0.000**.**

Time spent in fetching water: In the Chi-Square test, we are given an almost overwhelming number of statistics to interpret. For simplicity's sake we will only concern ourselves with the first row of statistics labeled Pearson Chi-Square, in this row we are given the Chi-Square obtained, the degree of freedom [df=(R-1)(C-1)] and the exact level of significant. In this case, we have a Chi-Square of 88.636[a] with a degree of freedom [df= (2-1) (2-1) =1] which is significant at least at the level 0.000. We can see the strength of association between the variable is moderate (.685) 0.000

Fetching water for household: In this table we are given the Chi-Square obtained the degree of freedom [df = (2-1) (2-1) =1] which is significant at least at the level of 0.01 alpha level. In this table we can see here that Chi-Square = 100.000[a] and P= 0.000 and P is less than alpha error term 0.05, the probability of the Chi-Square test statistic was P<0.05. The hypothesis that differences in lack of water facility are related to difference in expenditure on health is supported by this analysis. We can see the strength of association between the variable is moderate (.135) 0.000

Water born diseases: In the Chi-Square test, we are given an almost overwhelming number of statistics to interpret. For simplicity's sake we will only concern ourselves with the first row of statistics labeled Pearson Chi-Square, in this row we are given the Chi-Square obtained, the degree of freedom [df=(R-1)(C-1)] and the exact level of significant. In this case, we have a Chi-Square of 42.568[a] with a degree of freedom [df= (2-1) (2-1) =1] which is significant at least at the level 0.000. We can see the strength of association between the variable is moderate (.124) 0.000

Interpretation for crosstab:

Table No.14

		expenditure on health	
		yes	no
social welfare(water facility)	yes	45%	35%
	no	0	20%
Total		45%	55%

It has been inferred from the field data that first category, 45% responders have agreed that expenditure on health within lack of water supply. And 55% responders have not agreed that lack of water facility depend on expenditure health? The relationship between water supply and expenditure is negative. Where these groups make the significant association among water supply and expenditure on health. This mean our hypothesis (Hi) is accepted as their capability the lack of water facility. We reject null hypothesis between water supply and expenditure on health.

Table No.15

Monthly income

		monthly income			
		5000-12000	13000-20000	21000-27000	28000-34000
social welfare(water facility)	yes	15%	50%	15%	0%
	no	0%	0%	8%	12%
Total		15%	50%	23%	12%

The table of crosstab which shows, it has been inferred from the field data that (5000-12000) income responders have agreed that the lack of water facility cause to decrease the monthly income 15% reduce. Therefore (13000-20000) 50% responders have agreed that within lack of water supply cause reduce their income. And (21000-27000) 23% responders do expensive within lack of water supply on monthly income. (28000-34000) 12% responders have agreed that just 12% expensive in monthly income. The Chi-Square test results show significant, this mean our developed hypothesis (Hi) is accepted and we reject null hypothesis association between water supply and monthly.

Table No.16

Time of spent in fetching water

		time of spent in fetching water		
		0-2	2-3	3-4
social welfare(water facility)	Yes	60%	20%	0%
	No	0	2%	18%
Total		60%	22%	18%

In this table, time of spent in fetching water 0-2 hours 60% within the lack of water facility responders have agreed that 2 hour waste their time in fetching water and 2-3 hours time spent in fetching water, 22% responders have agreed that three hours waste their time in fetching water. Therefore 3-4 hours 18% responders have agreed that lack of water facility to fetching the water in this area.

Table No.17

Fetch water for household

		fetch water for household		
		men	women	children
social welfare(water facility)	Yes	40%	40%	0%
	No	0%	0%	20%
Total		40%	40%	20%

Lack of water facility in fetching water for household, it has been agreed that there are three categories men, women, children. In crosstab 40% male responders have agreed to fetching water for household. And 40% also female responders to fetching water for household and 20% children to fetching water for household in this area. The crosstab table shows that within lack of water facility male, female, and children participate to fetching water.

5. Conclusion and Recommendations

5.1 Conclusion

The study reveals that this project has positive impacts on social welfare of people. And the study has found out the determinant of the impact of water supply on social life in Cholistan with the help of Chi- Square test, results have been obtain. Average and percentage has also been calculated. The dependant variable is social welfare which is the function of water facility and independent variables are expenditure on health, monthly income, time of spent in fetching water, fetch water for household, water born diseases, and productivity of women. It has significantly reduced the water born diseases, as a result no of ill persons has decreased. The money they used to spend on health now they can spend on other activities. Income, the project also contributed to productive activities of women by saving their time. But there is a small impact on educational opportunities because it is a long run process and needs more time. The independent variable has positively affected the social welfare. Hence, we can conclude that the improved water supply significantly improved the living slandered of the people.

5.2 Recommendations

a) Although government has provided water facilities but there is need of more investment in this sector because government does not spend sufficiently in these services so there is need of greater investment.
b) According to our findings the project has enhanced the productive activities of women but still majority of women are not in work and they have no awareness about time allocated. There is need to give awareness to the people by media for the purpose.
c) The project has relatively small effect on literacy. It is a long run process government should take some active measures to inform people about the importance of education.
d) The project has reduced water born diseases and no of ill persons. Their health has improved but still government should help the people to make environment better for the welfare of economy.

e) The government spending in this sector is low as compared to its spending in other sectors; government should enhance it is that people get better opportunities of life.
f) Most of villages in Punjab have lack of water facilities that affects the health of people seriously and their productivity as well there is need of more investment and to launch new projects for the welfare of rural areas.
g) The people of village should be in touch with the organization that provide these facilities and inform them about their problems relating to the project to gain more benefits and satisfaction from water supply scheme.
h) The project has provided the water at their door step in rural locality. If the facility is provided to the whole rural areas then people should save their time and their health, education, employment and productive activities will improve. So government should take keen interest for the improvement of this sector for the progress of rural Punjab.
i) Although government is providing these facilities to improve living stander of people, but its top priority should towards the health of public. It should provide basic health facilities for the welfare of society. It should use bottom to top up approach rather than top to bottom approach.
j) Government spending in WATSAN (Water and Sanitation) sector is low as compared to other sectors. It should spend more on these sectors to make society healthy and prosperous.

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