SOCIO-ECONOMIC EFFECTS OF WATER SCARICITY IN TEHSIL KARAZAT DISTRICT PISHIN BALOCHISTAN

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Abstract

In the globally changing scenario water is becoming scarier and important due to its non-availability for the communities in almost every corner of the world. Focusing on the importance of the water a research was conducted on the socio-economic effects of water table depletion in Pishin Balochistan. primary data was collected through a questionnaire,secondary data from different generals, line departments and reports, the finding were discussed in focus group discussions in Karezaat and analyzed. Due to agrarian society absolute majority of people are engage with agriculture and they are irrigating their agriculture fields through tube wells by pumping the underground water through electric motor pumps that resulted in the water table depletion and change in agriculture productivity in the area. Which directly affect the socio economic conditions of the people of area like effect on children education, local traditions, and migration is taking place to urban centers. The unemployment, poverty and crime rate is increased. The Water Table in the area could be improved by the introduction, adoption and expansion of low delta crops, best water management practices, strictly implementation and monitoring of tube wells installation rule and regulation, diversify the means of livelihood.

Keywords: *economic effects, water scarcity, karezaat, Pishin, Balochistan*

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INTRODUCTION

Socio-economic factors are lifestyle components and measurements of both financial viability and social standing. They directly influence social privilege and levels of financial independence. Factors such as health status, income, environment and education are studied by sociologists in terms of how they each affect human behaviors and circumstances (Chris and Mehmood ul Hassan, 2000)

Socio-economic impact assessment is designed to assist communities in making decisions that promote long-term sustainability, including economic prosperity, a healthy community, and social well-being. Analysis are made in two situations: 1) assessing impacts of a proposed development, 2) in case of a major climate/environmental change.

Assessing socio-economic impacts requires both quantitative and qualitative measurements of the impact. It also examines how a proposed development or a major climate/environmental phenomenon will change the lives of current and future residents of a community, the perceptions of community members about how a proposed development will affect their lives is a critical part of the assessment and should contribute to any decision to move ahead with a project. In fact, gaining an understanding of community values and concerns is an important first step in conducting a socio-economic impact assessment (District Pishin, 1998 and GOB, 2010).

Conducting a social impact assessment is important for several reasons. In general, it is used to alert the community, including residents and local officials, of the impact

and magnitude of the proposed development on the community's social and economic well-being. The assessment can help communities avoid creating inequities among community groups as well as encourage the positive impacts associated with the development.•The impact assessment provides estimates of expected changes in demographics, housing, public services, and even the aesthetic quality of the community that will result from the development. Equally important, the assessment provides an opportunity for diverse community values to be integrated into the decision-making process. Together, these components of the assessment provide a foundation on which decisions about whether to alter or change a proposed development can be made.

Generally, a two-step process for conducting a socio-economic impact analysis is used. The process is designed to establish a framework for evaluating current and future proposed developments in a community. The two phases of socio-economic impact assessment are: (1) defining the scope of the Socio-Economic Impact Assessment, (2) identifying and evaluating development impacts for quantitative changes and community perceptions (Hussain and Tajmal, 2000)

Water Scarcity

Water is essential for all socio-economic development and for maintaining healthy ecosystems. As population increases and development calls for increased allocations of groundwater and surface water for the domestic, agriculture and industrial sectors, the pressure on water resources intensifies, leading to tensions, conflicts among users, and excessive pressure on the environment. The increasing stress on freshwater resources brought about by ever rising demand and profligate use, as well as by growing pollution worldwide, is of serious concern.

The Food and Agriculture Organization (FAO) of the United Nations regards water as a severe constraint on socio-economic development and environmental protection at levels of internal renewable water availability of less than 1 000 m^3/capita. At levels of water availability of less than 2000 m^3/capita, water is regarded as a potentially serious constraint, and a major problem in drought years. Water scarcity provides a measure of the sensitivity of a given situation to drought. In situations where the average availability of water per capita is low, even slight variations can render whole communities unable to cope and create disaster conditions.

Causes of water scarcity

The causes of water scarcity are varied. Some are natural and others are as a result of human activity. The current debate sites the causes as largely deterministic in that scarcity is a result of identifiable cause and effect. However, if water scarcity is the point at which water stress occurs (the point at which various conflicts arise, harvests fail and the like), then there are also less definable sociological and political causes. Many of the causes are inter-related and are not easily distinguished (Jeevands *et al*.,1998).

Most countries in the Near East and North Africa suffer from acute water scarcity, as do countries such as Mexico, Pakistan, South Africa, and large parts of China and India. Irrigated agriculture, which represents the bulk of the demand for water in these countries, is also usually the first sector affected by water shortage and increased scarcity, resulting in a decreased capacity to maintain per capita food production while meeting water needs for domestic, industrial and environmental purposes. In order to sustain their needs, these countries need to focus on the efficient use of all water sources (groundwater, surface water and rainfall) and on water allocation strategies that maximize the economic and social returns to limited water resources, and at the same time enhance the water productivity of all sectors.

MATERIALS AND METHODS

The research study on socio-economic effects of water table depletion in tehsil Karezaat district Pishin was conducted in Tehsil Karezaat District Pishin as part of Masters of Science in Environmental Management and Policy thesis in 2010, The methodology used for research such as:

Collection of Secondary data

A large number of books, newspaper articles, magazines and web pages were reviewed to understand macro dimension of the issues and ripple effects of those historical events that have shaped situation as of today. This material was be analyzed to draw international, national, and regional context of the issue. Learning from literature review was also help to understand the issue, developing questionnaire for primary data collection and designing focus group discussions.

Collection of Primary data

The Primary data was collected through survey conducted in thirty villages of nine union councils of Tehsil Karezaat District Pishin, ten households were included from each village. Total 300 people from 300 households of thirty villages of nine union council.

Sampling strategy

Data was collected during household visits in the respective villages. The number of households from each village was ten household as sample. Once the number of household visits from each area is decided, then systematic sampling approach was used to select the household in each village. Household visits started from a prominent landmark in the area such a big mosque or a government office or a school. The sampling interval for the household visits was decided based on the following formula: *Sampling interval= total number of households in the village/sample size for the village.*

Data analysis

Data analysis was performed using SPSS software version 13. Descriptive statistics such as means for continuous and proportion for categorical variables were calculated to check for missing information and the distribution of key indicators.

Focus group discussions

The results of the research was shared with the participants of Five multiple focus group discussions in various villages of five union council of Karezaat with groups of different stakeholders (farmers, line agencies officials, agriculture and water experts) were held. Participants of focus group discussions were belong to various walk of life including farmers, government officials, experts and they have respected names in their respective professions. The views of participants of focus group discussions were also considered in research finding to enrich the results and discussion.

RESULTS AND DISCUSSION

Source of irrigation

Data presented in table 1 as the source of irrigation of the household as affected by water depletion in tehsil Karezaat district Pishin. Analyses of the data indicated that 92 % houses in the communities are using the major source of irrigation tube well for agriculture activities, while 5% houses are using wells, whereas 2 % houses are irrigating their fields through streams (Karazes) followed by 1% on using other means of irrigation to grow agriculture crops in the said tehsil of district Pishin. It is crystal clear from the above results that the major source of irrigation is tube wells which is increasing and now dominating source of irrigation, groundwater has always been and still is an important source of irrigation water in Baluchistan. Ramzan (2000) and Gisser M and Sanches (1980) in his study confirmed that there has been a rapid increase in drilling over the last 20 years, resulting in some major benefits but with accompanying disadvantages. Until 1989, approximately 22 percent of land in the province was irrigated from underground water resources such as Karazes, springs, open wells and tube wells. By 1998, however, land irrigated from these sources was 34.5 percent, with tube wells alone accounting for 22.8 percent.

Table 1: Source of irrigation.

Source of irrigation	Frequency	Percent
Wells	16	5
Tube wells	275	92
Karazes	3	1
Stream	6	1
Total	300	100

Water Availability for agriculture

Data presented in table 2 as the current water depletion situation is enough for cropping of the household as affected by water depletion in tehsil Karezaat district Pishin. Analyses of the data indicated that 66.3 % houses in the communities are not satisfied from the current water situation for their irrigation, whereas 33.7 % houses are satisfied from the available water to them for irrigating their fields to grow agriculture crops in the said tehsil of district Pishin. It is evident from the above results that the major source of irrigation is tube wells which is increasing and now dominating source of irrigation, It is also proved from the said results that the graph of commercial crops are increasing rapidly in the said tehsil which is Sami arid zone and the commercial high delta crops is not suitable for tehsil Karezaat which require more quantity of water and farmers are pumping from underground which is considered to be the major cause of water depletion in the area.

Table 2: Water availability for agriculture.

Water availability for agriculture	Frequency	Percent
Satisfied	100	33.7
Not satisfied	200	66.3
Total	300	100

Change in agriculture productivity

Data shown in table 3 on the change in agriculture production of the household as affected by water depletion in tehsil Karezaat district Pishin. Statistical analyses of the data depicted that 80.2 % houses in the communities have noted change in agriculture production in the area while 18.8% household did not observe any change in agriculture production and 1% household did not have any knowledge about change in production in the tehsil Karezaat of district Pishin. It is pertinent from the above results that the change in the agriculture productivity may be due to the depletion of water and excessive use of the natural resources including land and water, the soil is losing the productivity.

Table 3. Change in agriculture productivity.

Change in agriculture productivity	Frequency	Percent
Don't Know	2	1
Change not observed	56	18.8
Change observed	242	80.2
Total	300	100

Reasons for change in agriculture productivity

Data presented in table 4 on major reasons of change in agriculture production of the household as affected by water depletion in tehsil Karezaat district Pishin. Perusal of the data interprets that 67 % houses in the communities are thinking that the depletion of water table or the shortage of water is the major reason of change in agriculture productivity in the area followed by 15% think the shortage of electricity load shedding is the major reason of change in productivity 10% make responsible climate change and 6% community is on the view that the lack of water reservoirs (Dams) contributes toward the change in agriculture productivity as major reason in the tehsil Karezaat of district Pishin. It is clear from the above results that the change in the agriculture productivity could be due to the reason that and absolute majority are well aware about the major reason of change in productivity as water shortage, followed by the climate change and load shedding.

Table 4: Reasons for change in agriculture productivity

Reasons	Frequency	Percent
Water depletion	200	67
Climate Change	30	10
Load shedding	45	15
lack of dams	18	6
Others	7	3
Total	300	100

Situation of water table depletion

Data on depletion of water table in your household as affected by water depletion in

tehsil Karezaat district Pishin is presented in table 5. Analyses of the data depicted that the underground water table depletion of the communities concerned is with the percentage of 97%. Whereas the 3% communities are on the view that the underground water depletion is not depleting in their area of tehsil Karezaat district Pishin. The reasons for such high level awareness about underground water table depletion is the decline in economic activities of the concern communities which directly affects the socio economic conditions of the people of the area of the tehsil Karezaat of district Pishin. Now the communities who were completely depended on agriculture sector in the area are facing hurdles because the water table depletion seriously affects their productivity from their agriculture fields which results the effect on their economic and social life. In a report (Hussain and Tajamal, 2000) reassessed the ground water resources also confirms that the annual potential is being extracted in the Nari and Pishin Lora basins and that several of the others have limited development potential IUCN assessment 2000 for Balochistan Conservation strategy fresh water chapter also confirm that the Pishin Lora basin is in deficit.

Table 5: Situation of Water depletion.

Situation of Water Depletion	Frequency	Percent
Not Depleting	9	3
Water Table Depleting	291	97
Total	300	100

Annual rate of water table depletion

Data relating to the underground water table depletion in household as affected by water depletion in tehsil Karezaat district Pishin are reported in table 6. The statistical analyses of the data indicated that the highest population pertaining the water table depletion per annum ranges from 1 to 10 feet with the percentage of 30.7%. Whereas the water table depletion per annum from 11-20 feet and above 60 feet per annum subsequently with the percentage of 17.8 % while the 41-50 feet is were only 4%. This could be the reason of change of conduct or behavior towards the use of water in different union councils of the tehsil and also shows that the underground reservoirs of different union councils are different where the depletion occurs at different level. The second major reasons could be the communal ownership of land which is common in tribal people and the areas distributed earlier used their water and now the depletion ratio is high and on the other hand the areas where then tribes distributed their land among themselves recently have more underground water and the depletion is taking place slowly. Another reasons of variation of depletion of water table may be due to recharge of water table the union councils having the dams (water reservoirs) is charging the underground water table on comparatively high level and where the union council has no water reservoir comparatively getting less recharge and the depletion of water table is at high rate.

Yusupha Crookes, World Bank Country Director for Pakistan in his article for Daily time in 2010 agree with result that the Pishin Lora basin has been severely impacted by drought since 1998 and this has exacerbated underlying water management problems. The surface water availability has decreased and rangelands have degraded, severely curtailing agricultural and other economic activities. The poor and marginalized sections of society have been most affected, resulting in increased urban migration. Like the rest of the province, drought has taken its toll on the lives of the local population in Pishin.

Table 6: Annual rate of water depletion.

Depletion in feet	Frequency	Percent
not change	18	5.9
1-10 Feet	92	30.7
11-20 Feet	53	17.8
21-30 Feet	27	8.9
31-40 Feet	27	8.9
41-50 Feet	12	4
51-60 Feet	15	5
Above 60 Feet	53	17.8
Don't Know	3	1
Total	300	100

Effects of water depletion on annual Income

Data reported to the effects on annual income by the water table depletion in household as affected by water depletion in tehsil Karezaat district Pishin are exhibited in table 7. The statistical analyses of the data indicated that the highest populations pertaining the reduction in annual income from the water table depletion are with the percentage of 73%. Whereas the 24% household did not reported any change in their annual income from agriculture sector.

This could be the reason of class difference in the area the people having more resources belong to the high class invests in pumping more water from the deep by installing more drills and gets more water and the land owners belong to the middle class cannot afford to invest in installing more money to pump more water for their agriculture production results the less production in agriculture which automatically reduces their income from agriculture activates and production. Faces more affects of water table depletion in the area of Tehsil Karezaat district Pishin.

Low income affects on daily life

Data shown in the table depicted that how the income reduction from the water table depletion affects the daily life of communities in tehsil Karezaat district Pishin. Perusal of the data in table 8 showing that the communities were on view with the percentage of 71.3 % that the reduction in their income due to the water table depletion effects their daily life, while the percentage of 27.7% community of the area are on the view that their daily life is not affected by the reduction of their income from water table depletion in the tehsil Karezaat district Pishin.

Table 7: Effects of water depletion onnnual income.

Effects of water depletion on annual income	Frequency	Percent
No effects on annual income	72	24
Effects on annual income	219	73
Don't•know	9	3
Total	300	100

The reasons of results may be that about half of the agriculture community in the district suffering from the depletion of water table is the pumping huge water from the ground water reservoirs which is also the sign of natural resources depletion at huge quantity. Along with the natural phenomenon of drought the unwise use of water resources for agriculture crops, depletion of catchment areas.

Table 8: Low income effects on daily life.

Low income effects on daily life	Frequency	Percent
Don't•know	3	1
No effects on daily life	83	27.7
Effects on daily life	214	71.3
Total	300	100

Increase in Poverty Rate

Perusal of the data on poverty ratio in the area as affected by water table deletion in tehsil Karezaat district Pishin in table 10. The data analyses shows that with the percentage of 90.1 % were on view that the rate of poverty is increased in their area while the percentage of 9.9% households were on view that the ratio of poverty is not increasing in the area tehsil Karezaat district Pishin. The possible reasons for huge percentage of households who feels increase in poverty ratio is the economic effects on their lives due to the depletion of water table and this depletion of water directly affect the agriculture production which is the largest mean of livelihood in Tehsil Karezaat district Pishin.

Water and Power Development Authority in a report published in 1992 also indicated that excessive withdrawal has resulted in a shift of population from rural to urban areas, which strains urban resources. Quetta has to bear the brunt of this migration, which has serious social and economic repercussions and which has disturbed the homogeneity of rural society, creating social problems for the urban and rural populations.

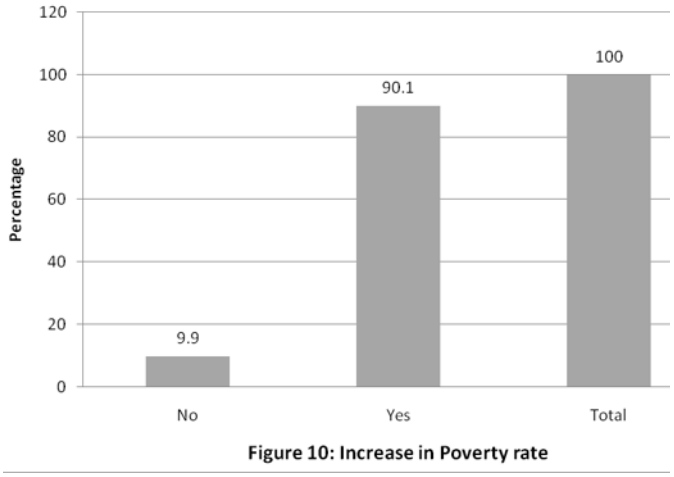

Figure 10: Increase in Poverty rate

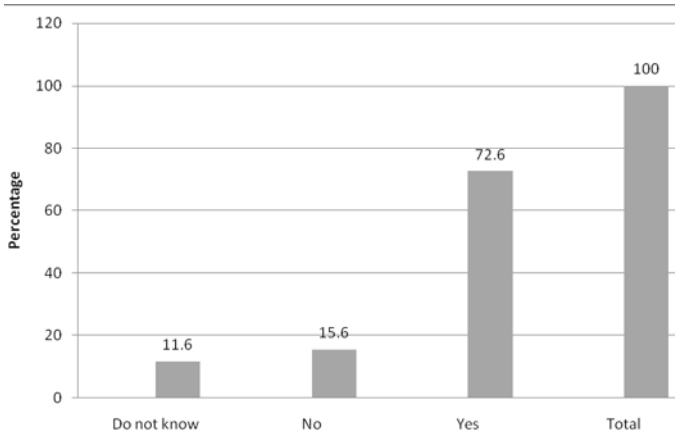

Figure 11: Increase in crime rate

Increase in Crime Rate

Data presented on the crime ratio is increased or not in the area affected by the water table depletion in tehsil Karezaat district Pishin as presented in table 11. The analyses shows that 72.6% community members were on view that the crime ratio is increased in their area while 11.6% population feels there is no increase in crime ratio in their respective areas followed by 11.6% interviewed people was not in position to analyze the crime situation in their area. The reasons of such a huge percentage of increase in crime is may be the unemployment in the area which is occurred due to the non availability of work in agriculture sector due to the water table depletion in the area, second reason may be the ration of poverty where the majority of household does not have money to imitate their own business to engage their house hold members working, the government sector employment is also not possible due to the limited jobs creates in public sector every year all these sectors may create the reasons of increase in unemployment and altimetry increase in crime ratio in Tehsil Karezaat District Pishin.

A report by leadership group on water security in Asia, April 2009 also reflect the same result that reduced access to fresh water will lead to a range of consequences, including impaired food production, the loss of livelihood security, large-scale migration within and across borders, and increased geopolitical tensions and instabilities. Over time, these effects will have a profound impact on security throughout the region.

How many HHs are migrated from the area

Data presented to interpret the households migrated to various cities of the province and country from water depletion affected areas as shown in table 12. The analyses of the data shows that 10 to 20 households are with the percentage of 55% while 23.6% falls from 1-to-10 households the 20-to-30 households are 9.3% and the minimum percentage is 5% from forty to fifty households migrated from the area due to the water table depletion in tehsil Karezaat district Pishin.

It is evident from results concern that the possible reasons could be the migration at the level of 55 percent from 10 to 20 household may be the search of jobs due to the depletion of eater in rural areas where the only largest mean of livelihood is agriculture supplemented by the basic necessities which is available in urban areas of the province and cities, the people having no mean of livelihood in rural areas and that is the push sector of migration from rural to urban areas. This migration from rural to urban areas in search of employment creates more problems in urban cities because the urban areas cannot observe such kind of huge migration due to already less basic facilities. The situation attracts the attention of planners and development government departments to create the opportunities of employment in rural areas of the province along with provision of basic facilities of life to sustain the lives in rural as well as in urban areas of the province and country.

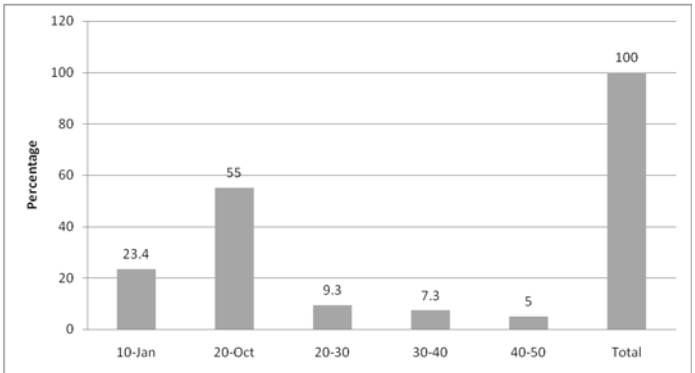

Figure 12: Household Migrated from Area

CONCLUSIONS

The majority of people are dependent directly or indirectly on agriculture activities and agriculture services follow by the business and government services. The second major traditional livelihood activity livestock is now decreasing and only a small portion of farmers continues the livestock in the area the major reason research shows that the non availability of water and recent drought (1998-294) vanished the vegetation cover in Tehsil Karezaat.

The traditional irrigation system like Karezes, streams and rain water harvesting have been changed now the absolute majority of farmers irrigates their agriculture fields and orchards through tube wells pumping the underground water through electric pumps. The water table depletion is also at various level in different villages that shows the huge quantity discharge in some areas and less discharge in others but depletion is taking place in whole Tehsil in the range from 10 to 60 feet per annum.

Agriculture productivity in Tehsil Karezaat is changing rapidly majority of the farmers are getting less product by using more inputs like seed, land and labor due to less water availability for agriculture purpose.

The finding of the research shows the serious socio-economic effects on the population of Tehsil Karezaat, unemployment is increasing. In some households the majority of people are migrated from the Tehsil to the urban centers to get jobs especially in government services and businesses, in some households few members are left their homes in search of jobs, the farmers having their own land now working as daily wages workers in other farmers fields. especially small landowners.

Increase in poverty rate are another effect that results on the one hand the implications for provision of social services like spending on children education, health services, local traditions and on the other hand people of the Tehsil are evident of increase in crime. Majority of the crimes are robbery, dacoits and Rahzani.

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