

WATER CRISIS AND ITS IMPACT ON THE SOCIO-ECONOMIC CONDITION OF LOCAL PEOPLE OF DISTRICT KARAK, KHYBER PAKHTUNKHWA, PAKISTAN

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ABSTRACT

Water is one of the basic requirements for a human civilization to flourish and survive. It is not only essential for human survival but a major source of enhanced agricultural and industrial productions. The present research was aimed at analyzing the socio-economic impacts of water scarcity on the local community of District Karak, Khyber Pakhtunkhwa, Pakistan. The study was conducted through a quantitative survey technique, where data were collected from 399 respondents. Risk Society Theory was applied to study the water crisis and its impact on the socio-economic conditions. For current research, we used a well-structured questionnaire containing various elements about the sources of water, reasons behind water scarcity, and socio-economic effects of water scarcity as well as adapted policies by the Government to ensure water availability in District Karak. The sampling strategy for the current study was convenient sampling. Descriptive as well as inferential statistical procedures were used for the exploration of the data. Findings of the study highlighted that people are frustrated and are in threatening conditions as they are being underprivileged from the most fundamental necessity of quality water. The findings of the study reflected that most of the people are compelled to migrate in search of water. They are dealing with conflicts within joint families and neighbors on the fair distributions of water. They are compelled to purchase water due to water scarcity which affects their economic conditions. The findings of the study also revealed that women are mostly responsible for bringing water from long distances which could have the worst impacts on their health. Due to water scarcity, people are living a disturbed life and their livelihoods are at stake. The study concluded that with the passage of time the issue will reach to a climax and it can also create more problems for the people of this region. Now, it is everyone's responsibility to take of this issue more seriously for a better public health, biodiversity, ecosystem, and even for the coming generations.

Keyword: water scarcity, socio-economic impact, community conflicts, governmental strategies, Khyber Pakhtunkhwa, Pakistan.

1. INTRODUCTION

Water scarcity is a severe problem that exist throughout the globe, especially in most of the developing countries. Today, one-fifth of the population is deprived of quality drinking water (Pahl-Wostl, Joyeeta & Daniel, 2008). The issue of water scarcity will reach to a climax when the present 7.8 billion population of the world

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will reach to an estimated to 8.3 billion up to two thousand twenty-five (Rajan, 2014). Developing Countries like Pakistan are facing more water scarcity and there are no authentic studies which have been published on the issue of water scarcity. Although there is very little work that has been done on the issue at the local level. From these local studies, there are serious threats to Pakistan if Pakistan did nothing up to two thousand and thirty-five (Iqbal, 2010). Moreover, the International Monetary Fund (IMF), placed Pakistan in the third position that is facing severe water scarcity (Nabi, Ali & Khan, 2019). This article describes the socioeconomic impact of water scarcity on the Pakistani local community of district Karak. Moreover, it explores some of the key reasons with respect to an indigenous plus western literature review.

The need for water has increased due to rapid population growth and other technological improvements. Water shortage is the result of huge population growth along with the available water resources. Other worldwide main causes behind water scarcity are poor infrastructure planning, poor management of available water resources, and the absence of strategies to control the effects of climate change (Oki & Quioco, 2019). The water crisis not only creates environmental but social stress also (Global Water System Project (GWSP), 2005). Since last century actions have been initiated to advance technology, policies, and strategies to provide clean water and sanitation. Progress has occurred in most of the technological advanced countries. The developing countries are still lagging behind in terms of handling water crisis. In the developing countries, most of the cities are released their 80 to 90 percent of water wastes into rivers and streams. Nearly two million children at the age of five lose their life throughout the world due to this polluted water (Nabi, Ali & Khan, 2019).

North America and the Middle East are the areas that are affected due to water shortage. Rwanda, Kenya and some other countries of Sub-Saharan Africa would face more water scarcity as their population is on the rise (Tibbetts, 2006). However, various observers have identified this fact that water could define as a 21st-century disputes (Foster & Holleman 2012). UN news plus world report threatens that “the water war surprise will come” (Antonio & Rock, 2009). Looking at the world water-scarce areas one can say that idea of Malthusianism of resource scarcity may occur. Because in East Africa competition or diplomacy over the Nile River among nations is heated increasingly over the time (Dunn, 2013). Asia is also in a conflict situation because of water as India, Bangladesh, and Pakistan time to time break the treaties signed by them. That has made a new crisis situation for them and could lead to another major conflict in South Asia in the coming years (Dunn, 2013). Comparing African countries' infrastructure with other developing countries, the African countries are lagging far behind. In 2002, only forty-four percent of populations were having access to the water while in Latin America and Caribbean about 65 percent population was having access to the clean water. From 2003 to 2006 there are no improvements that have been made to clean water and half of the inhabitants have a lack of sources to clean water (Oki & Quioco, 2019).

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Developing countries like Pakistan had reached a water scarcity of 1,700 cubic meters per capita per year since 2000 (UN, 1999). But according to the Government of Pakistan, the country had reached water scarcity early in 1992 with a water capacity of 1,700 cubic meters per capita. According to the statistics of 2002, water capacity had decreased to 1,500 cubic meters (Iqbal, 2010). Water scarcity is the most severe problem especially in rural areas of Pakistan because of the lack of management and government's attentions. Urbanization and huge population growth are among the main causes of water scarcity. Expert has predicted that water capacity could reach to 1,000 cubic meters if Pakistan did nothing till 2035 (Iqbal, 2010). Almost all of the provinces of Pakistan have suffered from water scarcity especially Khyber Pakhtunkhwa (KP). In some districts of Khyber Pakhtunkhwa, there is sufficient water such as districts in Malakand division (Rasool, 2019). However, some of the districts are facing extreme water scarcity such as district Karak. People of this district are in frustrated situation and having dangerous conditions as they are derived from the most fundamental necessity for life. People are now suffering from the worst social and economic conditions due to water scarcity (Rasool, 2019).

Therefore, this study is organized to find out the socio-economic impacts of water scarcity on the local community of district Karak. The study has focused on the socio-economic impacts such as social conflicts in a joint family relationship, conflict with neighbors, depression, and disturbance in livelihood due to water scarcity. The study findings would help the government by informing them about the identified causes of water scarcity to reduce the future happening. The research findings would perform as an eye-opener for both municipal council and other ecological organizations to detect the impact of water scarcity. This would further empower them to legislate the laws and strategies on water management to decrease the negative impact. This would ensure the sustainability of water availability.

2. REVIEW OF LITERATURE

The Universal Bill of Human Rights does not encompass the right to water. But Later on, the agreement on the right of the child in 1989 marks it clear that water is a fundamental element for good health. The state parties are responsible to provide health, education, food, and clean water (Nandy & Gordon, 2009). The Global Convention on Economic, Social, and Cultural rights in 2002 clearly focuses that rights of access to water are prior among other rights. All human beings deserve an accessible, affordable, free, and sufficient quantity of water, with a monitoring and evaluation systems that allow everyone to enjoy the water without any inequality (Rajan, 2014). Water must be sustained as public deposit and human right for a lifetime and this right should be protected by the law (Barlow, 2009). Unequal division of water among world regions, countries, and social groups results both in social and environmental depression (GWSP, 2005). Due to global change, the unequal division of water is in depressing position which in turn increases threats of droughts and floods (Integrated Water Resources Management, 2002).

Climate change is identifying the hydrological sequence mixing further moisture into the climate and changing the sequence of rain (Tibbett, 2000). A moistness atmosphere results in extra rain that mixes chemicals, microorganisms into water sources (Tibbett, 2004). Abundant rain results in a flood that affects wellwater and other water sources especially related to the ground water. Floods bring diseases cholera, bacterium, and other pathogens (Epistein & Heinkei, 2001). While some dry regions often face droughts as a result of climate conversion. In some dry areas, people are compelled to migrate in search of food and water. As a result, they migrate to overloaded areas where they are open to suffering from harmful diseases (Environmental Protection Agency, 2005).

Many scholars have predicted that future disputes might happen on water resources, especially in the South Asian region (Victor, 2014). India has signed treaties with Pakistan, Bangladesh, and Nepal, but the flow of rivers between these countries is dropping at nearly seven percent each year due to illegal construction like dams and hydroelectric plants (Strategic Foresight Group (SFG), 2003). Illegal permanent constructions against treaties are the future signs of conflict between South Asian states (Victor, 2014). Nearly every great society shaped around water which has been essential to provide water not only for drinking but also for providing long term agriculture, energy production, trade, and transport (Hanjra *et al.*, 2009). Agriculture is fully dependent on freshwater resources as well as trade and transportation of goods are also dependent on shipping by sea (Vinnari & Frederiksen, 2010).

The world agricultural nearly needs seventy percent of the world's clean water. Due to limited access to water and a high expanded population, the agriculture system is suffering to produce more crops with less water (Kijne, 2001). According to the latest world development report, about seventy-five out of a hundred of poor throughout the globe are surviving in rural regions. Where they have water sources like rivers, but no proper irrigation system (Kijne, 2001). Some rural areas depended on groundwater and rainwater. But have no tube well or solar-powered pumps for extracting water and no dams for water storage (Vinnari & Frederiksen, 2010).

There are studies conducted on the issue of water scarcity and its likely socio-economic consequences around the globe. However, most of the focus on existing water scarcity literature is on the global north (Hanjra *et al.*, 2009). The issue is being largely ignored in the academic circles of the global south, specifically in the South Asian region which is the most affected by this issue (Barlow, 2009). The issue needs a global perspective and research contribution from the South Asian region and it will add to our understanding of the changing socio-economic dynamics in the face of different global ecological issues (Vinnari & Frederiksen, 2010). Pakistan is one of the most affected countries from ecological catastrophes, and water scarcity is a major calamity in this regard. However, the issue is largely ignored in the academic milieu. The current study is therefore an effort to fill up this literature gap through analyzing the situation of water scarcity and its socio-economic repercussions.

3. THEORETICAL FRAMEWORK

Risk society theory by Ulrich Beck (1992) is an organized approach of dealing with risks and insecurities brought and lead through modernization itself. In accordance with this theory, society moves from traditional to modern patterns of life (Beck, 1992). He argued whenever society moves towards development, it makes technological advancement. This technological advancement brings hazards like climate change and a shortage of resources. He argued modern society produces environmental risks and also brings changes in a cultural pattern. Changes due to modernization in culture are changes in traditions, values, norms, mores, and folkways. While environmental risks produce a shortage of resources like food and water (Beck, 1992). Pakistani society is also moving towards the modernization and it is also facing problems such as the sustainability of resources. These all risks lead to socio-economic problems like the conflict in social relations, impacts on livelihood, impacts on education, and on the economic condition of the families (Iqbal, 2010). The theory will provide guidance in contextualizing our findings in the larger academic discussions within the discipline of sociology.

4. METHODOLOGY

In the current study, the data were gathered by using a quantitative survey technique. Quantitative techniques are commonly applied to measure the issue by producing numerical information or data that can be transformed into usable statistics. This is applied to measure attitudes, opinions, behaviors and additionally other well-defined variables, as well as to generalize consequences on a large populace (Montgomery, 2000).

The study was conducted in District Karak which comes in Kohat Division of Khyber Pakhtunkhwa Province in Pakistan. In 1982 Karak got district status as it was previously part of District Kohat. District Karak is distributed into 3 Tehsils that are Banda Daud Shah, Takht-e-Nasrati, and Karak. As per the 2017 census, District Karak has an overall populace of seven lac six thousand two hundred and twenty-nine (706,299). Moreover, the unit of analysis for current research was comprised of only males who were 18-65 years old. Females were omitted for the reasons of traditional principles of locale as they do not permit women to interact with strangers. Although we have included such types of questions which are related to female problems. Such questions are; (1) Do you ask females for bringing water in water scarcity conditions?, (2) Did your family women complain to you about the water scarcity problem ever?, (3) Does water scarcity affects the education of your family females?, (4) Did your family women ever complain to you that they are feeling a disturbance in their routine activities due to water scarcity?, (5) Did your women ever complained to you that they are facing depression due to water scarcity? and (6) Did you ever observed any conflict with your family women due to scarcity of water?

The sampling strategy for the study was convenient sampling as it gives freedom to the researchers to collect data from easily accessible respondents (Vaessen, 2002).

Another reason for opting for this strategy was that people of this area do not respond to strangers easily, so we collected data from those who happily agreed to provide data.

In addition to sampling, the size was chosen according to Taro Yamane formula for sample size. The formula is $n = \frac{N}{1+N(e)^2}$. Where n is sample size, N is total populace and e is confidence interval which is 0.05. The total population of District Karak is 706,299 according to the 2017 census. By putting these values into the formula, we get a result of 399 respondents with a 95% confidence interval. So finally, we interviewed 399 respondents.

The survey method was executed for the collection of data. The researchers developed a close-ended interviewing schedule because all the population was not educated. In this study, descriptive and inferential statistical processes were applied to analyze the information. Descriptive statistical process was applied to analyze the percentages and frequencies. The inferential statistical method was primarily applied for chi-square test, through the use of Statistical Package for Social Sciences (SPSS) which is considered as one of the best software aimed at social disciplines (Montgomery, 2000).

5. RESULTS

The Table 1 shows that most of the respondents (70.4%) migrated due to water scarcity, while 23.6% didn't. The data also shows that 74.3% of respondents faced major conflicts in their joint families and relationships due to the water crisis, whereas 21.5% of the respondents were not facing any problem.

Table 1: Percentage Responses of Interviewees

Statement	Yes	No	Do not know
Migration due to water scarcity	70.4%	23.6%	6.0%
Water scarcity is affecting relationships in joint families and creating conflicts	74.3%	21.5%	4.2%
Ask children to bring water from other areas	69.9%	25.2%	4.9%
Impact on children education and health by bringing water	78.6%	18.4%	3.0%
Water scarcity and Purchasing water	72.6%	23.4%	4.0%
Water scarcity and its impact on family income	79.7%	15.4%	4.9%
Water scarcity and its impact on the livelihood	70.3%	15.4%	2.5%

Furthermore, the majority of the respondents (69.9%) were of the opinion that they ask their children to bring water from far-flung areas, while 25.2% of the respondents said that they do not ask their children to bring water from far-flung areas. Moreover, 78.6% of respondents replied that bringing of water from other areas has many effects on children's education and health, whereas, 18.4% of the respondents said that it does not affect the education and health of their children. Likewise, the majority of the respondents (72.6%) were of the view that they

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purchase water due to water scarcity; while 23.4% disagreed, and 4.0% of the interviewee replied they do not know about it that bringing water from other areas has an effect on children's health or not. Similarly, 79.7% of respondents were of the opinion that water scarcity has a huge impact on their family's income whereas 15.4% of the respondents replied that water crisis is not effecting their family's income and 4.9% of respondent does not know that water scarcity is affecting their family's income or not.

In addition, 70.3% of the respondents were of the view that water scarcity affects their livelihood, while 27.2% of the respondents replied that it is not affecting their livelihood.

5.1. Hypothesis Testing

Hypothesis 1: Water scarcity leads to conflict in joint family relationship

The Pearson chi-square test was executed to see the association between water scarcity and family conflict. The chi-square table shows that the value of Person chi-square is 200.710^a, the degree of freedom is 4, whereas significant level is .000 that is fewer than 0.05 so that there is a significant association between water scarcity and family conflicts.

The results show that respondents who have faced water scarcity also suffered with intra family conflicts and their relationships were also affected. Whenever they face water crisis, they blame each other for the excessive use of water which becomes the main reason behind conflicts. Respondents have faced disputes on their household levels due to the distribution of water with their neighbors. Chi-square test also shows that there is a significant association between water scarceness and conflicts in joint family relationships due to scarcity of water. This is a micro level effect of water crisis and slowly it will spread on macro level. According to literature, the water will be the unbelievable reason of war; various observers accept as true that water could define as 21st-century dispute if people lack access to clean drinking water. This will lead people to death which in turn increases the chances of wars. In such a situation, people without the availability of water will have to choose war or death because of dehydration (Foster & Holleman, 2012).

Chi-Square Tests

	Value	Degree of freedom	Asymp. Sig. (2-sided)
Pearson Chi-Square	200.710 ^a	4	0.000
Likelihood Ratio	44.347	4	0.000
No of valid cases	203		

a. 7 cells (77.8%) have expected count less than 5. The minimum expected count is .01.

Hypothesis 2: Water scarcity is a major cause of a decrease in family's income. The value of the below given chi-square test is 226.829^a, the degree of freedom is 4 and the statistical significance level is .000 which is less than 0.05. So, there is an association between water scarcity and family's income.

Respondents stated that when they face water crisis and they have no water at home for drinking and domestic usage than they purchase water through water providers (water companies who supply water through tankers on cost). They have to ask water supply companies from long distances to provide water to their houses and these companies charge a lot of money from them because they bring water from other far-flung areas, which badly affect their monthly budget. Respondents have said that water scarcity has the worst impact on their livelihood because they have to arrange water for their daily usage and all the time, they think about it which somehow becomes one of the major causes of tension for them. Pakistan is an agricultural country and for growing different fruits, vegetables, and other food products a farmer needs water, and when there will be a shortage of water then it will affect the economic conditions of the farmers. So, a micro-level problem will convert into a macro-level problem. So, if there would be water scarcity, then a country will badly suffer on the micro and macro levels.

Chi-Square Tests

	Value	Degree of freedom	Asymp. Sig. (2-sided)
Pearson Chi-Square	226.829 ^a	4	.000
Likelihood Ratio	49.580	4	.000
No of Valid Cases	203		

a. 7 cells (77.8%) have expected count less than 5. The minimum expected count is .03.

6. DISCUSSION

The findings of the research reflect upon the socio-economic impact of water scarcity. A large number of respondents said they have migrated to different areas due to water scarcity which create many problems for them e.g. renting or buying a new house at a new place, start a new business or job, and choosing a new school for their children. People were not very happy after this migration because it was not easy for them to leave their homeland, their job/business, and migrate to an unfamiliar place. The literature also shows that the crisis of water leads people to migrate from one place to another for survival so they move to such places where they could survive (Dunn, 2013).

Therefore, the present study is fully supported by the literature that people migrate from one place to another due to water scarcity. According to the present study, most of the people in the area are suffering from both the social and economic impacts of water scarcity. They purchase water or travel to long distances to fetch water. They are also suffering from conflicts within families and in neighborhood due to water scarcity. They usually blame each other when they face a shortage of water. People living in joint families spent a lot of money on buying water. The male members of the family blame female members of the family that they wastewater in many household chores. Similarly, when water becomes the cause of neighborhood dispute. Sometimes these disputes become the root cause of major conflicts between tribes. The literature also shows that, in the scarce condition, the amount of water is always less than the demands of water. This leads to conflicts on

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the distribution of water within the family and with neighbors. In rural areas, people have combined sources of water such as well-water and tube well water. In the case of water shortage, people face conflicts within the family and with neighbors on the allocation of water (Tibbetts, 2000).

The findings are also fully supported by the literature that the water crisis creates conflict within families and between tribes. The present study also shows that the respondents asked their children to bring water which has a negative impact on their education and badly affects their health because they have to bring water from far-flung areas that waste their time and traveling affect their health too. According to literature, children of the water-stressed areas are asked to bring water to fulfill the household's demands. Because their families do not have any other alternatives to arrange water such as income for purchasing of water and municipal committee water. This in turn deprives their children from education (Baqai, 2005).

Results of this study also show that people of the areas are also suffering from depression and anxiety which is fully supported by the literature that people of water-scarce areas usually suffered from depression and feeling a disturbance in their livelihood. Unavailability of water leads people to purchase water in order to fulfill domestic and agricultural needs. Purchasing water on a daily basis is a great economic burden for middle and lower-class family and most of the time economic problems become the cause of domestic as well as inter-family conflicts. It imbalances the other household requirements of the family such as food, health, and education. The scarceness of water compels poor people to bring water covering long distances. Because poor people cannot bear the price of purchasing water. The only alternative they have is to bring water from other far areas either on their shoulders or by animals (Odaro, 2012). One of the problems of people in water-scarce areas is that they face hurdles in their indoor and outdoor activities. Because they spent most the time in fulfilling the needs of water, which in turn creates disturbance in indoor activities such as household chores. Outdoor activities like going late to office or livelihood which leads to tensions and economic crisis (Vinnari & Frederickson, 2010).

According to the result of the study, respondents are of the opinion that water shortage is due to extreme pumping of the water from the ground. Some have said that water scarcity is the due to decrease in annual rainfall, poor water management, and lack of government attention towards the water crisis as well as due to climate change. According to literature, water is somewhat sufficient in most of the areas of the world but lack of management makes it scarce. The distressed rural areas can get water at low cost if governments, international agencies, public sector organizations try to utilize this water (Tibbetts, 2002). In addition climate change is identifying the hydrological cycle mixing extra moisture into the atmosphere then changes the sequence of rain. A moisture atmosphere results in more rain that mixes chemicals and microorganisms into water sources. Abundant rain results in floods that affect well-water and other water sources (Dunn, 2013). Floods bring diseases cholera, bacterium, and other pathogens. While some dry regions often face

droughts as a result of climate change (Hussain *et al.*, 2011). So micro-level problems become the root causes of macro-level problems.

The findings of the study are in line with the basic notion of Risk society theory (Beck, 1992) which states that increasing modernization and mechanization of the societies are becoming more riskier. Increasing technological advancements will be accompanied by ecological hazards like climate changes, floods, and water scarcity. Our study also shows that the major reasons for water scarcity in district Karak are the changing environmental dynamics of the area. For housing and industrial purposes, there is an increasing trend of deforestation and the barring of fertile land, which is ultimately resulting in an increased temperature and the underground water table is also decreasing. Resultantly, the area is facing the issue of water scarcity which is leading to other socio-economic issues like community conflicts, the disintegration of the familial institution, and discriminatory treatment with children and women in terms of bringing water from long distances. This study is a significant contribution to the extension of risk society theory to the issue of water scarcity and future studies could also use it as a baseline.

7. CONCLUSION

The research study shows that almost all parts of the Karak region are facing water scarcity. This results in internal migration, familial conflicts, and has badly affected their socio-economic conditions. Furthermore, people are facing conflicts on the fair distribution of water within joint families and with their neighbors. In some cases, these conflicts resulted in loss of precious lives. Contrary to that, in scarce conditions, people bring water with the help of their children which can badly affect their health and other activities, and if they purchase water it can affect their financial conditions. People of the Karak region also show dissatisfaction towards Governmental and Non-Governmental organizations (NGOs) in conserving and provision of water. The government is not playing its role in constructing dams. Finally, the results of the current study conclude that with the passage of time the issue will reach to a climax and can become the cause to more problems for the people of the region. People of the area are feeling depression, tension, and anxiety because of the water crisis. Though at present this is a micro-level issue but with the passage of time it can become a macro level issue and affect the major parts of Karak.

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