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**EXPLORING SOCIO-ECONOMIC EXPERIENCES OF
WATER INSECURITY IN DISTRICT RAWALPINDI,
PUNJAB: PAKISTAN**

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ABSTRACT

Water insecurity is an emerging topic in the context of the growing body of literature. There is a dearth of qualitative research on water insecurity in the context of Pakistan. Current research aims at investigating and explaining the socio-economic impacts of water insecurity in the context of Rawalpindi District of Punjab, Pakistan. This study is based on qualitative research methods, using key informant interviews from the members of the household in the municipalities of New Lalazar and Gorakhpur in Rawalpindi District, Punjab. The sample for the interviews comprised of forty individuals with twenty males and twenty females to ensure equal gender participation. This article focuses on (1) the Socio-economic experiences of Water insecurity at the community level, (2) Coping strategies adopted by the community for water insecurity at the household level. This article suggests that water insecurity may also produce household struggles and individual distress at the micro and macro levels.

Introduction

Water serves as an essential input for almost each societal activity and acts as a basic element from food to energy production. Culture and water are interconnected, as water is a necessity of life and culture adapts to suit the water availability in each society differently. Water is a necessity and a basic human right, but its quality, quantity, and ownership may add to malnutrition and vector-borne diseases and conflicts (Jahren & Sui, 2016). Water is one of the main causes of 60 percent of child

fatalities besides hygiene and sanitation (WASH) (Boschi-Pinto, Velebit & Shibuya, 2008). Water brings waterborne diseases that can be controlled by proper water management (Jahren & Sui, 2016).

Globally seventy percent of water is used for agriculture (Wolf, 1999). 80% of the human population is facing a high threat to water security because of the marked water reduction (Vörösmarty et al., 2010). Water tables are dropping rapidly, rivers are not reaching their deltas, with human waste and industrial waste swiftly contaminating clean water (Postel, 2000).

Water security has emerged as a global issue in the 21st century. Water security can be defined as the access to adequate quantities of water of acceptable quality for human and environmental uses (UN-Water, 2013). It is also defined as the lack of sufficient, safe, reliable, and affordable water for personal and domestic use. It raises the risk of water-related disease and other health issues that come from having inadequate hydration. Water insecurity is the lack of a consistent and reliable source of water or when quality and quantity of water are not suitable to meet the needs of the local population and environment (Habiba, Abedin & Shaw, 2014). Bad water management and poor governance are one of the major factors contributing to water insecurity (Cosgrove & Rijsberman, 2000). Risks associated with water insecurity include shortage of water supply, poor hygiene, and sanitation etc. Water related shocks i.e. floods, droughts, contamination of water are also a part of water insecurity, because lack of water results in the inability to adapt to unfortunate circumstances (Habiba, Abedin & Shaw, 2014). Some authors are of the view that water insecurity brings inequalities in a society, with women and children walking miles to bring water. Economies are based on agriculture and agriculture solely depends on water. Economies of nation states are in danger owing to water insecurity (Keefer & Bousalis, 2015). Sometimes water shortage is the main reason of hostility among groups (Wolf, 1999). Water scarcity refers to the insufficient resources to support human needs while insecurity is a broader term with multiple concepts attached to it. It includes resource scarcity as well as resource access and lifestyle concerns (Wutich, Brewis, Logan, Maes, Armelagos, Piperata & Young, 2014). The major global crisis of current century will be the shortage of fresh water. Analysts warned a decade ago that **future wars will be fought for water resources**. Water is very important for economic growth and everything from agriculture to energy production needs water, so it is labelled as “the next oil” (Alam, 2002).

Pakistan is in the list of those countries facing chronic water problems (UN-WATER, 2013). Around the world, voices over water crises have arisen resulting in the Sustainable Development Goal no. 6 to reduce the number of people without sustainable access to improved drinking water. It has also led to a focus on water insecurity (UNDP, 2006) – which, in parallel with food insecurity, has been defined as inadequate and uncertain access to sufficient water for an effective and healthy way of life (Hadley & Wutich, 2009).

Pakistan is also in the list of thirty-six most water-stressed countries in the world (Reig, Maddocks & Gassert, 2013). African, Middle Eastern, and Asian countries have the highest clean water shortages (Hope, Edmunds, McDonnell, Rouse, Johnstone, Kistin & Vincent, 2007). Water professionals and researchers are of the

view that the issue of water insecurity is largely faced by underdeveloped regions of the world, which do not have enough resources and awareness to overcome the complex and deep-rooted issue. It is predicted that by 2025, many developing countries may face water scarcity (Keller, Sakthivadival & Seckler, 2000). Freshwater resource shortage is more acute problem in developing countries. Pakistan's water situation is extremely dangerous. The water level is declining, in 1950s it was 5,000 cubic meters per capita, now it is less than 1,500 cubic meters per capita (Kugelman, 2013). In Pakistan, water demand has increased manifolds and water supply decreased, owing to increasing agriculture activities and reduced river flow (Bhatti, Suttinon & Nasu, 2009).

An anthropological and sociological perspective of water insecurity highlights the cultural and social dimension of water insecurity and its impacts on individuals at household and community level. Water Insecurity directly affects people's lives at daily basis as water is a basic need and necessity of life. Water Insecurity is tied to the household economy, putting extra financial burdens on people for sourcing water. It affects livelihoods that are connected to agriculture, due to shifts in agricultural production and lower yields. It is further contributing to stress on individuals as well as inter-family relationships.

Current research article elaborates the socio-economic experiences of water insecurity in the locales of New Lalazar and Gorakhpur in the Rawalpindi District through the lens of anthropology. It also illustrates the adaptive strategies used by the local community to make water secure .

Locale

This study was conducted in two locations, New Lalazar and Gorakhpur in Rawalpindi, a city adjacent to the capital of the country. New Lalazar is an urban area, where people from different socio-economic backgrounds live. Gorakhpur is a rural area, but it is changing vastly and has developed significantly.

Research Methodology

Qualitative methodologies were used to gather data for this study. Participant observation focus group discussions, semi structured interviews were employed. The sample comprised of forty individuals with twenty males and twenty females to ensure equal gender participation. The interviews were conducted in Punjabi and Urdu then translated into English.

The primary data was subsequently scanned for prevalent and recurring codes, which were then thematically analysed and presented in the findings below. The following section presents the findings of the research considering two major themes, socio-economic experiences of water insecurity; and coping strategies to deal with water insecurity.

Results and Discussions

Causes of Water Insecurity

Gorakhpur and New Lalazar have differing causes leading to water insecurity in these locales. Although New Lalazar is a more urbanised area, and has water supply to the houses, this supply is unpredictable and inconsistent. Residents sometimes must wait up to two weeks before the water is supplied through the pipes. Most people have resorted to boreholes but they too dry up in the dry summer months.

Water in the dry season is supplied mainly through water tankers available in both formal and informal markets who supply water in trucks or specially equipped rickshaws.

In Gorakhpur, the rural pattern of life is still dominant. There is no piped water supply, with people relying on shared boreholes for household usage or on open wells for drinking water. The agriculture practiced in Gorakhpur is predominantly ‘*barani(Arid)*’ in nature, relying on rainwater for the water requirements of the crops.

Two major data-driven themes that emerged during research are socio-economic experiences of water insecurity and coping strategies adopted by the community members in the context of water insecurity. The themes along with their subthemes and selected verbatim are given below.

The following table highlights the residents’ narratives regarding water sources water insecurity

Table 1. Factors leading to Water Insecurity

Bore Well	‘Borehole has “ <i>namkeen</i> ” (salty) water in the area, which brings many health issues with it’
Salty water	‘salty water is difficult to drink’ ‘We cannot drink it, nor throw it out’
Open Wells	‘There is not enough water in the wells or borings to be able to meet up the needs of a household.’ ‘People throw garbage, vegetable or fruits in the open well’
Tanker Supply	‘A water tanker is costly, a person can either eat food or drink water’.
Agriculture	‘Agricultural fields drink all water and tube well fetches all water’.
Pipeline	‘water supply is just a name; no water is in our water supply pipe’ ‘water that is provided by the water supply stinks’
Governance	‘They [rich and politicians] can buy mineral water for their home, they use fresh sweet water for their swimming pools and even a poor man has not access to that swimming pool water’

The above narrations highlight issues of both quality and quantity of water, which are the key components of water insecurity. The ground water levels are being impacted by unchecked harvesting of groundwater, which is not replenished by adequate rainfall.

Apart from natural causes, bad governance, and inadequate infrastructure is perceived the root cause of lack of access to a reliable water source. In Gorakhpur, located at the banks of the River Soan, the water is extracted by WASA (Water and Sanitation Authority) through tube wells, but the pipelines for this water are not supplied to the residents of Gorakhpur.

Socio-Economic Experiences of Water Insecurity

This section indicates that water insecurity has a multidimensional impact on the households affected by it. The socio-economic experiences are highlighted in this section. These impacts include the additional expenses incurred because of water

insecurity, the time wasted in collecting and managing water as well as more profound changes in the family structure and agriculture patterns. The table below highlights some key codes and narratives that were prevalent in the research regarding the socio-economic impacts of water insecurity.

Table 2. Socio- Economic experiences of Water Insecurity

Sub-themes	Verbatim
Time wastage	<p>“We have a borehole in our home, but when the motor burns out, we fetch water from the well, which is in the fields near our home. We carried water gallons on a <i>rairrhi</i> (hand pulled cart). It takes two to three hours in water collection for the full day.”</p> <p>“People wait for hours in the queue at filtration plant to get drinking water”</p> <p>“A person has to stay with the water tank to keep check on water. It takes me more than two hours for water supply and more than one hour for borehole every day”</p>
Expenses and Poverty	<p>“Missile motors used in water borings use a heavy-duty motor which uses more electricity than other motors. This results in the increase in cost of electricity bills”</p> <p>“It is difficult for us to find a labor that is willing to clean water well. They charge extra money because there may be many gases in the well, which may be dangerous for them”</p> <p>“I did not have enough money to dig water well. So, I took loan from different relatives, and made water well in my farm.”</p> <p>“We did not eat fruits or other things because we need to pay a large amount of money in the name of electricity bill. Electricity bill looks like a jin(devil)”</p> <p>“When my water motor burnt, the monthly budget got disturbed. I needed to call a technician, who charged approximately two thousand rupees for motor repair, a new motor costs almost half my salary.”</p> <p>“Inflation is rising day by day, before some time, people buy food to live but now they need to buy water to stay alive”.</p> <p>“He did not have water for himself, from where can he afford water for plants”</p>
Family Structure	<p>“We had a lot of domestic conflicts over water in their family, which led to the separation of the family into separate units”</p> <p>“I have a borehole in our home. I have four sons, their wives with children lived in the same house. Daily, they had conflicts over water wastage. At the end of month, they were fighting on the water bills. So, I took the harsh decision to dissolve my family into a nuclear family by separating his children”</p>

Water consumption of a joint family is higher than the water consumption of the nuclear families. Family structures are changing from joint to nuclear families

owing to water insecurity, as the sharing of scant water resources puts extra burden on the families. In the research locale, it was observed that joint families have weakened, and independent nuclear families have emerged. Water is one of the major reasons as described by the respondents.

During water collection process, household members spent a lot of time in water collection process owing to long queue and crowding at the community filter. Sometimes when someone broke the queue and the fight started. These disputes were widespread at intra- community and Intra-family level. A lot of time is consumed to collect water, either from wells or filtration plants. This time has an impact on the daily routine of the household members, allowing less time for other important tasks.

Water insecurity places additional monetary burdens on the household. Installation and maintenance of borehole and heavy-duty motors being the most prevalent issue. Due to there being scant amount of water in the boreholes, there is a high risk of the motor burning out. The motor needs to be monitored while operating and replaced or repaired when damaged due to running dry. Open wells also require regular cleaning and repairs, for which specialised labour is required. Water tankers severely affect the household economies in the locale, which are run by private companies that charge higher in times of acute water shortage. Furthermore, tankers cannot access households in uphill areas, and charge higher for providing services there.

People shifted their cultivation patterns to those crops which need less water. They grow vegetables, to earn money. Less water brings less agricultural production, which results in hunger. Plenty of water is needed for agricultural yield. According to some farmers from Gorakhpur, water logging and salinity occurred due to channelization of water towards farms. The constant flow of water in furrows resulted in water salinity.

Adaptive Strategies to Minimize Water Insecurity

Households have adopted different coping and adaptive strategies to minimize the use of water and maximise the utility of available water. Respondents say that when there is a clear shortage of water in the summer season, they start limiting bathing, use of showers, and washbasins. Like other ecological adaptations, residents of Gorakhpur and New Lalazar have modified their living patterns to cope up with water shortage.

Some households collect rainwater during monsoon season, through different techniques and use it for washing clothes and utensils. Some of the respondents installed pipe in their terraces and collect the rainwater from their terraces. Water collected from the terrace drains down through the pipe and saved into gallons, drums, etc. They place their tub, buckets, and other things in an open area to fill it with rainwater, and then they store it for future use. One of the respondents said, "*rainwater makes them feel secure, in water shortage*". However, rainwater cannot be stored for a longer period. They can save it in monsoon season and use that water as early as possible, otherwise, it starts stinking. Respondents used large underground water tanks that can store a large amount of water.

Another respondent explained that she has a small bowl near the water cooler. Children dump extra water in that bowl, which she uses for small plants, planted in bottles.

Migration from one place to another place is one more strategy used by local people. People are leaving the area of Gorakhpur because of water shortage for cultivation. They are migrating to get a job in the city. The main reason behind house shifting was the unavailability of water. Less agriculture compels people to urban areas for employment, which will increase employment pressure. A respondent from Gorakhpur said “water insecurity pushes them to leave their ancestral job. They do not know any other skill instead of farming.”

A 45-year-old respondent stated that when he moved to the urban area to find some labour work, loading work, it was very difficult for him to load things for more than eight hours. Soon he fell ill and came back to the village.

The following table highlights some key codes and narratives regarding adaptive strategies used by the residents to cope with water insecurity.

Table 3. Adaptive Strategies to deal with Water Insecurity

Sub- themes	Verbatim
Filtration	<p>“We store water in “<i>matka</i>” (large clay pot) or “<i>gharra</i>” (pitcher) which is a natural purifier”</p> <p>“They boil water to make it purify and germs free”</p> <p>“I put “<i>gandhak</i>” (sulphur) in the water tank. Sulphur is a remedy to prevent foot fingers from swelling.”</p> <p>“I use “<i>phitkari</i>” (alum) in water to purify muddy water”</p> <p>“We bought electronic water filters for the homes and attached them to the dispenser.”</p>
Exploitation	<p>“Nozzle is also illegal to use because it fetches all water from the other households’ pipelines, but some people use nozzle in the locale. Nozzle is a little device that fits on the opening of pipe. It pulls water.”</p> <p>“My neighbour has made a copy of the valve key that opens the water supply, he paid the supply person to make a copy for himself.”</p>
Lifestyle	<p>“We start limiting bathing, use of showers, wash basins. use tub (filled with water) instead of tap water”</p> <p>“I wash vegetables and fruits in bowl to save water”</p> <p>“I fill bucket of water for the children to take bath because using showerhead is wastage of water”</p>

Rainwater	“Our area is “Baraani” (arid), so that area does not need a lot of water for crops. Rain provides sufficient water for wheat and corn. Seasonal vegetables need more water. Monsoons fill the deficiency of water”
Shifts in Agricultural production	<p>“Three to four decades ago, cash crops were cultivated in Gorakhpur. Now the people have shifted their cultivation to those crops which need less water. They grow vegetables, to earn money.”</p> <p>“We were getting high amount of profit from agriculture few years ago, now we are getting less money because of water shortage. I used to have a better lifestyle. My lifestyle changed and I use less consumption of consumer goods”</p>
Migration	“People are leaving the area, to get a job in city, because they cannot fulfill their family needs with the help of farming.”

Anthropologists analyse reciprocity as the ground of society, based on an exchange system, the exchange can be in the form of good, labour, and ideas that form the basic building blocks of society. Another perspective analyses it narrowly, as a system of exchange in which goods are exchanged in the expectations to get back later. Malinowski conceived reciprocity as the principle that organized the entire social life of Trobriand Islander’s legal, economic, moral, social, religious, and psychological (Malinowski, 1922). Reciprocity plays a key role in water insecure situations as well. When water tankers are not available, households run out of water, they borrow water from neighbourhood. They did not give back the borrowed water immediately to the family from where they get water. When the family of the loaner, have a shortage of water, they can borrow back water from the borrower. The borrowers give small gifts or favour to the loaner. A family in the locale Lalazar becomes a water patron to the near mosque, for *sawaab* (reward in the life hereafter) purpose.

Summary and Conclusion

This article highlights the everyday socio-economic experiences caused by water insecurity in Rawalpindi, a city adjacent to the national capital of Pakistan. Water insecurity is a multi-dimensional phenomenon, with major factors being water inadequacy due to falling water table, over-harvesting of groundwater, and low recharge of natural aquifers. This is intensified by governance related issues such as poor infrastructure and lack of management of water resources.

The communities in research locale face social and economic impacts of water Insecurity at individual and community level. They are part of everyday lived experiences. These impacts are seen in the additional expenses incurred due to installation and maintenance of boreholes in households, the cost of running motors for extracting the water and the cost of water tankers in the summer months when the water tables drop lower. Furthermore, the time taken for water-related tasks is seen in socio-economic terms as it detracts from the time available for individuals to engage in other tasks.

The communities in New Lalazar and Gorakhpur have developed several adaptive strategies to deal with water insecurity. While some families have migrated to other locales, others have developed rainwater collection systems for use in the rainy season. Households minimise water wastage by limiting washing, laundry, and cleaning. Wastewater is reused for plants and other purposes. Communities in the locales have developed systems of reciprocal exchange in times of water scarcity, relying on neighbours and mosques to share water in times of need, on the expectation of returning the favour as needed.

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