P-ISSN: 2709-6254	Journal of Development and Social Sciences	Jul-Sep 2023, Vol.4, No.3
O-ISSN:2709-6262	http://dx.doi.org/10.47205/jdss.2023(4-III)90	[981-990]

Journal of Development and Social Sciences
www.jdss.org.pk

RESEARCH PAPER

GEO-Spatial Analysis of H_2O Excellence and its Influence on Public Health, Taluka Faiz Ganj District Khairpur, Sindh

[1]Naila Parveen Abbasi*, [2]Nisar Ahmed Khand and [3] Ghazala Parveen Abbasi

1. Assistant Professor, Department of Geography, Shah Abdul Latif University Khairpur, Sindh, Pakistan
2. Teaching Assistant, Department of Geography, Shah Abdul Latif University Khairpur, Sindh, Pakistan
3. Assistant Professor, Department of Education, SMBBGC, Larkana, Sindh, Pakistan

***Corresponding Author:** proudtobeageographer@yahoo.com

ABSTRACT

Water is the staple need of sustainable improvement with well significant source Healthy production of energy, food, and economic development is essential. Ecosystem as well as for human existence as well. Without water, nothing on earth can survive. It makes up around 60% of our body and covers 71% of the surface. The availability of clean water is an essential for sustainable human health. Polluted water is a major cause of environmental hazard and it's dangerous for human health. The exploration is based on the monitoring the water quality impact on human health. For analyzing the findings geo-informatical and statistical techniques have been applied. Current study is an attempt to know the sources of intake H2O at Faiz Ganj , though quality water on different areas and how many people effect due to unhygienic water. For this study water samples has been collected from various major sources and tested in laboratories. Based on results of water samples the pH is found at high rate in samples, and the quality of water is not drinking able. The delivery system is also unhygienic. People's perception about the quality of water is that there is no need to drink purified water due to emotional attachment and unawareness. This study helps in increasing and enhancing awareness about safe drinking water. It is seen though water contains dangerous indigents but people are using river water as a first priority then hand pump in last well for drinking.

KEYWORDS Safe Drinking Water, Water Quality, Human Health

Introduction

Water is the prime need for life survival of humans, plants and animals on earth. The availability of clean water is an essential for sustainable human health. Polluted water is a major cause of environmental hazard and it is dangerous for human health (Mumtaz, et al, 2017). The report states that of the 2.1 billion people who lack access to adequately managed water, 844 million do not even have a basic source of drinking water (Savci, 2012). This includes 159 million people who continue to drink untreated water from surface water sources, such as streams or lakes, and 263 million people who must travel more than 30 minutes each way to acquire water from outside the home (Panhwar, 1969).

In our daily life, aqua is an invaluable natural resource that is utilized to drink also for another growing motives. Safe intake H2O is essential for maintain human health everywhere in the world. WHO approximations about 80% diseases are water-borne (Baig, 2011). Several peoples' water for drink does not keep to the WHO measures. 3.1% of deaths recorded due to grimy water.

Aquatic pollutant are frequently began by dint of the dischargeable domestic plus industrialized discharge wasted material, leakages through water containers, aquatic

throwing away, emitting radiation surplus, plus full of atmosphere depositional elements (Mahar, 2018). Manufacturing waste in addition to discarded heavy metals can formed in ponds also in streams, harming together public and flora and fauna. As focal cause of immunology defeat, impaired reproductive factor, similarly acute harming is in contaminants in industrialized wasted material.

Through contaminated water, infective maladies including cholera, typhoid fever, and another illnesses like gastroenteritis, diarrhea, vomiting, peel issues, and kidney problems spread (Mahar, 2018). Directly nutritional harm toward the floras plus faunae influence to the humanoid well-being. There is a limited supply of groundwater In Pakistan. Most of the time, it is hazardous to drink. In many areas of the country, the problem of ground water pollution has gotten so bad that vast ground water supplies are quickly deteriorating. All those processes and reactions that have an impact on water have an impact on the quality of groundwater.

Its quality changes throughout time and space. It varies depending on the depth of the water table and the location (Sarfraz, et al, 2018). Reid according to estimates, 75% of people in affluent countries lack access to clean water to drink, among many other issues. Other issues were lack of sanitary facilities and landfills close to sources of water (Pirzada, et al, 2016).

The primary route of intake H2O in widely held in our country is ground water. In pastoral parts, manual pumps and electric motor pumps are the most often used equipment for groundwater extraction. In several parts of Sindh province, the water is of low quality (Daud et al, 2017). People are forced to consume tainted water in locations without filtration facilities Water-borne infections, which are spread to people through this water due to the depletion of water supplies and declining quality of ground water, are on the rise. In Pakistan, groundwater is the main source of drinking water.

A lot of water-based ailments are brought on by the majority of people using the water untreated or unfiltered. The lake that are farther from the canal are very salty. In contrast to the salty Thar lakes, the Khairpur lakes are often alkaline. The reasons behind this phenomena are frequently in question. It is thought that the salts in lakes in Khairpur and Sanghar district have essentially the same components, but in the lakes in Khairpur, the sodium salts are changed into soda ash by the presence of some bacteria or organic material (Haseena et al, 2017).

Khairpur, Sindh's drinking water quality revealed significant levels of coliform and fecal coliform contamination at various places; as a result, it is unfit for human consumption. The results show worth of intake aqua is more deteriorating in distributional structure, that perhaps caused by pipe leaks wherever dirt aquatic flows addicted to the civic water supply (high coliform and fecal coliform count at all 3 levels). Due to improper handling and exposed storage tanks, water for drink use is becoming extra polluted at consumer level. Colony forming units (cfu) or coliform should not be found in drinking water in concentrations of more than 0 per 100 mL WHO, or in any amount (Zeenat et al, 2015). For drinking and irrigation needs, the ground water of various rural community in the district Khairpur, Sindh, remained examined physically and chemically. All samples had physical and chemical properties that exceeded WHO standards, making the water unfit for irrigation or drinking. Groundwater in Sindh's coastal regions was found to be unsafe for drinking after a physicochemical and bacterial analysis. The quantities of phosphate and sulfate were acceptable. Turbidity and salinity were higher than organic and fecal contamination, though. Worthful ground aqua at different areas in Sindh revealed that while turbidity and also majority of the chemical indicators were beyond the critical levels, pH of the water samples was contained by WHO standards (Majidano et al, 2017).

One of the major threats to Pakistan's survival is the lack of clean drinking water. According to a recent survey, the country is amongst the topmost 10 nations within the

lowest accessible uncontaminated water (Tahir et al, 2010). In Pakistan, which has a population of 207 million people, 21 million people do not have access to clean water, placing it ninth among the top 10 countries with the lowest access to it. The top three nations without access to clean water are India, Ethiopia, and Nigeria. With an estimated 44% of the population lacking access to clean drinking water, Pakistan's water shortage is escalating swiftly (Baig et al, 2011).

90% of rural dwellers in Punjab lack access to this necessary resource, and 7% of them only get their water from rivers and wells. Its looks that Punjab takes the good aqua resource water supply scheme out of rest of the other provincial areas of Pakistan. The share of this is 24% in Sindh, where inhabitants obtain their water from unprotected sources. In Baluchistan and Khyber Pakhtunkhwa (KP), respectively, 72% and 46% of rural communities use surface and dug well water. In Pakistan's Sindh province, the vast majority of people dearth right to use to clean drinking water. (Daud et al, 2017).

Literature Review

The eight talukas that make up the Khairpur district in northern Sindh are Fai Ganj, Gambat, Khairpur, Kingri, Koti Diji, Mirwah, Nara, and Sobho Dero. Khairpur, a city of 0.12 million people, appears to have poor water quality, which could lead to waterborne infections, especially in children. In District Khairpur the groundwater at most of the places is brackish and not fit for human consumption.In the study area, drinking water is Brackish the incidence of Hepatitis, Diarrhea and other skin infectious diseases are common due to unhygienic water (Iqbal et al, 2020).

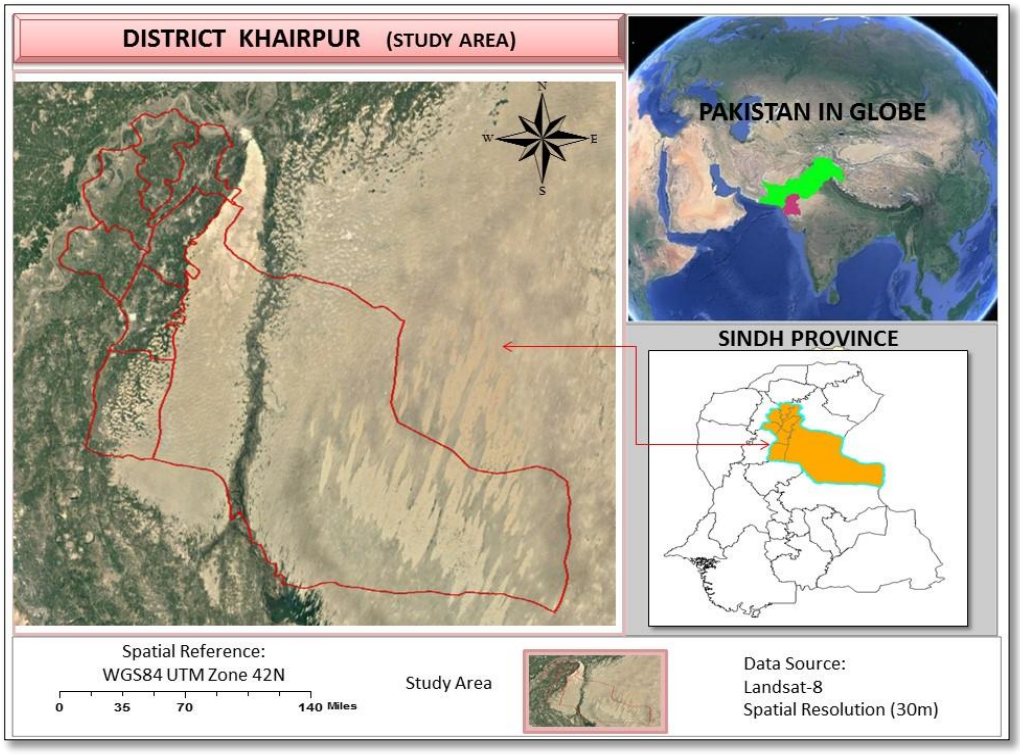

Fig: 1 Location of Study Area

Nearly everyone in the area of study to whom interviewed, who are using drinking water from canals and wah sources were perceived that the quality of this water is 'very good' it is healthy water and 'safe for drinking', because it is 'sweet water' it is 'clean water' it 'test good. The other group of people do not agree to use the water from canal and wah resources of their own area for drinking purpose because of salinity of water and they bring water from any other source such as from venders.

Table 1
Spatial Distribution of water sources in District Khairpur

	Tap water	Hand pump	Motor pump	Others
District	10	73	15	2
Urban	9	53	38	0
Rural	11	80	6	2

Table: 1 is sowing the rate of water sources in rural urban ratio of the district, hand pumps are commonly used for water in main areas of the district. But in rural areas people using canal and wah water for usage of common purpose.

There are various systems of drinking water supply to the households. In many localities of the area people store water in various types of plastic containers and water coolers. People of that locality said that this tap water is contaminated and when they store this tap water in a bucket for few hours an oily layer appears on surface and bucket also become oily (Ali, et al, 2015).

The water quality in revision extent is change because of salinity, the water is saline due to the canals and sewerage water is mixing in drinking water that's why water test is change and seen that sewerage line and line of drinking water is Joining somewhere in that area. Water insufficiency, discontinuous water supplied system, poorly planned water providing structures, crossed contaminated elements produced by thoroughly put down the supply of aquatic sources plus sewage pipes, dumping of unprocessed dirt line and manufacturing wastes, plus insufficient procedural measurements of facility suppliers were few of the foremost restraints known in provide the nontoxic water. Additionally, the country's groundwater quality and quantity are under extreme pressure due to unmaintainable and unregulated groundwater construct strategies, a deficiency of stringent implementation of groundwater regulations, plus weak authority control. (PCRWR, 2021).

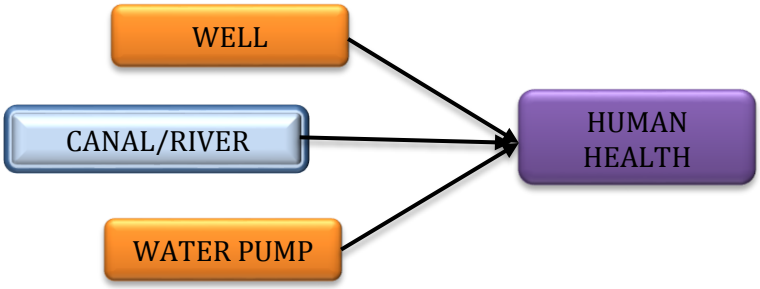

Fig: 2 Water resources connected to Human Health

Materials and Methods

For acquiring the results the technical outline have been planned through different research steps as used of ArcGIS 10.8 version also utilized the LandSAT 8, plus Quickbird imageries gave the great variation in land cover of the study area. GIS platform remained helpful to get final layouts of an objective along used of statistical methods through ANOVA and SPSS software's. Water samples have collected from different areas of the taluka Faiz Ganj and testify in laborty for TDs and PH values of sampled areas.

Around eleven the localities for the water quality monitoring were chosen in study area. Both pH and total dissolved solids (TDS) were determined. The arsenic was also observed using the Kit method. The pH ranged from 6.16 to 8.6, the TDS was 10 to 970 mg/L, and the arsenic content was 0.00001-2.14 g/L, according to the data.

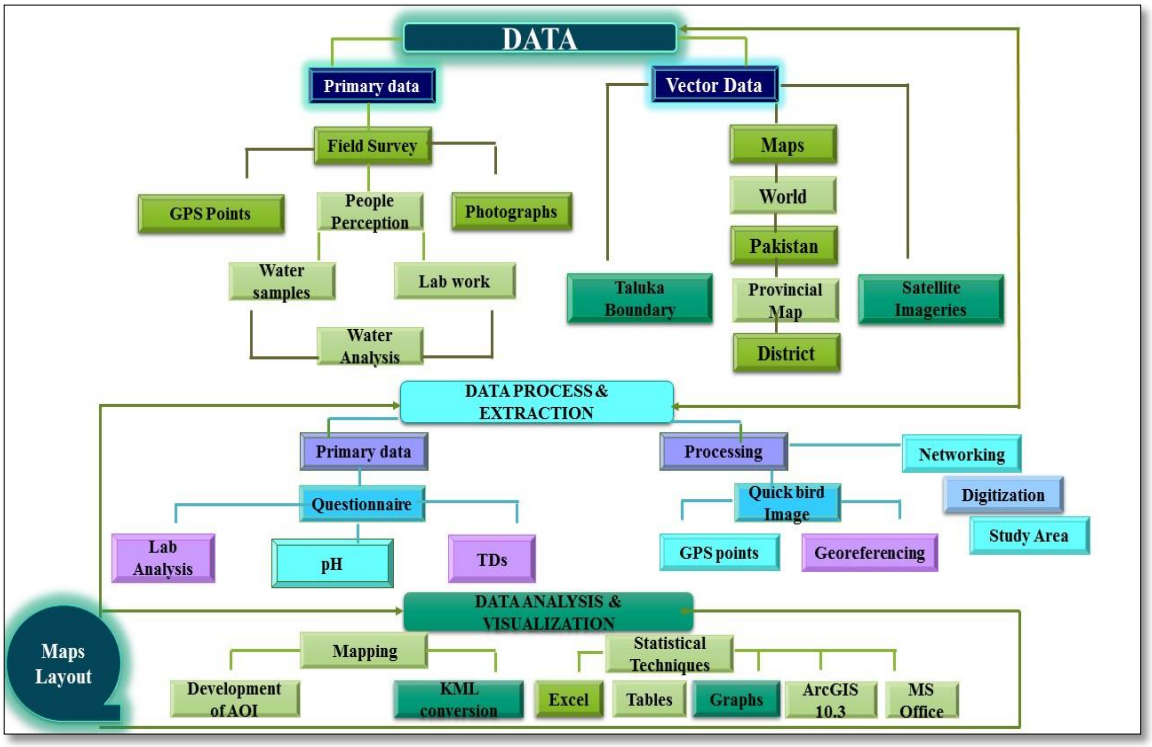

Fig: 3 Methodological Framework

Results and Discussion

Table 2
Statistical Model Summary of parameters

MODEL SUMMARY			
Model	R	R Square	Adjusted R Square
1	.768[a]	.589	.581

a. Predictors: (Constant), well, canal/ river, hand pump

Above table is entitled as model summary it represents how much model fitness exists in research. Adjusted R squire displays the results that are taken from respondents given data. It is about well, canal and hand pump impact on 58.10% on human health.

Table 3
ANOVA representation

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	91.971	3	30.657	73.673	.000[b]
	Residual	64.083	154	.416		
	Total	156.055	157			

a. Dependent Variable: Human Health
b. Predictors: (Constant), well, canal/ river, hand pump

It illustrated that each self-regulating variables are predicting reliant on variable or not thus ANOVA in significant column clears that well, canal and hand pump are impacting on human life it can be verified from results.

Table 4
Coefficients of dependent variable

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.084	.059		1.413	.160
	CANAL/ RIVER	.596	.056	.619	10.640	.000
	HAND PUMP	.177	.056	.193	3.182	.002
	WELL	.099	.051	.108	1.926	.056

a. Dependent Variable: Human Health

Coefficient table shows at what level each variable contributes separately so here beta represents that canal water impacts on human health almost 61.90% it is because in canal drainage water exists that impure the water that's why its impact on human health, whereas, hand pump effects on 19.30% on human health it can be said it is somehow better and wells are effecting 10.80% but it is insignificant in this research might be cases are not properly diagnosed in these area where people are using water from wells.

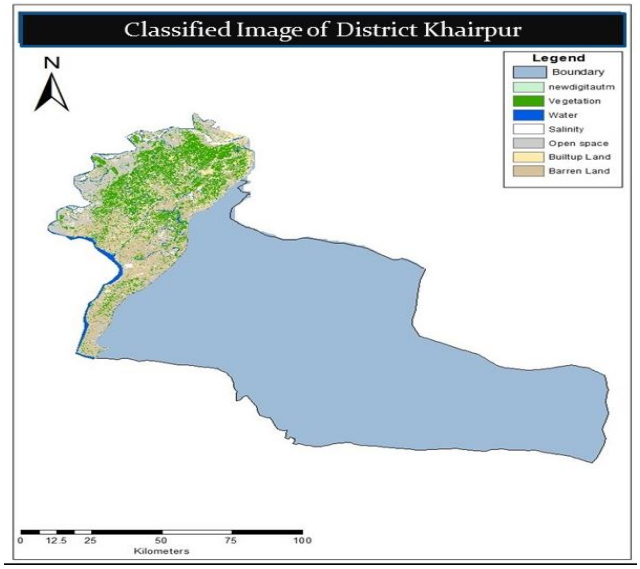

Fig: 4 Classified Image of District Khairpur

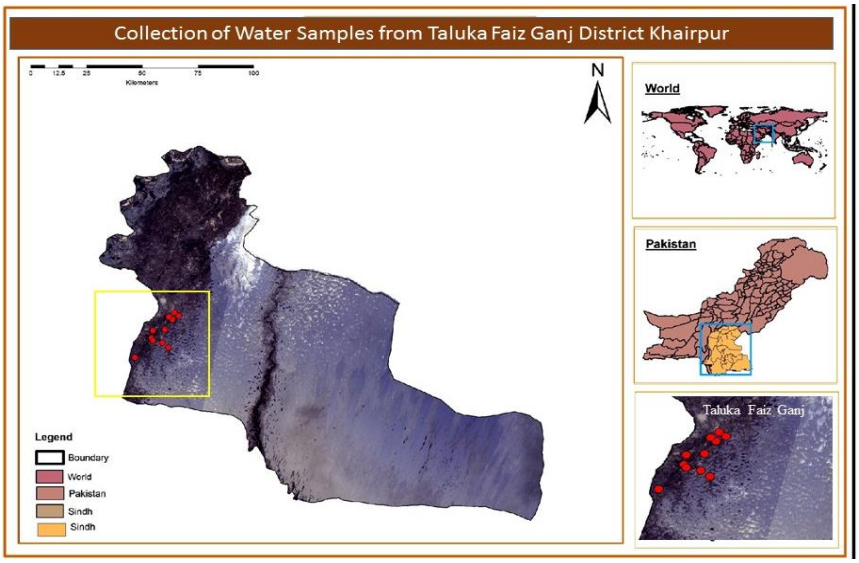

Fig: 5 Water Sampling Sites of Study area

Table 5
Spatial Distribution of Sample Sites from Taluka Faiz Ganj, Khairpur

Area location	Taluka	pH	TDs
Pond water	Faiz Ganj	7.6	212
Hand pump 1-(home)	Faiz Ganj	7.6	100
Water pump	Faiz Ganj	8.3	118
Meer waah	Faiz Ganj	7.8	175
Water supply-2 (home)	Faiz Ganj	8.2	207
Pump-3 (home)	Faiz Ganj	8.1	438
Well water	Faiz Ganj	8.0	865
Canal water	Faiz Ganj	7.0	289
Nursery	Faiz Ganj	8.1	337
Sathyo waah	Faiz Ganj	8.1	197
Faiz waah	Faiz Ganj	8.3	209

Table 5 is showing the TDs and pH values of water collected areas in Faiz Ganj and also recorded the Perception of people about water quality in study area that nearly everyone in both areas of study to whom we interviewed, who are using drinking water from canals and wah sources were perceived that the quality of this water is 'very good' it is healthy water and 'safe for drinking', because it is 'sweet water' it is 'clean water' it 'test good.

The other group of people do not agree to use the water from canal and wah resources of their own area for drinking purpose because of salinity of water and they bring water from any other source such as from venders. The water quality of Khairpur is change because of the salinity of water because the water is saline due to the canals and sewerage water is mixing in drinking water that's why water test is change.

Human Health Impacts

The disease, which would otherwise be preventable, is largely brought on by unsafe drinking water, especially in young children in underdeveloped nations Annually 2.5 million peoples expire through this prevalent of diarrhea disease for the reason of pathogens bring into being in intake aqua, including several viral, bacterial, and protozoan agents. Gastroenteritis (40%–50%), diarrhea (47%–59%), dysentery (28–35%), hepatitis A (32%–38%), hepatitis B (16%–19%), and hepatitis C (6-7%) were the major health issues mentioned by respondents. Many waterborne aliments, like as renal issues, gastroenteritis, dysentery, and diarrhea, as well as renal disorders, are reasoned from by intake water pollution in south part of Sindh.

Waterborne diseases could be caused by the contaminated water. Children are the ones who suffer the most seriously as a result of consuming contaminated groundwater and open channels. According to some estimates, 100 to 150 children in Pakistan die each day from diarrheal diseases brought on by contaminated water and unhygienic living conditions. This research was quantitative in nature it represents the results that how water impacts on human health so for data questionnaire was designed and administrated in taluka faiz ganj, in this connection people responded that what effects are they have seen on people health and their life. Many hepatitis patients have been observed in study zone because hepatitis A and E are waterborne diseases similarly the stone problem is common issue among population of that area in different age groups.

Conclusion

Safe drinking water is essential for life and human health. Unsafe and polluted water is a significant risk to public health. It concluded that water is used by people for drinking contains many contaminated elements in taluka Faiz Ganj and these pollutants are directly

creating waterborne diseases among people as the area has need to initiative to provide safe and clean drinking water. To increase the quality of drinking water for use in agriculture and human consumption, reliable testing methods are required.

This means that critical aspects of water quality that have a significant impact include the analytical tests for color, odor, EC, pH, flavor, turbidity, bicarbonate, alkalinity, carbonate, magnesium, calcium, water hardness, potassium, sodium, chloride, sulfate, phosphorus, and nitrate. It is found from this exploration that firstly, canal water is most fit and secondly, hand pump water and lastly well as shown in coefficient table. And further there is acute need for the water purification plants in targeted area of not only taluka Faiz Ganj but for the entire populated areas of the district Khairpur.

Recommendations

For the healthier wellbeing water cleanliness, and sanitization practices are essential for maintaining human health. Because having access to clean and safe drinking water is essential for defending against several viral infections that affect people. A trustworthy network for groundwater monitoring is needed throughout the area. Making well-informed decisions would aid in maximizing the utilization of the resources at hand. Additionally, extensive sewer infrastructure that includes sewage collection should be included in rural settlements. It's crucial to keep the appropriate spacing, and water supply tubes shouldn't cross sewage lines. Alternative water sources should be explored in areas where the groundwater supplies are impacted by toxins including arsenic, TDS, nitrate, and fluoride, among others. Furthermore education, instruction, and knowledge spanning from law to the public for use of safe and clean drinking water for daily use. This type of methodology can be very beneficial and keep secure from waterborne diseases in study area.

References

Baig, J. A. (2011). *Chemical Analysis of Arsenic in Environmental and Biological Samples of Selected Areas of Sindh, Pakistan and its Removal from Water*, (Doctoral dissertation, University of Sindh, Jamshoro-Pakistan).

Baig, J. A., Kazi, T. G., Shah, A. Q., Khan, S., Kolachi, N. F., Afridi, H. I., & Kanhar, F. H. (2011). Determination of arsenic scalp hair of Pakistani children and drinking water for environmental risk assessment. *Human and Ecological Risk Assessment: An International Journal, 17(4)*, 966-980.

Daud, M. K., Nafees, M., Ali, S., Rizwan, M., Bajwa, R. A., Shakoor, M. B., & Zhu, S. J. (2017). Drinking water quality status and contamination in Pakistan. *Bio Med research international.*

Haseena, M., Malik, M. F., Javed, A., Arshad, S., Asif, N., Zulfiqar, S., & Hanif, J. (2017). Water pollution and human health. *Environmental Risk Assessment and Remediation, 1(3)*, 16-19.

Iqbal, N., Ashraf, M., Imran, M., Salam, H. A., Hasan, F. U., & Khan, A. D. (2020). *Investigations and Mapping in the Lower Indus Plain*. PCRWR: Islamabad, Pakistan.

Mahar, A. G. (2018). Evaluation of ground water impacts on soil fertility: A case study. *Pakistan Journal of Biodiversity and Environmental Sciences*. Vol. 13, No. 2, p. 324-328.

Majidano, A., Khan, S., Sodhokhoso, N., Memon, S., & Qureshi, S. (2017). Physicochemical study of drinking water of talukaMirwah and KotDiji from District Khairpur Mir's. Sindh *University Research Journal-SURJ (Science Series), 49(3),* 499-504.

MDF, (2010). The Participatory Irrigation Management (PIM) System for Water Governance to Ensure Water Availability at Tail End of Faiz Gunj Canal, District Khairpur. *Management and Development Foundation Projects.*

Mumtaz, A., Mirjat, M. S., Mangio, H. U. R., & Soomro, A. (2017). Assessment of Drinking Water Quality Status and its Impact on Health in Tandojam City. *Journal of Basic & Applied Sciences, 13,* 363-369.

Panhwar, M. H. (1969). *Ground Water in Hyderabad & Khairpur Divisions. (Report).* Directorate of Agriculture, Hyderabad Region. P.1-169.

Pirzada, T., Talpur, M. M. A., Aftab, A., Kaleem, M., & Shahab, B. (2016). Hydro chemical Analysis and Evaluation of Groundwater Quality and Agriculture Soil of Khairpur Taluka, Sindh, Pakistan. *Pakistan Journal of Analytical & Environmental Chemistry, 17(1), 10.*

Sarfraz, M., Sultana, N., & Tariq, M. I. (2018). Assessment of groundwater quality and associated health risks in rural areas of Sindh (Pakistan). *Studia Chemia, 63(1),* 125-136.

Savci, S. (2012). An agricultural pollutant: chemical fertilizer. International *Journal of Environmental Science and Development, 3(1), 73.*

Soomro, A. (2017). Assessment of drinking water quality status and its impact on health in Tandojam City. *Journal of Basic & Applied Sciences*, 13, 363-369.

Tahir, M. A., Marri, M. K., & Hassan, F. (2010). *Technical Assessment Survey Report of Water Supply Schemes: Sindh Province. Islamabad:* Provision of Safe Drinking Water Project, Pakistan Council of Research in Water Resources, Ministry of Science and Technology.

Zeenat, M. A., Bhatti, Z. A., Mukwana, K. C., & Tunio, M. T. (2015). Ground Water Quality of Khairpur Mir's Sindh: A Case Study. Quaid-e-Awam University Research. *Journal of Engineering, Science & Technology*, *14*(2), 69-71.