

## A STUDY ON ATTITUDE TO WATER USE AMONG INHABITANTS OF NORTH 24 PARGANAS IN RELATION TO ENVIRONMENTAL CONCERN & CERTAIN DEMOGRAPHIC VARIABLES

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Date of Received

20 May, 2021



Date of Revised

11 June, 2021



Date of Acceptance

25 June, 2021



Date of Publication

30 June, 2021

DOI : <https://doi.org/10.51514/JSTR.3.2.2021.23-30>

To link to this article: <http://jstr.org.in/downloads/pub/v3/i2/4.pdf>



*"together we can and we will make a difference"*

# A STUDY ON ATTITUDE TO WATER USE AMONG INHABITANTS OF NORTH 24 PARGANAS IN RELATION TO ENVIRONMENTAL CONCERN & CERTAIN DEMOGRAPHIC VARIABLES

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## ABSTRACT

The study attempts to investigate public awareness about water related issues and the water use practices among the inhabitants of West Bengal. For a just appraisal of the topic, a questionnaire with Likert items was prepared to collect data and administered through both the offline and online mode; the demographic data were also collected following the same procedures. Data were collected from 107 inhabitants and analysed accordingly to ponder over required trend. The demographic variables, although collected, are not important in this case as the participants are mostly from the Ganges basin of West Bengal, specially in the district of North 24 parganas.

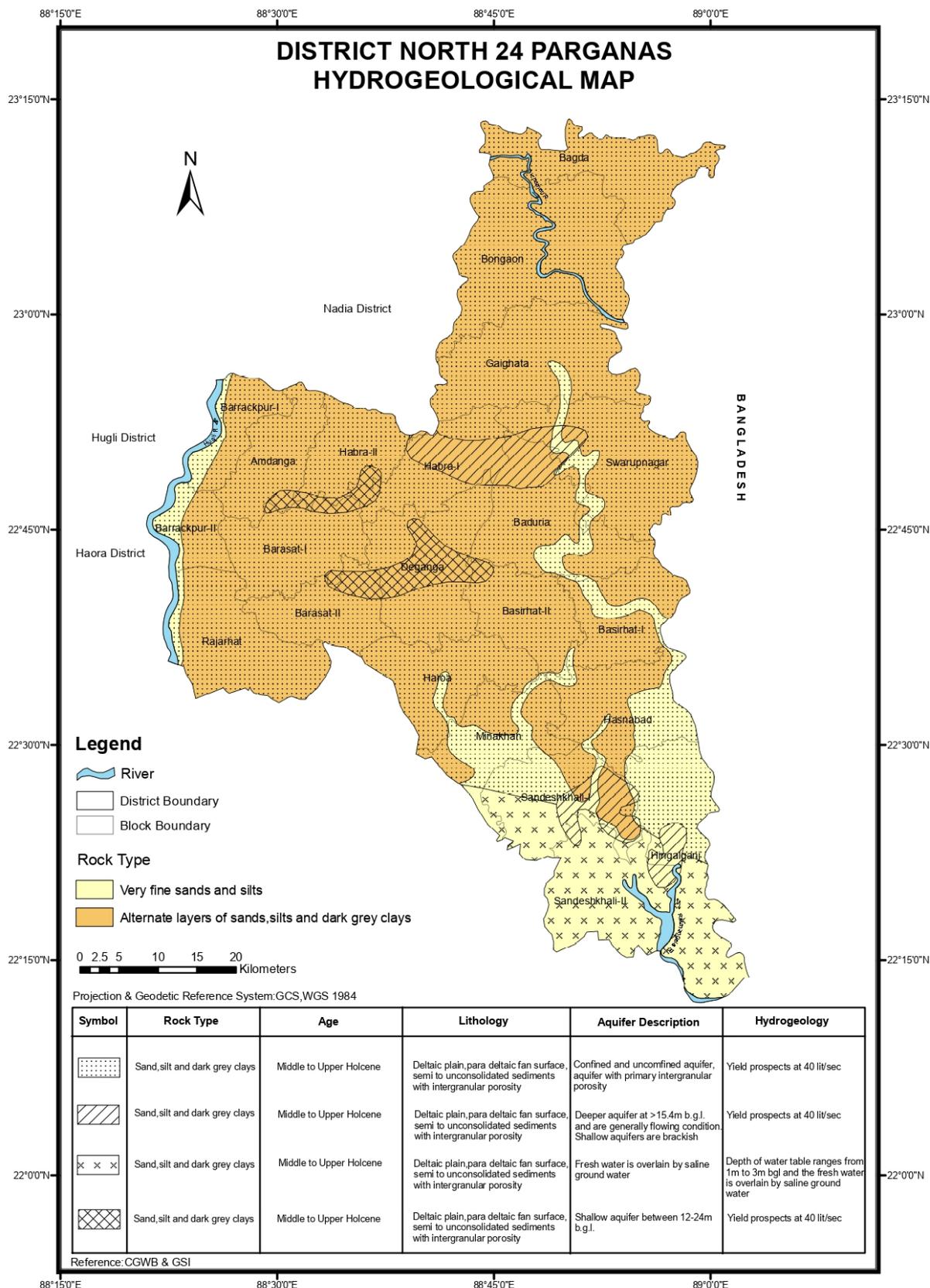
**Keywords:** Awareness. Water Related Issues, Water use practices, Water Pollution, West Bengal

## INTRODUCTION

So far as the journey of human civilization through the pages of World history is concerned, water and its relevant usages take a significant part and the arguments concerning the usage are not only plausible but also feasible and constitute a deep rooted foundation of man's history. Thus it has always been a prime concern for the researchers to focus on 'individuals' perceptions of water and how it impacts individuals' beliefs and actions toward water' (Noga & Wolbring, 2013). The present study aims to focus on the environmental concern of an individual that helps in shaping his/her attitude to the use of water in general. The work is part of a project that aims to study the water quality of different parts of West Bengal and people's attitude and concerns regarding water and its use. For the present purpose, the researchers have selected North 24 Parganas district which is West Bengal's most populous district (and India's second most populous one), with a population of 10,009,781 (2011 census) which is spread over an area of 4,094 km<sup>2</sup>. The population density of this district is 2,463/km<sup>2</sup>. According to Asian Development Bank's report (2020), the groundwater of this area is of mildly alkaline quality, with pH values ranging between 7.5 and 8.2. 'Total hardness, expressed in terms of mineral (calcium carbonate) content, ranges

from 140 to 670 mg/l. Iron content is generally above the national permissible limit of 0.3 mg/l in all the blocks, ranging from 1.23 to 18.10 mg/l; but, in a few places, it is lower: 0.09–0.56 mg/l. Groundwater in the area is typically of the bicarbonate type. The chloride content is low (18–234 mg/l) in the northern and central parts of the district. In the southern and south-eastern parts (Basirhat, Haroa, Hasnabad, Hingaljanj, Minakhan, and Sandeshkhali), the upper aquifers are brackish to saline, but freshwater aquifers underlie the saline aquifers. Shallow aquifers within a depth range of 20–80 meters below ground level (mbgl) show arsenic concentrations above the permissible limit (0.01 mg/l) in drinking water occurring in all the 22 blocks in the district. Deeper aquifers down to a depth of 350 mbgl are arsenic-free. On surface water quality, the Hooghly River is now the major water source for a number of water treatment plants in West Bengal. Typical water quality results indicate high coliform contamination, which is probably due to discharge from habitations on both sides of the river. Turbidity reaches 500 nephelometric turbidity units (NTU) during the monsoon. There have been no reports of chemical contamination, though this does not mean that none exists.'(ADB Report, 2020)

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In connection to this household water use and related practices requires special focus to grasp an understanding regarding the global problematic scenario that is associated with water conservation

and related measures on a global perspective. The problematic scenario is primarily related to the disruption of environment that has taken place as an obvious aspect of procuring water for different uses

and the waste that have generated in such processes to act as catalyst in polluting the Nature.

### Review of Related Literature:

Cruz & Manata (2020), in their study, opined that there should be five distinct aspects of environmental concern. They mainly focus on the attitudinal aspects and stated that ‘attitude are connected to one another in logical hierarchy’; and ‘the attitude system is connected to, but distinct from, systems of beliefs, intentions, and behaviour’ (Rokeach, 1968; Hunter et al., 1976, Cruz & Manata, 2020)

- limits to growth,
- anti-anthropocentrism,
- fragility of nature’s balance,
- rejection of exemptionalism, and
- possibility of an eco-crisis

Klineberg, McKeever and Rothenbach (1998) focussed on four measures of environmental concerns. These are—Economy/ govt. trade offs (mainly dealing with political ideology with respect to the protection of environment), assessment of pollution, pro-environmental behaviour and ecological worldview. The data were collected at Texas and there are eight demographic variables, i.e., gender, years of education, age, ethnicity, town-size, income, ideology and religiosity.

Fielding, et.al. (2012) found that demographic, psycho-social, behavioural and infrastructure related variables have a role to determine water use at household. The culture of water conservation at household is also an important factor in shaping good water-use habits.

The role of knowledge about environmental factors in determining effective water use is evident in different studies (e.g., Hines et al., 1987; Hungerford and Volk, 1990). Adams et al. (2013) found that attitude to water use at household positively affects the outdoor conservation of water that ultimately begets a better outlook. Receiving water resource information from established and respected sources is also an important factor of water conservation behaviours that obviously affects the use. Interest in water issues also influences the behaviour. Perceptions about how well different levels of government protect water quality also influence water conservation behaviour. Lower-level governments are the main agents to induce positive behaviours among people. General environmental attitudes also

somewhat positively influence indoor conservation.

Wang et al. (2018) focussed on people’s satisfaction with drinking water quality, safety issues and related solutions. They also highlighted the issue of education on determining the said measures. The respondents ‘who have some information about their water quality are more confident in their drinking and offer stronger support for the protection of water safety and prevention of water pollution.’

Fan et al. (2014) had found that people tend to underestimate their outdoor and kitchen water consumption and overestimate their indoor water consumption. There is a gender and age related concerns that may accurately estimate their water consumption, whereas consumers with high education levels and incomes underestimate their actual water consumption. ‘The groups who can accurately estimate water consumption have better water conservation consciousness’.

Eck et al. (2019) have focussed on perceptions and attitude of the respondents about water issues. Their work was a part of the National Water Needs Assessment Program (Mahler et al. 2013). A 53 items survey questionnaire was administered having four sections i.e., perceptions regarding the environment, drinking water issues, protecting and preserving water resources, collecting socio-demographic information and learning preference data. Age related differences in learning preference was found. The effect of education and outreach were also highlighted in this study.

### Research Questions:

For the present purpose the researchers have selected two research questions.

- **RQ#1:** What is the current awareness status of the people regarding water related issues?
- **RQ#2:** What is the current status of the water use practices of people in their daily life?

## MATERIALS & METHODS

### Population & Sample:

The population of the study was the people across the state involved in different professions.

In the present case, the researchers have selected 107 responses out of 114 responses from the state of West Bengal, specially from the district of North 24 parganas through snowball sampling technique. We had rejected only the incomplete responses.

Development of Tools

- For our present purpose, we tend to focus on two measures to design a questionnaire covering two different aspects— 1) Environmental concern regarding water related issues and 2) Water use practice. For Environmental concern regarding water related issues, the measures are interpreted with reference to the existing norms and practices of our locality. Fourteen items were selected for this aspect. Initially items were selected across 2 different aspects— 1. Awareness about water quality, 2. Concern About Water Pollution. The water use practice aspect is comprised of 7 items which are based on the practical approaches as shown by different studies [i.e., Wang et al. (2018), Fan et al (2014), Eck et al. (2019)]. It is also important to note that with these measures the researchers have tried to focus on the attitudinal aspects as the measurement of

attitude involves three components: an affective component, a behavioural component, and a cognitive component (belief and knowledge) (Rosenberg & Hovland, 1960 & Rana, et.al, 2020)

Data Collection

The questionnaire was administered through both online and offline survey and for online version we had used Google Form format. Data were collected from different respondents who live mainly on the Ganges basin across the state of West Bengal.

**FINDINGS & DISCUSSION**

Most people are attentive to the quality of their drinking water. A large number of them use water purifiers at their houses to keep the drinking water at the safe level. Data also show that majority of the respondents are of the opinion that pollutions at rivers and lakes would affect the well-being of the society itself.

<i>Awareness about Water Quality</i>		
Water related health hazard in family within last five years	Strongly Disagree	22.43%
	Disagree	41.12%
	Neutral	11.21%
	Agree	18.7%
	Strongly Agree	6.54%
Water related health hazard in locality within last five years	Strongly Disagree	9.35%
	Disagree	40.19%
	Neutral	20.56%
	Agree	24.30%
	Strongly Agree	5.60%
Drinking water is safe with respect to fluoride pollution	Strongly Disagree	5.60%
	Disagree	19.63%
	Neutral	40.19%
	Agree	25.23%
	Strongly Agree	9.35%
Drinking water is safe with respect to nitrate pollution	Strongly Disagree	3.74%
	Disagree	27.10%
	Neutral	28.97%
	Agree	33.65%
	Strongly Agree	6.54%
Drinking water is safe with respect to arsenic pollution.	Strongly Disagree	2.80%
	Disagree	21.50%
	Neutral	34.58%
	Agree	28.04%
	Strongly Agree	13.08%
Drinking water is safe to existing pollution problems in rivers and lakes.	Strongly Disagree	4.67%
	Disagree	23.37%
	Neutral	28.04%
	Agree	33.64%
	Strongly Agree	10.28%
Do you pay attention to drinking water quality?	Strongly Disagree	1.87%
	Disagree	6.54%
	Neutral	11.21%
	Agree	49.53%
	Strongly Agree	30.84%

<i>Concern About Water Pollution</i>		
Clean rivers and lakes are good for society	Strongly Disagree	2.80%
	Disagree	7.48%
	Neutral	14.95%
	Agree	24.30%
	Strongly Agree	50.47%
Municipalities should introduce harsh measures for better conservation of water	Strongly Disagree	3.74%
	Disagree	9.35%
	Neutral	14.95%
	Agree	19.63%
	Strongly Agree	52.33%
Constant monitoring needed on behalf of local government to detect water pollution	Strongly Disagree	1.87%
	Disagree	3.74%
	Neutral	16.82%
	Agree	25.23%
	Strongly Agree	52.34%
Clean ground water is important for our wellbeing	Strongly Disagree	1.87%
	Disagree	10.28%
	Neutral	9.35%
	Agree	27.10%
	Strongly Agree	51.40%
Use of groundwater for agriculture is good	Strongly Disagree	9.35%
	Disagree	19.63%
	Neutral	18.69%
	Agree	38.32%
	Strongly Agree	14.01%
It is necessary to involve citizens in collecting water quality information	Strongly Disagree	3.74%
	Disagree	7.48%
	Neutral	17.76%
	Agree	44.86%
	Strongly Agree	26.16%
<b><i>Industry is doing its best to control water pollution</i></b>	Strongly Disagree	17.76%
	Disagree	45.79%
	Neutral	20.56%
	Agree	12.15%
	Strongly Agree	3.74%
<i>Water Use Practices at home</i>		
Use clean water for washing hands	Strongly Disagree	1.86%
	Disagree	9.35%
	Neutral	14.02%
	Agree	48.60%
	Strongly Agree	26.17%
Use clean water for taking bath.	Strongly Disagree	2.80%
	Disagree	6.54%
	Neutral	14.02%
	Agree	51.40%
	Strongly Agree	25.24%
Storing drinking water at house properly	Strongly Disagree	1.87%
	Disagree	5.60%
	Neutral	12.15%
	Agree	45.80%
	Strongly Agree	34.58%
use clean water for cleaning utensils	Strongly Disagree	0.94%
	Disagree	6.54%
	Neutral	14.95%
	Agree	56.07%
	Strongly Agree	21.50%
use clean water for washing clothes at your house	Strongly Disagree	0.93%

	Disagree	6.54%
	Neutral	17.76%
	Agree	54.20%
	Strongly Agree	20.56%
use the same drinking water for other purposes like washing and cleaning or taking bath	Strongly Disagree	20.56%
	Disagree	22.43%
	Neutral	15.89%
	Agree	34.58%
water purifier at home (for drinking water)	Strongly Agree	6.54%
	Strongly Disagree	10.28%
	Disagree	17.76%
	Neutral	5.61%
	Agree	33.64%
	Strongly Agree	32.71%

**Table:** Percentages of responses obtained from Respondents

Fluoride related and Nitrate related health problems are not so common among the respondents of the study. Arsenic related health problems may be found in different places (presence of fluoride exceeding the permissible limit may cause problems of fluorosis and in case of nitrate (permissible limit of 45.0 mg/l), methemoglobinemia takes place. But majority of the respondents reported that their drinking water is safe from such polluting agents. In fact, majority of the respondents use municipal water supply as drinkable water source and as per the draft prepared by the Public Health Engineering Department, Government of West Bengal (2018), the presence of fluoride in Ganges river water was within the permissible limit of 1.0 mg/l (data taken since February 2016 to January 2017). The same was also found in case of the presence of arsenic. Although North 24 parganas is known as one of the mostly arsenic affected district, but the use of municipal water supply (which use the Ganges water as the main source) by the majority of respondents had kept the problem aside. Obviously it opens up a chance for more rigorous study regarding presence of fluoride, nitrate and arsenic elements in both ground water and the Ganges water.

The trend also indicated that some people were not fully aware of other polluting agents except arsenic. This would be happened, with all probability, due to news coverages on arsenic related health problems and government's regular campaigning. One important information also came out from the respondents' testimony. Although most people said that they didn't experienced any water related health

issues in their family or local area within last five years, but obtained data showed that a considerable number of respondents experienced such hazards in yesteryears.

Data showed that Local authorities should introduce harsh measures for better conservation of water and they should involve the local citizens in collecting water quality related information. In connection to this, most of the respondents are in favour of introducing harsh measures on part of the local authorities, to assure better conservation of water. Constant monitoring to detect water pollution in locality on part of local government, is also a demand of most of the informants covered under this study.

Clean groundwater is obviously important for the society itself, although, majority of the respondents support the use of groundwater for agricultural purposes. According to CGIAR (Consultative Group on International Agricultural Research), 'Use of groundwater can boost agricultural production, improve rural incomes and strengthen farmers' ability to withstand climate shocks and water variability. Access to groundwater allows farmers to intensify and diversify their cropping systems, improve household food security and incomes, and shield against droughts. Over the past half century, groundwater has boosted agricultural production and underpinned agrarian transformation in large parts of Asia, North Africa and the Middle East.' But at the same time, sustainable use of groundwater is also a necessary demand of time as unrestricted and unplanned use of groundwater may lead to 'pollution and overexploitation; of the ecosystem. There is a

possibility of such responses. As most of the respondents are from Ganges river basin, thus they don't have to feel the draught related consequences. So far as the responsibilities of industrial sectors are concerned, most of the respondents (63.55%) were in favour of letting them decide their part in controlling water pollution.

In the year 2010, a milestone was achieved as the UN General Assembly recognized the importance of human right to safe and clean drinking water and sanitation. And the rights are associated with the prioritisation of clean water for safe drinking and sanitation facility that primarily focus on maintaining hygiene at domestic levels. This is often associated with other broader perspective regarding different socio-economic human rights including the rights of women. (Hall, Koppen & Houweling, 2013)

So far as the Water Use practices are concerned, use of clean water is supported by most of the respondents for different purposes of daily life. Such activities ranges from drinking safe water to maintain hygiene through washing hands or taking bath, from washing clothes or utensils to toilet flushes. In most of the cases the respondents were in favour of using the same drinkable water for other household practices. It is found that most persons use the same drinkable water for different purposes of daily life like taking bath or washing utensils etc. It is also reported that most of the respondents tend to properly store drinking water at their house.

In order to implement sustainable water governance, it is important to have a specific water policy based on the water use awareness of the people. West Bengal has already implemented Ground Water Resources (Management, Control & Regulation) Act, 2005 from 1<sup>st</sup> August 2006. 'The State Water Investigation Directorate (SWID) has been declared as the functional organ of the State Level Ground Water Resources Development authority. The functions of the SWID involve investigation and assessment of the ground water resources of the state and provide data and findings to the State Level Ground Water Resources Development authority for framing appropriate policy and guide lines, so that the same may be followed for effective control and regulation of the ground water resources'.

In fact, the study tries to focus on the nature of water use and related environmental concerns as validated by the practices on daily basis by the people of North 24 Parganas where one may find highly industrialized northern part along with, a moderately industrialized northeast, and a highly agricultural section where nearly sixty-six percent(66%) of the total area of the district is marked as cultivable land (ADB Report, 2020). Although there is a chance to have a varied responses from the people, but in practice a common understanding is found.

From the above discussion it is clear that most people (as covered under this study) is aware of the proper use of water and related environmental concerns. But it should not be an exaggeration to point out that the respondents, as they hailed from the Ganges river basin, show almost similar attitude to water related practices. Regular campaigning by the state government also has a good effect on people's mind that is commensurate to Vision 2020 of 'providing safe, reliable, and sustainable drinking water to selected districts in West Bengal' (PHED, 2011 and ABD Report, 2020).

The study has also revealed some important aspects of water resource management the same has also been pointed out by Hori (2014), 'when the locations of problems with water are clearly shown, local government should the use civic water awareness for groundwater conservation and mitigate serious issues which arise in a practical manner. The exchange of information between citizens and local government would encourage an effective governance and management of water.'

## CONCLUSIONS

In order to achieve a better future, we have to ponder over the ongoing practices to find out the loopholes and to amend them obviously leads to a sustainable growth. Being a part of a project, the present study has explored only a part of the actual practices presented in our society. In order to get a clearer picture, there are enough provisions to address the concerning issues like, the assessment different psycho-social variables that are related to water use practices.

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