



DYNAMICS OF DRINKING WATER QUALITIES AND FACILITIES IN RURAL BUNDELKHAND REGION OF UTTAR PRADESH: WITH SPECIAL REFERENCE TO MAHOBA DISTRICT

BY:

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Abstract

Water is the basis of life on Earth. Without water, nobody can imagine how to survive flora as well as fauna without water. Water covers 71 percent of the area of the Earth's surface and the oceans hold about 97 percent of Earth's water. 3 percent of the water is found in lakes, rivers, ponds, underground aquifers, glaciers, etc. About 97.5 percent of water is salty, which is not suitable for daily use, and about 2.5 percent of water is fresh in some lakes, ponds, rivers, glaciers, etc., in which only 0.32 percent of freshwater is found in liquid form on the Earth's surface. In India, the main sources of drinking water are rivers, tube wells, hand pumps, bore wells, wells, and rainwater. For many reasons, like factories, agriculture fertilizers, wastage pits, mining, irregular water management etc., the quality of drinking water is affected. That's why people have to suffer from many diseases like cholera, diarrhoea, dysentery, hepatitis A, typhoid, polio etc. The rural area of the Mahoba district in the Bundelkhand region is located in a drought-prone region of the country. The main reasons for the water crisis in the rural areas are the low groundwater level, low annual rainfall in the entire region, hard rocks, high water evaporation, excess use of groundwater, etc., and the quality of drinking water is affected by enormous mining, stone mills, raw latrine pits, and people's awareness, etc.

It is very important to take quick action to save water resource quality and increase the rate of management of water facilities in the rural area. Nowadays, the scenario has changed to reflect the population requirements and health of the local people of that region. We should make young people, women, students, and local people aware of the need to save water by applying various methods and techniques to improve the facilities and quality of drinking water in the rural area. An attempt has also been made in this research paper to understand the changing scenario of drinking water quality and facilities in the rural areas to solve the problem of water deficiency.

Keyword: Drought-prone, Massive, Resources, Deficiency

Introduction

Water is the most vital natural resource on earth. Usable fresh drinking water is very low, about 0.32 percent, which may be in a few decades, in a dangerous stage, including India. A lot of graphic diversity is found in India, where some regions are facing the problem of water deficiency. In rural areas, a large portion of the population was affected by drinking water scarcity and poor drinking water quality. The main causes of water deficiency in the study region are low annual rainfall and hard surfaces. The groundwater flows through runoff and excess use of groundwater. The study region suffers from drinking water deficiency and groundwater depletion. So local people in a rural area, mostly women and young people, travel to drink water from their residence and carry heavy containers on their heads in their daily routine. Due to economic instability, each family does not make an effort to hold the expenditure of bore wells, R.O. and packed drinking water in their daily life. So forcefully, rural people have to accept drinking impure and salty water. Because of this, they suffer from many health diseases.

Water is the most important aspect of our lives and it is critical that everyone drink clean, pure water for their own health and the health of future generations. Water is an essential resource for every person, so it should be manageable to store, stop misuse, and control excess exploitation of underground water. Many techniques and methods help to pull out of this situation, like organising a water awareness programme for the conservation of water and management in a rural area, telling people about traditional techniques for filtering water with alum (fitkari) stone and transporting water from an abundant water resource region to a dedicated water resource region. According to the United Nations, in the next four to five years, two-thirds of the world's population will suffer from the shortage of fresh drinking water. So it is essential to investigate the changing scenario of quality and facilities in the rural areas of the study region. So it is important in the study region to find the spatial-temporal dynamics of the quality of water and the current status of their drinking water sources.

Aims and Objectives

To investigate the spatiotemporal dynamics of water quality.

To investigate the distance from the drinking water source to the house.

To give suggestions for improvement in water quality and water conservation techniques.

Research Methodology and Database

This study is based on both primary and secondary data. Primary data was acquired by conducting a household survey at the village level. Respondents delivered a well-structured questionnaire to understand spatial and temporal dynamics and problems faced in the rural area. Secondary data will be gathered from a variety of sources, including the District census handbook and town and village directories.

Selection of sample villages and households by simple random sampling to cover the entire area of the study region. The district is divided on the basis of block divisions by government.

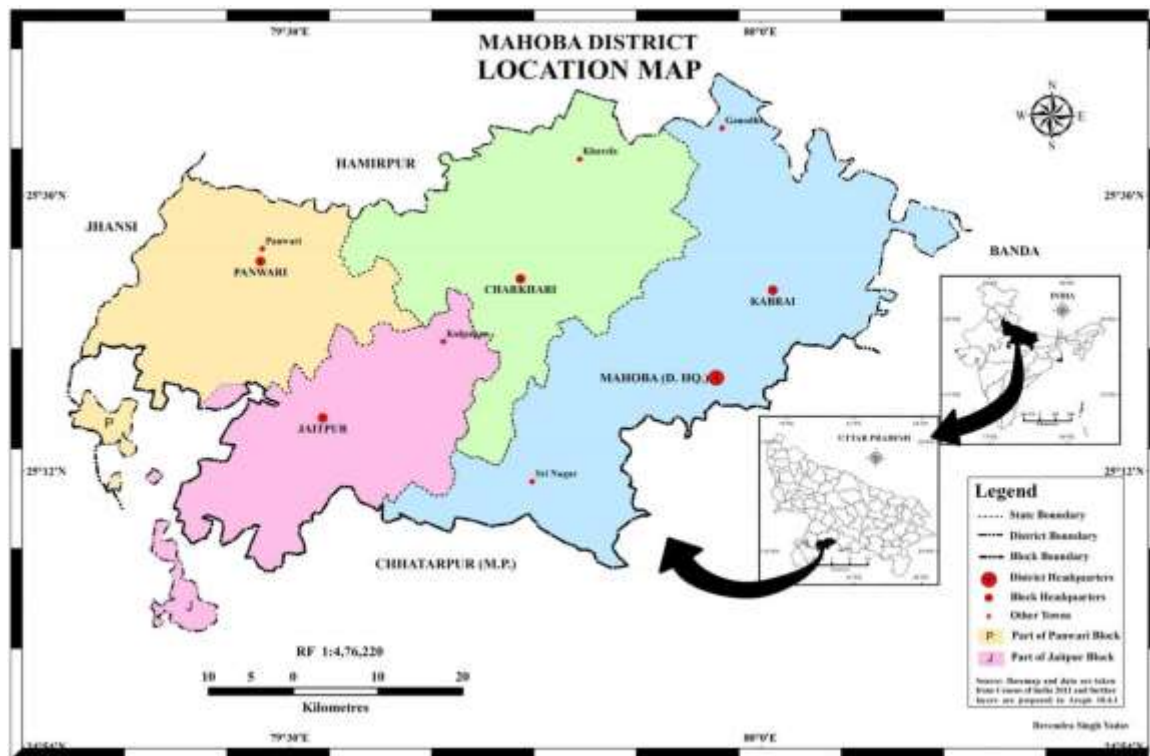
For analysis of the data tabulation method, different types of statistics will be used, like average, percentage, etc. And cartographic tools like maps, tables, diagrams, etc. will be used to represent the data.

Study Region

The study region (Mahoba district) extends from 25°01'30" to 25°39'40" north latitude and from 79°15'00" to 80°10'30" east longitude. It consists of an area of 3144 sq. km. and, as per the 2011 census, it houses 8,758,858 people. The area under study is situated in the southwestern part of Uttar Pradesh state. It has Hamirpur district in the north, Madhya Pradesh in the south, Banda and Jhansi districts in the east and west, respectively. The district is administratively divided into 3 tahsils, namely Mahoba, Charkhari, and Kulpahar. For implementation and monitoring of various developmental schemes, the district is divided into 4 development blocks, namely Kabrai (Mahoba), Charkhari, Jaitpur, and Panwari. The rural area covers 3116.1 sq. km. and the urban area records 27.9 sq. km. There are 247 Gram Panchayats and

521 revenue villages, covering 435 inhabited villages and 86 uninhabited villages in the entire study region.

The rainwater doesn't percolate to the deep lower part of the soil and is usually stored underwater since the rocks are of large and compact nature. The Aznar Range hill, which is located in Jaitpur block, has the distinction of possessing the 500-foot highest point in the study area. The area under forest cover is 162 sq. km. and the principal rivers of the area are Dhasan, Urmil, Birma, Chandrawal, and Arjun.



Dynamics of Major Rural Drinking Water Quality Sources

For the past twenty years, the scenario of the changing pattern of sources and quality of drinking water has been moving toward a better situation. According to the personal survey in the study region, we can see that people before twenty years ago are unaware of the impact of impure and salty water on their health but now the scenario is being changed. Moreover, the rural population of the study region has been much more aware in the last two decades about the quality of drinking water. Here we can see the individual studies of rural areas in four blocks of the Mahoba district.

Dynamics of quality of drinking water in Rural area of Charkhari block (In percentage)				
Quality	Pure and clean	Impure	Salty	Total
15 years - 20 years ago	52	31	17	100
10 years - 15 years	71	18	11	100
5 years - 10 years	77	14	9	100
At present - 5 years	83	11	6	100
Source : Personal survey, 2019				

At the drinking water facilities in the rural areas of Charkhari block, initially 20 years ago, the quality was at its very worst stage. At that time, only 52 percent of the population drank pure and clean water, 31 percent drank impure and 17 percent drank salty water. Then, after 5 years, people's awareness increased and 71 percent of the population used pure and clean water to drink, and then, with time, the proportion of people who used good quality drinking water increased to 83 percent in the current status, 11 years of impure and 6 percent salty water.

Dynamics in quality of drinking water in Rural area of Jaitpur block(In percentage)				
Quality	Pure and clean	Impure	Salty	Total
15 years - 20 years ago	74	12	14	100
10 years - 15 years	82	6	12	100
5 years - 10 years	86	6	8	100
At present - 5 years	87	5	8	100

Source : Personal survey, 2019

In the rural area of Jaitpur block 20 years ago, approximately 74 percent of the population drank pure and clean water, while 12 percent drank impure and 14 percent drank salty water. After a decade, the quality of drinking water in the population has increased to 82–86 percent. After this, the improvement in water quality and awareness has stopped.

Dynamics in quality of drinking water in Rural area of Kabrai block(In percentage)				
Quality	Pure and clean	Impure	Salty	Total
15 years - 20 years ago	65	26	9	100
10 years - 15 years	77	13	10	100
5 years - 10 years	81	8	11	100
At present - 5 years	81	9	11	100

Source: Personal survey, 2019

In the case of rural areas in Kabrai block, 20 years ago, about 65 percent of the population used pure and clean water for drinking, 26 percent was impure, and 9 percent used salty water. Then, after five years, 77 percent of people used pure and clean water, 13 percent used impure water, and 10 percent used salty water for drinking. And in the last decade, there has not been much improvement in the quality of drinking water. The percentage of impure water used has increased from 8 percent to 9 percent.

Dynamics in quality of drinking water in Rural area of Panwariblock (In percentage)				
Quality	Pure and clean	Impure	Salty	Total
15 years - 20 years ago	69	23	8	100
10 years - 15 years	82	10	8	100
5 years - 10 years	87	5	8	100
At present - 5 years	87	5	8	100

Source : Personal survey, 2019

In the case of the rural area of Panwari district, about 20 years ago, 69 percent of the population used pure and clean water for drinking purposes, 23 percent used impure water, and 8 percent used salty water. After five years, 82 percent of households drink pure and clean water, 10 percent drink impure water and 8 percent drink salty water. Approximately five years

ago, 87 percent of households drank pure and clean water, 5 percent drank impure water, and 8 percent drank salty water. The last five years, there has been no change in water quality.

Dynamics in quality of drinking water in Rural area of study region(In percentage)				
Quality	Pure and clean	Impure	Salty	Total
15 years - 20 years ago	65	23	12	100
10 years - 15 years	78	12	10	100
5 years - 10 years	83	8	9	100
At present - 5 years	85	7	8	100

Source : Personal survey, 2019

Twenty years ago, the entire region's households drank 65 percent pure and clean water, 23 percent impure water and 12 percent salty water. Here we can see that, with time, the awareness of people has increased. Now 85 percent of households drink pure and clean water, whereas 7 percent drink impure and 8 percent salty water. Initially, the improvement rate in the quality of water grew rapidly and now it is slow, but it still increases.

Distance travelled by households in rural areas from drinking water source to house

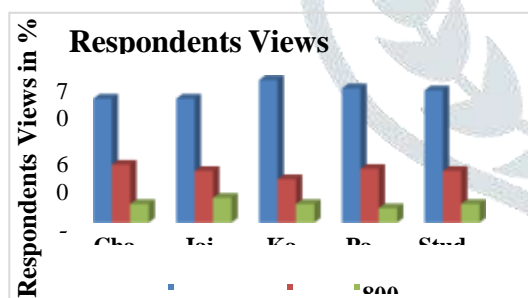
In India, as a developing country, drinking water supply facilities are not available in houses in rural areas. That's why in most villages, people (mainly women and young people) travel a long distance to bring the nearest suitable drinking water. Because of this, more than half an hour is wasted bringing water from sources.

Distance travel for drinking water in Rural area of four blocks in study region from water source to house (In metres)					
Blocks & distance	Less than 400	400-800	800-1000	More than 1000	Total
Charkhari	60	28	9	3	100
Jaitpur	60	25	12	2	100
Kabrai	69	21	9	1	100
Panwari	65	26	7	2	100
Study region	64	25	9	2	100
Source: Personal survey, 2019					

In the rural areas of the study, there is a lack of drinking water supply facilities from the government or private sector. So they should travel to bring drinking water from pure water sources near them. And this problem is mostly suffered by women and children. Some rare and rich people have facilities for drinking water at their houses and can afford the expenditure of bore wells and R.O. filters.

In the study region's rural area, 64 percent of households travel from their homes within 400 metres or less. People travel less than 400 metres in Kabrai rural areas, 60 percent in Charkhari and Jaitpur blocks and 69 percent in Kabrai block households bring water from less than 400 metres walking distance. In addition, approximately 25 percent of households travel 400–800 metres to bring drinking water from the source to the house, with 28 percent of rural households in Charkhari block, 25 percent of rural households in Jaipur block, 21 percent of rural households in Kabrai block and 26 percent of rural households in Panwari block doing so.

In the rural areas of the study region, about 9 percent of households travel about 800- 1000 metres to bring drinking water from source to house, in which 7 percent of households in Panwari block, 9 percent of Kabrai block, 12 percent of Jaitpur block and 9 percent of Charkhari block households travel 800-1000 metres from source to house.



And, on average, 2 percent of rural households travel more than 1000 metres to bring drinking water from sources to their homes, with a maximum of 3 percent in Charkhari block, a minimum of 1 percent in Kabrai block, and 2 percent in Jaitpur and Panwari blocks, where rural households bring drinking water from sources to their homes from more than 1000 metres on one side. The facilities for drinking water are wretched in the rural areas of Mahoba district in the Bundelkhand region. This is because of the availability and accessibility of drinking water sources and also because of the backwardness and weak economic structures of households.

Suggestions

For improvement in the quality and facilities of drinking water in rural areas, we can use the following methods and techniques:

- To enhance the quality of drinking water in the rural areas, a cooperative water filtration plant is very useful, in which case a common water boosting station at two or three villages is used.
- Traditional techniques like rainwater harvesting are very useful for our country. By using this technique in rural areas of direct storage of rainwater on their rooftops and underground tanks, people can use this water for a long time because rainwater is pure and does not unwell quickly. Rainwater storage in underground tanks is also helpful for groundwater recharge.
- The identification of watersheds at the micro level is extremely beneficial to the long-term storage of large amounts of water. Bundelkhand is a plateau and hard rock area. That's why the rainwater percolation process is very low, so mostly rainfall water flows through runoff. Watersheds and ponds are very useful for storage on a micro level and the flooring of gravel and pebbles at watersheds acts as a filter for the water.
- In rural areas, the latrine pits are open from the bottom. That's why the underground drinking water becomes of poor quality and that wastage is mixed with underground water aquifers. So we should make local people aware of further construction of cemented and closed latrine pits also from the bottom surface.
- To make rural people use a homemade step-by-step filtration system in which an upper layer of pebbles and sand, a fine sand layer after the charcoal layer for solid and chemical filtration of water, and cotton for fine solid particles through which pure water percolates in the container of clean water.
- To provide the facility of drinking water at home, the government should take quick action to setup pipe lines of supply to each house in rural areas and the timing of daily water supply should be fixed. After this, women and younger people, who are mainly involved in the water bringing process from sources to the house, have so much relaxation. Then, children and younger people will be focused on their career during this time.
- Many of those have a preference for the elderly. Children have migrated from rural to urban areas for education and employment. Because they are dependent on their neighbours and relatives and are not able to bring drinking water from a source to their house. So firstly and immediately, free of cost or low cost, provide them with tap supply facilities at their houses.

Conclusion

Water is an important natural resource for every biotic and abiotic component to survive. Water deficiency and low food quality are very big problems in rural India. The Bundelkhand region is a type of hard rock surface area where water percolates and digging wells is not an easy process. Our study region, Mahoba district, suffers from water scarcity, mainly in rural areas. Mostly women and young people bring water from a source to their house. That's why most of their day is consumed with this work.

In the rural areas of the Mahoba district, the scenario of water quality used for drinking water has changed since twenty years. According to a personal survey in the rural areas of the study region, about 23 percent of people drink impure water, another 12 percent drink salty water, and only 65 percent of households use pure and clean water for drinking. At the time, the Charkhari block in the rural area was in the worst condition, with only 52 percent of households drinking pure and clean water. Current situation, awareness is growing among rural people about the quality of drinking water. About 85 percent of the rural area population drinks pure and clean water but 7 percent of households use impure and 8 percent of households use salty water for drinking purposes. To improve the quality of drinking water in rural areas, many methods and techniques are suggested by this study, like cooperative water filtration plants, water harvesting, home-made step-by-step water filtration techniques, cemented latrine pits, etc.

In the rural areas of India, it is common practise to bring drinking water from sources like hand-pump, wells, tube wells, ponds, etc. Also, in the rural areas of Mahoba district of the Bundelkhand region, almost the entire population has suffered from this water crisis problem. According to a personal field survey, 64 percent of households bring drinking water from sources within 400 metres of their home, 25 percent of households from 400 metres to 800 meters, 9 percent of households from 800 metres to 1000 meters and about 2 percent of households from more than 1000 metres one-sided walking distance. Government should take quick action on this problem by netting the pipe lines of water tape supply of drinking water with a special preference for the elderly who are not capable of bringing drinking water from water sources. Precisely, by following the suggestions and adoptions of various techniques and methods, which are helpful in solving the problems of poor quality and facilities of drinking water.

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