SANGHAMITRA BUSINESS INCUBATOR ’2022’

Assessment of Water Quality in Wardha: Comprehensive Analysis of Water Samples

Contents

Abstract

This report presents a comprehensive analysis of water samples collected from various locations in the Wardha region. The study aimed to assess the water quality parameters including pH, color, odor, turbidity (NTU), hardness of water, residual chlorine, chloride (Cl), fluoride (Fl), iron (Fe), nitrate (N), arsenic, and coliform bacteria. The samples were collected systematically and geographically mapped using Google Maps for precise location tracking. Laboratory analysis was conducted to measure these parameters, and the results were compared against relevant water quality standards. The area-wise data was compiled in a table format, providing a spatial overview of water quality variations across the region. The findings of this study contribute to a better understanding of the overall water quality status in different areas of Wardha and identify potential sources of contamination. Recommendations for remedial actions and future monitoring strategies are discussed, aiming to ensure the provision of safe and clean water to the community.

1 Introduction

Water quality assessment is crucial for ensuring the safety and sustainability of water resources. In the Wardha region, understanding the quality of water sources is essential for the well-being of the community and the preservation of the environment. This report presents a comprehensive analysis of water samples collected from various locations in Wardha, aiming to evaluate water quality parameters and identify potential sources of contamination.

The assessment includes a wide range of water quality parameters, such as pH, color, odor, turbidity (NTU), hardness of water, residual chlorine, chloride (Cl), fluoride (Fl), iron (Fe), nitrate (N), arsenic, and coliform bacteria. These parameters provide important insights into the physical, chemical, and microbiological characteristics of the water sources. By systematically collecting water samples and geographically mapping the sampling locations using Google Maps, a representative assessment of water quality across the region is ensured.

Laboratory analysis was conducted on the collected water samples to measure the various parameters. The results were compared against established water quality standards and guidelines set by regulatory bodies and organizations. Deviations from the recommended limits were carefully examined to identify areas of concern and potential sources of contamination.

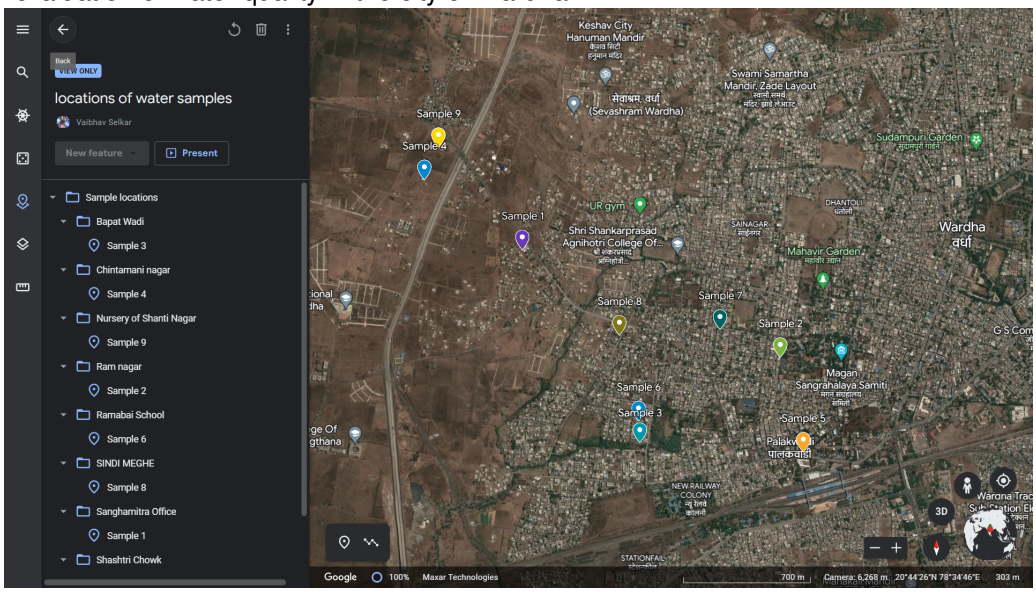
The analysis of water quality data provides a comprehensive understanding of the current state of water quality in different areas of Wardha. It serves as a foundation for implementing appropriate measures to ensure the provision of safe and clean water to the community. Remedial actions based on the identified issues can contribute to the preservation and restoration of the water resources in the region.

In the following sections, we will present the methodology employed for sample collection and laboratory analysis, as well as the results obtained for each water quality parameter. The discussion will focus on interpreting the findings and identifying potential contamination sources. Finally, recommendations will be provided for remedial actions and future monitoring strategies to maintain and improve water quality in Wardha.

2 Methodology

2.1 Sample Collection:

Water samples were collected from groundwater wells, borewells, and municipal water taps in the city of Wardha. Ten representative locations were selected across the city, covering both urban and rural areas. To ensure accurate location tracking, Google Maps was utilized to map the sampling sites. Samples were collected from actively used wells and taps, employing clean and sterilized containers to maintain sample integrity. The coordinates of each sampling location were recorded for precise mapping and spatial analysis. In addition, photographs were taken at each sampling site to provide visual documentation. This methodology allowed for a comprehensive assessment of water quality in different parts of Wardha, leveraging both geographic mapping and visual evidence. By integrating Google Maps and photographic documentation, the study ensured accurate sample collection and enhanced data interpretation for a thorough evaluation of water quality in the city of Wardha.



2.2 Testing

The water samples collected were subjected to comprehensive laboratory analysis using various testing parameters to assess their quality. The following parameters were measured: pH, color, odor, TDS, turbidity (NTU), hardness of water, residual chlorine, chloride (Cl), fluoride (Fl), iron (Fe), nitrate (N), arsenic, and coliform bacteria.

pH levels were determined using pH paper strips, and the color change observed on the paper was compared against a pH color chart to determine the acidity or alkalinity of the samples. Visual assessment was conducted to evaluate the color of the water samples, comparing them against standard color references to determine color quality. Odor evaluation was performed through sensory perception, characterizing the odor as odorless, musty, earthy, or foul.

Turbidity, indicating water clarity, was measured using appropriate turbidity testing kits. The samples were treated with reagents, and turbidity levels were determined by comparing the results against standard turbidity values in nephelometric turbidity units (NTU). The hardness of water was assessed using specific testing kits or methods, enabling the measurement of calcium and magnesium ions present in the samples.

Residual chlorine concentration was determined through colorimetric methods using suitable

testing kits. Chloride, fluoride, iron, nitrate, arsenic, and coliform bacteria were analyzed using appropriate testing kits or laboratory techniques.

The laboratory analysis provided quantitative data for each parameter, allowing for a comprehensive assessment of water quality in Wardha. The results were compared against relevant water quality standards and guidelines to identify any deviations or potential contamination sources. The specific testing methods, reagents, and instruments used followed established protocols to ensure accuracy and reliability of the results.

2.3 Data Collection

The data collection process was conducted meticulously to ensure a comprehensive representation of water quality in various locations across Wardha. The sampling locations were strategically chosen to cover different sources, including groundwater wells, municipal taps, and borewells.

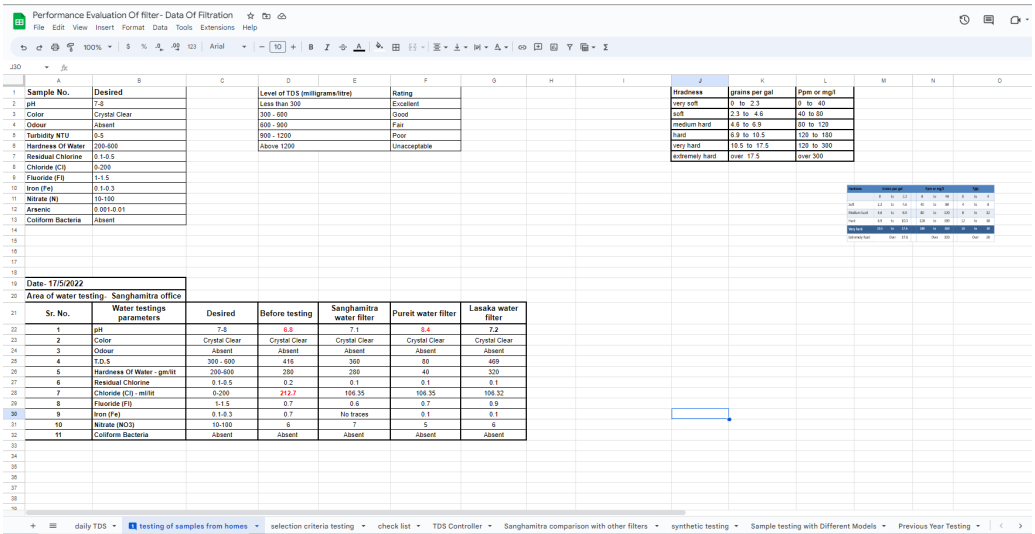
To map the locations accurately, Google Maps was utilized. The geographical coordinates (latitude and longitude) of each sampling site were recorded using a GPS-enabled device to ensure precision in data collection.

The samples were collected following standard protocols, ensuring the use of sterile sampling bottles to prevent contamination. Proper labeling and documentation of each sample were carried out for further analysis. Data Sheet and Analysis:

2.4 Data Sheet And Analysis

After data collection, the water samples were transported to the laboratory for analysis. The water quality parameters, including TDS, Iron, and Chloride, were measured using appropriate testing kits and instruments.

The results obtained from the laboratory analysis were meticulously recorded and organized in an Excel data sheet. Each location's water quality data was tabulated with its corresponding values for TDS, Iron, and Chloride.



3 Findings

It can be observed from collected data, that several locations exhibit higher TDS and Iron levels, represented by darker or intense colors, indicating potential concerns regarding water quality. These locations include Sindhi Meghe, Shanti Nagar, Ramabai School, Ram Nagar, Chintamani Nagar, Shastri Chowk, and Shitlamata Mandir.

On the other hand, some locations show relatively lower TDS and Iron levels, depicted by lighter or less intense colors, suggesting better water quality. These locations include Bahujan Nagar, Master Colony, Bapat Wadi, and areas with relatively lower TDS and Iron content.

Sanghamitra

Groundwater contamination in areas of Wardha city

AREA	TDS (100 - 300 ppm)	IRON (0.1 - 0.3 ppm)	CHLORIDE (0 - 200 ppm)
Sindhi Meghe	411	0.1	142
Shanti Nagar	516	0.9	194
Bahujan Nagar	431	0.3	89
Thul Layout	450	0.1	142
Bhim Nagar	516	0.8	89
Sai Nagar	518	2.0	106
Borgoan Meghe	377	1.0	106
Anand Nagar	514	0.8	177
Samta Nagar	640	0.01	160
Master Colony	594	0.6	177
Ramabai School	431	0.1	106
Ram Nagar	450	0.9	163
Bapat Wadi	300	0.5	78
Chintamani Nagar	300	0.4	71
Shashtri Chowk	280	1.0	80
Shaitlamata Mandir	320	0.0	71
Sindi Mandir	280	0.05	71

4 Conclusion

The water quality analysis conducted on the collected samples from various locations in Wardha reveals important insights regarding TDS (Total Dissolved Solids), Iron, and Chloride levels. Here is the conclusion based on the findings:

TDS Levels: The TDS levels varied across the tested locations. Some areas, including Sindhi Meghe, Shanti Nagar, Ramabai School, Ram Nagar, Chintamani Nagar, Shastri Chowk, and Shitlamata Mandir, exhibited higher TDS levels above the desired range of 100-300 ppm. This suggests a higher concentration of dissolved solids in the water, potentially indicating the presence of minerals, salts, or other dissolved substances.

Iron Levels: The analysis indicated varying iron concentrations in the water samples. Elevated iron levels were observed in Shanti Nagar, Ram Nagar, Chintamani Nagar, and Shitlamata Mandir. These areas showed iron levels outside the desired range of 0.1-0.3 ppm. Higher iron content in water may lead to aesthetic issues such as discoloration and metallic taste, as well as potential health concerns.

Chloride Levels: The chloride levels in all tested locations were within the desired range of 0-200 ppm, suggesting that the water samples met the acceptable standard for chloride content. Chloride is an essential mineral, but excessive levels can impact taste and pose health risks.

Overall, the analysis highlights the need for further investigation and mitigation measures in areas where TDS and iron levels exceed the desired ranges. Additional water quality parameters, such as pH, turbidity, and microbial contamination, should be considered for a comprehensive assessment of water quality in Wardha. Regular monitoring, appropriate treatment methods, and public awareness initiatives can help improve water quality and ensure the provision of safe drinking water to the residents of Wardha.