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GROUND WATER RESOURCE MANAGEMENT: CHALLENGES AND OPPORTUNITIES IN NANDURABAR DISTRICT

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Abstract

The Nandurabar, located in the northwestern part of Maharashtra, India, is characterized by its semi-arid climate and reliance on water resources for agriculture, drinking water, and industrial purposes. The region's water resources primarily include rivers, reservoirs, groundwater, and seasonal rainfall. Key rivers such as the Tapi, Girna, and Panjhara are the lifelines of the region, supporting irrigation and domestic water needs. However, the availability and management of water resources in Khandesh face significant challenges due to climatic variability, over-exploitation, and inadequate infrastructure.

Introduction

Groundwater is the water found underground in the cracks and spaces in soil, sand, and rock. It is stored in and moves slowly through geologic formations of soil, sand, and rocks called aquifers. Groundwater is a critical component of the Earth's water cycle and is a major source of water for agricultural, industrial, and domestic uses. It is replenished by precipitation and can flow into streams, rivers, and lakes, or be discharged as springs. Groundwater is often accessed by drilling wells, which can provide a reliable water supply for various needs.

Groundwater is the water located beneath the Earth's surface in the pores and fractures of soil, sand, and rock. It is stored in and moves slowly through layers of permeable subsurface materials called aquifers. Groundwater is a vital part of the water cycle and serves as a major source of freshwater for drinking, agriculture, and industry.

Nandurabar is a region in Maharashtra, India, known for its agricultural activities and dependence on water resources for irrigation and drinking purposes. Effective water resources management in Nandurabar is crucial to ensure sustainable development, especially given the challenges of water scarcity, erratic rainfall, and over-exploitation of groundwater.

Objective:

1. Ensure sustainable water availability for drinking, agriculture, and industrial use.
2. Ensure access to clean and safe drinking water.
3. Enhancing Agricultural Water Use Efficiency.
4. Mitigate the impact of extreme weather events.
5. Ensure equitable and efficient water resource management.

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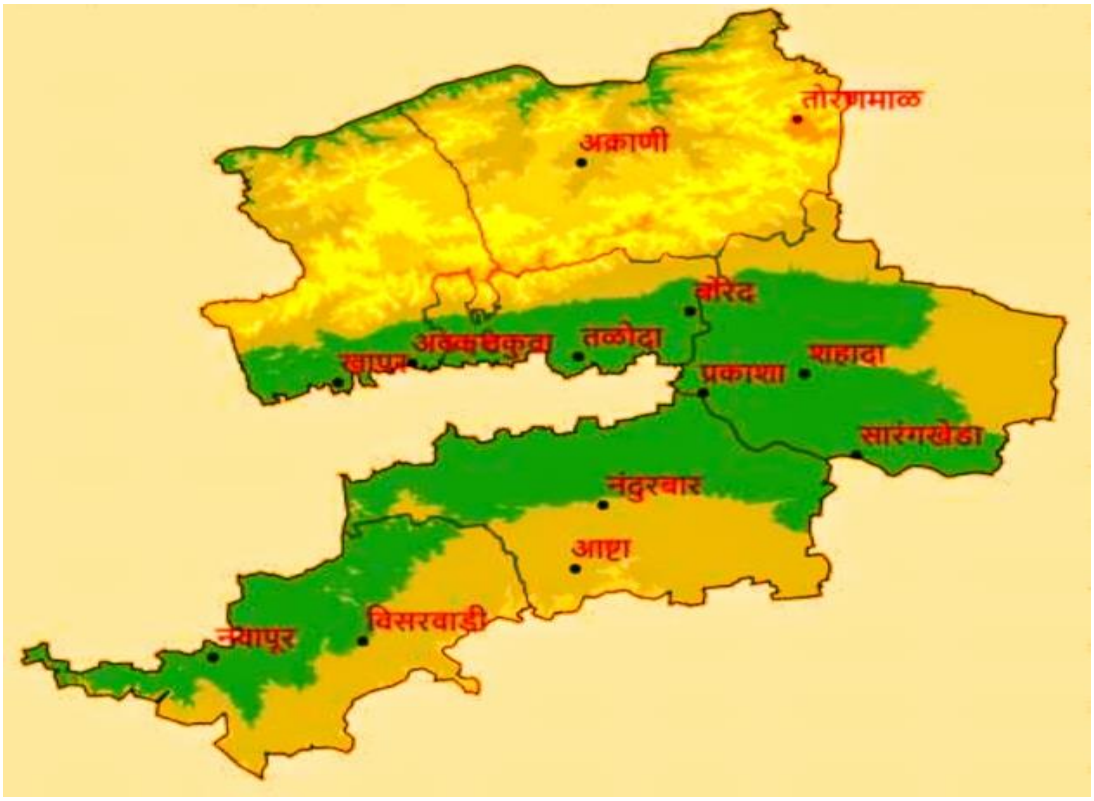
Study Area:-



Nandurbar district is a tribal-majority district in the state of Maharashtra. The latitude and longitude measurements of this district are as follows:

Latitude: 21.00° North to 22.00° North

Longitude: 73.00° East to 74.50° East

Nandurbar district is situated at the foothills of the Satpura range and Tapi River flows through the district. The district is located near the Maharashtra-Gujarat border. Its geography and climate greatly influence the lifestyle of the tribal community here.

Nandurbar district is a tribal-majority district in Maharashtra, India, where malnutrition is a serious problem. While studying malnutrition in this district the following key areas need to be considered. Tribal Communities A large proportion of the tribal population (Bhil, Korku, Varhadi etc.) in Nandurbar district is highly susceptible to malnutrition. Poverty, lack of education and limited access to health services in tribal communities have increased the prevalence of malnutrition, perpetuating the cycle of poverty and ill health.

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Methodology:-

The present study on research paper is mainly based on secondary data. It is collect from Government website as well as published book of groundwater resources, and daily newspaper. The methodology for water resources management in the Nandurbar district (or any region) typically involves a systematic approach to ensure sustainable utilization, conservation, and equitable distribution of water resources. Below is a general framework that could be applied to Nandurbar district, Maharashtra, India.

Assessment of Water Resources Data Collection Gather data on surface water (rivers, lakes, reservoirs) and groundwater (aquifers, wells) availability. Hydrological Studies Analyze rainfall patterns, river flows, and groundwater recharge rates. Quality Assessment**: Test water quality for contamination (e.g., salinity, fluoride, nitrates) to ensure safe usage. Demand Analysis Sectoral Water Requirements Assess water needs for agriculture, domestic use, industry, and ecosystems.

Population and Growth Projections Estimate future water demand based on population growth and economic development. Seasonal Variations Account for seasonal fluctuations in water demand, especially for agriculture.

Subject Analysist

The most promising aquifers in Nandurbar district, Maharashtra, are found in the fractured zones of the Deccan basalt, specifically in areas where weathered/fractured rock layers cover the compact basalt. However, because of the district's geological makeup, groundwater availability can vary greatly, with some areas experiencing difficulties because of limited recharge and possible overexploitation, particularly during the hottest summer months.

Challenges:

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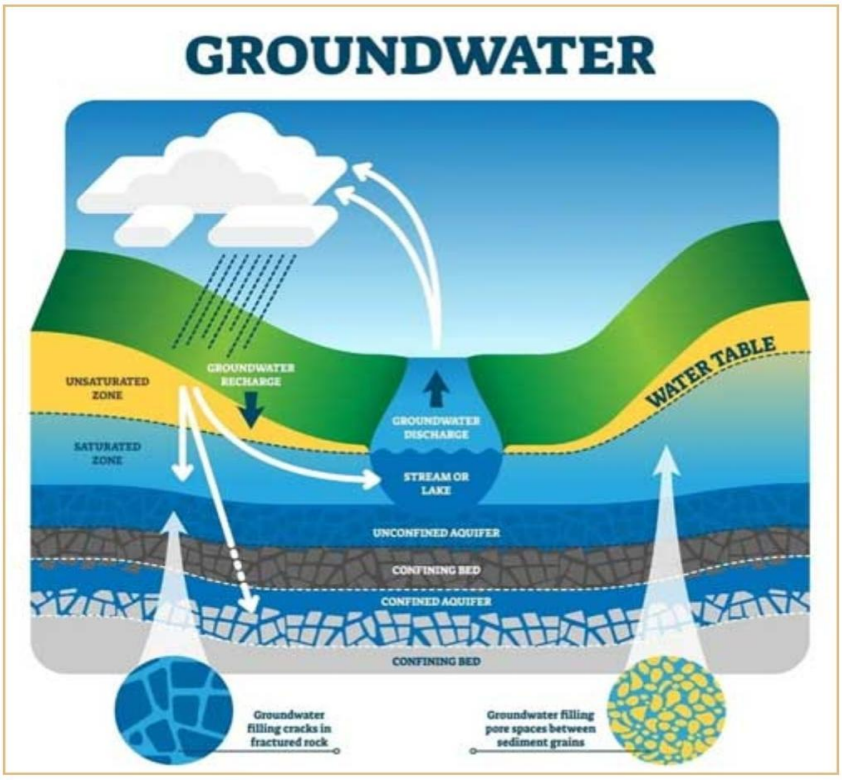

Over-exploitation: Some areas within Nandurbar might be facing groundwater depletion due to high extraction rates, particularly during dry seasons.
Poor recharge: The semi-arid climate Can limit natural groundwater recharge.
Rock formations: The hard basalt rock Can make accessing groundwater challenging in certain locations.

In Nandurbar district, the primary groundwater resource is found within the "Bagh Beds" formations along the Narmada river, consisting of siliceous limestones and sandstones, with additional sources in the "Lanetas" (Infra-trappean beds) containing calcareous sandstones, cherty limestones, and calys, which are generally accessed through tube wells, borewells, and dug-cum-borewells tapping confined and semi-confined aquifers; the major rivers draining the district are the Tapi and Narmada, with heir tributaries contributing to groundwater recharge.

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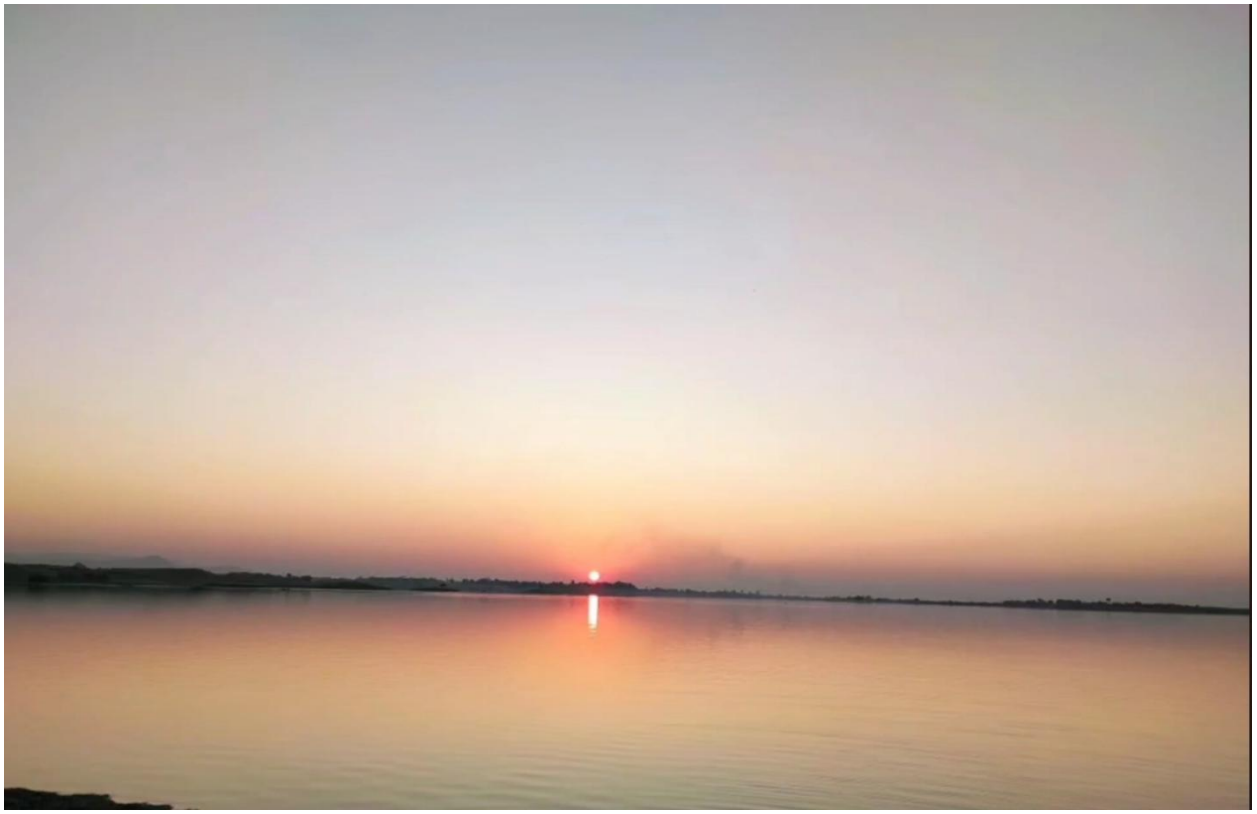

Key points about groundwater in Nandurbar:

1.Aquifer formations: Bagh Beds (silicious Limestones and sandstones), Lanetas (calcareous sandstones, cherty limestones)

2. Access methods: Tube wells, borewells, dug-cum-borewells

3.Groundwater conditions: Confined and Semi-confined

4. Major rivers impacting groundwater: Tapi and Narmada

Important factors to consider:

Geological formations: The specific geological formations within different areas of Nandurbar district will influence the depth and quality of groundwater.

Monitoring wells: The Groundwater Survey and Development Agency (GSDA) maintains a network of monitoring wells to track groundwater levels and quality.

Geology: The main aquifer system consists of weathered and fractured basalt rocks, with potential groundwater zones associated with differential weathering, fissures, and joints.

Aquifer Depth: Groundwater is generally found at shallow depths in the weathered zones, but deeper wells may be required in certain areas to access confined aquifers.

Variations in availability: Groundwater availability varies significantly depending on location, with areas near river basins and valleys having better access to shallow groundwater compared to elevated plateau tops.

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Hydrogeological studies: Detailed hydrogeological surveys are crucial to identify potential groundwater zones and assess their sustainability.

Water quality monitoring: Regularly monitoring groundwater quality is essential to ensure its suitability for drinking and irrigation purposes.

Benefits of Ground Water Recharge System

Conserving water is another benefit of the Ground Water Recharge System. Rainwater can be collected and used for a variety of non-potable uses, including cleaning, toilet flushing, car washing, and irrigation. This helps with water conservation initiatives by lowering the demand for freshwater.

Sustainable Water Management: There are several advantages to putting in place a ground water recharge system services provider in Nandurbar. First off, by lessening dependency on municipal water supplies and groundwater, it encourages sustainable water management. This lessens the demand on current water sources and helps preserve valuable water supplies.

Cost Savings: Another advantage of Ground Water Recharge System is the potential for cost savings. Household and businesses can significantly reduce their water bills by utilizing rainwater for non-drinking purposes. Moreover, in the long run, the initial investment in a rainwater harvesting system can be recouped through these savings.

Cost reductions: The possibility for cost reductions is another benefit of the ground water recharge system. Using rainwater for non-drinking uses can drastically save water expenses for households and businesses. Furthermore, these savings can eventually cover the upfront cost of a rainwater collection system.

We provide a ground water recharge system in Nandurbar, which is a sustainable and effective method of managing water resources. It is simple to modify these systems to satisfy the unique needs of various structures and applications. Modular rainwater harvesting systems are capable of effectively collecting, storing, and using rainfall; they also help to preserve the environment, save money, and conserve water. Come discover more about what we have to offer.

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Ground water level in Nandurbar district is as follows:

• In February 2018, the groundwater level of Nandurbar district was one and a half meter deep.

• Semi-contiguous and contiguous groundwater bodies in Maharashtra include Nandurbar district. The groundwater level in these groundwater sources is below 20 meters.

Ground water level in Nandurbar district is decreasing due to following reasons:

A growing population

Advanced agricultural practices

Industrialization

Man-made activities

The following measures can be taken to increase the ground water level in Nandurabar district

Adopting various methods of water conservation at the village level

Identifying water sources

Cleaning the pond

Adequate supply of drinking water

Avoiding diversion of animals into water sources

Adding alum to stagnant water sources

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Measure :-

Managing groundwater resources effectively is critical for ensuring sustainable water availability. Here are key measures and strategies for groundwater resources management:

1. Monitoring and Assessment Groundwater Level Monitoring**: Regularly measure water levels in wells to track changes over time.
2. Regulation and Policiesv Permitting Systems Control groundwater extraction through permits and quotas.
3. Sustainable Extraction Safe Yield Limit extraction to rates that do not exceed natural recharge.
4. Technological Solutions Remote Sensing Use satellite data to monitor groundwater changes.

Conclusion

Effective groundwater management requires a holistic approach that integrates scientific, legal, economic, and social dimensions. By adopting sustainable practices and leveraging technological advancements, we can ensure the long-term availability and quality of groundwater resources for all users.

Groundwater resources are indispensable for human survival and economic development. However, their sustainable management is crucial to ensure their availability for future generations. Balancing extraction with recharge and protecting groundwater from pollution are key priorities for global water security.

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