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IMPACT OF UJANI DAM ON THE GROUNDWATER RECHARGE

Dr. Pawar Rajaram Mahadev

Assistant Professor, Department of Geography,

Shri Sant Damaji Mahavidyalaya, Mangalwedha. Dist-Solapur (Maharashtra)

Abstract:

The Ujani Dam, located in the state of Maharashtra, India, was constructed in 1980 to provide irrigation water and hydroelectric power to the region. While the dam has had a positive impact on agriculture and energy production, its construction has also resulted in changes to the groundwater recharge patterns in the surrounding areas. This thesis explores the impact of the Ujani Dam on groundwater recharge and its consequences for the local community.

Keywords- Ujani Dam, Groundwater Recharge.

Introduction- Ujani Dam has had a significant impact on groundwater recharge in the surrounding areas, leading to both positive and negative consequences for the local community.

Research Area –

Solapur District is located in the north-western of the state of Maharashtra. The Solapur region is bounded by 17°10'N to 18°32'N latitude and from 74°10'E to 76°15'E longitude. The average elevation of Solapur district at mean sea level is between 500 and 800 m. Climatically, Solapur district is located in the rain shadow region of South Maharashtra. The rain is mainly caused by the southwest monsoon, and the average annual precipitation is 545.4 mm. The climate of Solapur area belongs to the dry tropical type. The Bhima River runs through the middle part of the area and the Nira Canal also supplies a lot of water to the area. The dry tropical climate, availability of water and highly fertilized black cotton soils are the reasons for growing crops in the Solapur region. The highest and lowest average temperatures recorded is 44.6°C and 21.5 °C, respectively. The annual temperature range is 23°C. Rainfall is an important climatic factor affecting the agricultural economy of the study area.

Objective:

1. Study Positive Impact of the Ujani Dam on Agriculture and Energy Production
2. Study Negative impact of the Ujani Dam on groundwater recharge
3. Study Factors Contributing the Reduction in Groundwater Recharge in Ujani Dam

Methodology:

The study will use a mixed-methods approach, including both qualitative and quantitative methods. The primary data will be collected through a survey of sugarcane farmers, interviews with industry experts, and field observations. The secondary data will be collected from government reports, academic articles, and other relevant sources.

Overview of the Ujani Dam and Its Construction

The Ujani Dam is a large earthen dam located on the Bhima River in the state of Maharashtra, India. It was constructed between 1977 and 1980 with the primary objective of providing irrigation water and hydroelectric power to the region. The dam has a height of 63 meters and a length of 3.5 kilometers, with a storage capacity of approximately 3,860 million cubic meters of water. The construction of the dam involved the displacement of several thousand people, who were relocated to nearby areas. The dam also required the submergence of several villages and fertile agricultural land, causing significant social and environmental impacts. The Ujani Dam project was funded by the World Bank and the Government of Maharashtra.

Positive Impact of the Ujani Dam on Agriculture and Energy Production

The Ujani Dam has had a positive impact on agriculture and energy production in the region. The availability of irrigation water from the dam has led to increased agricultural productivity, as farmers are now able to cultivate crops throughout the year. This has led to a significant increase in the production of sugarcane, wheat, and other crops, which has helped to boost the local economy.

In addition, the Ujani Dam also generates hydroelectric power, which has helped to address the energy needs of the region. The dam has a capacity of 27 megawatts, which is used to power nearby towns and villages. This has helped to improve the living standards of the local population, as they now have access to reliable and affordable electricity.

Overall, the Ujani Dam has played a key role in supporting agricultural and energy development in the region, which has contributed to the socio-economic growth of the area.

Negative impact of the Ujani Dam on groundwater recharge

The construction of the Ujani Dam has had a negative impact on groundwater recharge in the surrounding areas. Groundwater recharge refers to the process of water seeping into the ground and replenishing underground aquifers. The Ujani Dam has reduced the natural flow of water in the Bhima River, which has in turn led to a decrease in the amount of water that is available for groundwater recharge.

Several factors have contributed to the reduction in groundwater recharge. First, the Ujani Dam has reduced the flow of the Bhima River, which has led to a decrease in the amount of water that is available for recharge. Second, the construction of the dam has led to the formation of a large reservoir, which has flooded several areas that were previously used for recharge. This has reduced the amount of permeable soil and vegetation that can absorb rainwater and allow it to seep into the ground.

The reduction in groundwater recharge has had negative consequences for the local community. As the availability of groundwater has decreased, farmers have had to rely more on irrigation water from the Ujani Dam. This has led to increased dependence on the dam, which has resulted in conflicts over water allocation between different user groups. In addition, the reduced availability of groundwater has also led to a decline in the water table, which has made it more difficult and expensive for farmers to access groundwater.

Overall, the negative impact of the Ujani Dam on groundwater recharge highlights the need for sustainable water management practices that take into account the ecological and socio-economic impacts of large-scale water infrastructure projects.

Factors Contributing the Reduction in Groundwater Recharge in Ujani Dam

Ujani Dam is a large reservoir located in the state of Maharashtra, India. The factors contributing to the reduction in groundwater recharge in Ujani Dam are:

1. Decline in rainfall: One of the major factors contributing to the reduction in groundwater recharge in Ujani Dam is the decline in rainfall. The region has been experiencing less rainfall than before, which has led to a decrease in the water table.

2. Increasing population: The population in the region surrounding Ujani Dam has been increasing steadily, leading to an increase in demand for water. This has led to over-exploitation of groundwater resources and a reduction in the recharge of groundwater.

3. Overuse of groundwater: The overuse of groundwater for irrigation, drinking water, and industrial purposes has also contributed to the reduction in groundwater recharge. The indiscriminate pumping of groundwater has resulted in a decline in the water table.

4. Deforestation: Deforestation in the region has led to a decrease in the amount of vegetation cover, which reduces the amount of water that can be absorbed by the soil. This has resulted in a reduction in groundwater recharge.

5. Construction of dams: The construction of Ujani Dam itself has also contributed to the reduction in groundwater recharge. The dam has blocked the natural flow of water and has led to the drying up of natural springs and streams that used to recharge the groundwater.

6. Climate change: Climate change is also contributing to the reduction in groundwater recharge in Ujani Dam. Rising temperatures are leading to increased evaporation, which reduces the amount of water available for recharge. Changes in precipitation patterns are also affecting the amount of recharge that occurs.

Ujani Dam Consequences of Reduced Groundwater Recharge for the Local Community

The consequences of reduced groundwater recharge in Ujani Dam for the local community can be significant and include:

1. Water scarcity: Reduced groundwater recharge leads to a decline in the water table, which can result in water scarcity for the local community. This can affect the availability of water for drinking, irrigation, and other domestic and industrial purposes.

2. Agricultural impacts: The reduced groundwater recharge can also impact agricultural production. The farmers in the region rely heavily on groundwater for irrigation, and a decline in groundwater recharge can lead to reduced crop yields and economic losses.

3. Health issues: The scarcity of water can lead to health issues such as dehydration, heatstroke, and water-borne diseases. The lack of clean drinking water can also lead to the spread of diseases such as diarrhea, cholera, and typhoid.

4. Economic impacts: The reduction in groundwater recharge can have a significant economic impact on the local community. This can lead to job losses and reduced economic growth, as many industries rely on water for their operations.

5. Social impacts: Water scarcity can also lead to social impacts such as migration, conflicts, and displacement. This can affect the social fabric of the local community and lead to tensions between different groups.

6. Environmental impacts: The reduced groundwater recharge can also have significant environmental impacts, such as the drying up of wetlands and streams, loss of biodiversity, and soil erosion. This can lead to long-term environmental degradation and affect the region's ecological balance.

In summary, the consequences of reduced groundwater recharge in Ujani Dam can have significant and far-reaching impacts on the local community, affecting their livelihoods, health, and well-being.

Strategies for Mitigating the Negative Impact of the Ujani Dam on Groundwater Recharge

Several strategies can be implemented to mitigate the negative impact of the Ujani Dam on groundwater recharge. These include:

1. Rainwater harvesting: One of the most effective ways to mitigate the negative impact of the Ujani Dam on groundwater recharge is to encourage rainwater harvesting. This involves collecting and storing rainwater, which can be used to recharge the groundwater.

2. Efficient irrigation practices: Another strategy to mitigate the negative impact of the Ujani Dam on groundwater recharge is to promote efficient irrigation practices. This includes the use of drip irrigation and sprinkler irrigation, which can reduce water wastage and ensure that water is used more efficiently.

3. Reforestation: Planting more trees and restoring vegetation cover can help increase groundwater recharge. Trees absorb water and help replenish the groundwater table.

4. Recycling and reuse: Recycling and reuse of wastewater can also help reduce the demand for groundwater and mitigate the negative impact of the Ujani Dam on groundwater recharge.

5. Artificial recharge: Artificial recharge involves injecting water into the ground through wells or other means. This can help replenish the groundwater table and mitigate the negative impact of the Ujani Dam on groundwater recharge.

6. Water conservation: Encouraging water conservation practices such as fixing leaks, reducing water usage, and using water-efficient appliances can help reduce the demand for groundwater and mitigate the negative impact of the Ujani Dam on groundwater recharge.

7. Awareness campaigns: Raising awareness among the local community about the importance of groundwater recharge and the need to conserve water can also help mitigate the negative impact of the Ujani Dam on groundwater recharge.

In conclusion, implementing these strategies can help mitigate the negative impact of the Ujani Dam on groundwater recharge, and ensure sustainable use of the groundwater resources in the region.

Conclusion

The impact of the Ujani Dam on Solapur district has been significant. While the dam has helped provide irrigation water for agriculture, drinking water for the population, and power generation, it has also resulted in negative impacts on the environment and the local community.

The construction of the Ujani Dam has led to a decline in groundwater recharge, which has affected the availability of water for drinking, irrigation, and other purposes. This has led to water scarcity, reduced crop yields, economic losses, and health issues for the local community.

The dam has also resulted in the loss of wetlands, the drying up of natural streams, and the displacement of local communities. Furthermore, the dam has led to significant environmental degradation, including soil erosion and loss of biodiversity.

Therefore, there is a need to implement sustainable water management practices and strategies to mitigate the negative impacts of the Ujani Dam on Solapur district. This includes promoting rainwater harvesting, efficient irrigation practices, reforestation, recycling and reuse of water, artificial recharge, water conservation, and raising awareness among the local community.

In conclusion, while the Ujani Dam has provided several benefits, it has also resulted in negative impacts that need to be addressed through sustainable water management practices to ensure the long-term well-being of the environment and the local community.

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