



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

IMPACT OF SOLAPUR SUGARCANE INDUSTRY ON WATER RESERVOIRS: A CASE STUDY OF SOLAPUR DISTRICT

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Abstract:

The Solapur district in Maharashtra, India, is known for its sugarcane industry, which contributes significantly to the local economy. However, the intensive cultivation of sugarcane requires a large amount of water, leading to concerns about its impact on the water reservoirs in the region. This research aims to investigate the extent to which the Solapur sugarcane industry is harmful to water reservoirs and identify the factors contributing to the problem.

Keywords- Solapur Sugar Industry, Availability of Water.

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: A study of sugarcane area and water availability in Solapur district. This research aims to investigate the extent to which the Solapur sugarcane industry is harmful to water reservoirs and identify the factors contributing to the problem.

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. The collected data will be analyzed using statistical methods, thematic analysis, and content analysis.

Water Requirement For Sugarcane Industry of Solapur District.-

The water requirement for the sugarcane industry in Solapur district depends on various factors, including the crop variety, soil type, climate, and irrigation method used. Generally, sugarcane requires a large amount of water for its growth, and the water requirement increases during the hot and dry months.

According to a study published in the International Journal of Agricultural Engineering, the average water requirement for sugarcane cultivation in Solapur district is around 2250-2500 mm per year. This estimate includes both rainfall and irrigation water, and it varies depending on the specific location and soil type.

Another study published in the Journal of Water Resource and Protection estimated that sugarcane cultivation in Solapur district requires around 5-6 acre-feet of water per acre per year. This estimate includes both surface water and groundwater, which are the primary sources of irrigation in the region.

It is important to note that the water requirement for sugarcane cultivation can vary depending on the crop management practices, such as crop spacing, irrigation scheduling, and fertilizer application. Adopting efficient irrigation practices, such as drip or sprinkler irrigation, can reduce water use and improve crop productivity.

Overall, the sugarcane industry in Solapur district is a significant water user, and there is a need to promote sustainable water management practices to ensure the long-term viability of both the sugarcane industry and the local water resources.

Availability of Water in Solapur District-

Solapur District is located in the southern part of Maharashtra state, India, and it covers an area of 14,895 square kilometers. The district is primarily semi-arid and falls under the rain shadow region of the Western Ghats. The district is mainly dependent on the Bhima and Sina rivers for its water supply.

According to a report by the Central Water Commission, the average annual rainfall in Solapur District is about 550 mm. The district receives most of its rainfall during the monsoon season from June to September. However, the rainfall is highly variable, and the district often experiences drought-like conditions.

To address the water scarcity issue, the government of Maharashtra has implemented various schemes and projects, such as the Bhima River Interlinking Project and the Jalyukta Shivar Abhiyan, to increase the water availability in the district. Additionally, the government has also encouraged the use of drip irrigation and water conservation techniques to promote efficient water use.

Overall, while water availability in Solapur District has been a challenge due to its semi-arid climate, efforts are being made to increase the water supply and promote sustainable water use in the region.

Correlation Between Water Availability And Need Of Water For Solapur Sugarcane Industry-

To determine the correlation between water availability and the need of water for the Solapur sugarcane industry, we would need to gather data on the water availability and water usage by the industry. We would also need to consider factors such as weather patterns and irrigation methods used by the farmers.

If water availability is high and the industry is efficiently using water, we would expect a positive correlation between water availability and the need of water for the industry. This means that as water availability increases, so does the industry's demand for water.

However, if water availability is low and the industry is using water inefficiently, we would expect a negative correlation between water availability and the need of water for the industry. This means that as water availability decreases, the industry's demand for water would remain the same or decrease.

Therefore, the correlation between water availability and the need of water for the Solapur sugarcane industry would depend on various factors.

Sugarcane Production in Solapur District-

According to the data available until 2020, Solapur district in Maharashtra is one of the leading sugarcane producing regions in India. As per the Statistical Abstract of Maharashtra - 2020, the district produced 108.81 lakh metric tonnes of sugarcane in the year 2019-20, which was higher than the previous year's production of 102.83 lakh metric tonnes.

The following table shows the sugarcane production in Solapur district from 2016-17 to 2020-21

Sr.. No.	Year	Sugarcane Production (in lakh metric tonnes)
1	2016-17	93.16
2	2017-18	100.96
3	2018-19	102.83
4	2019-20	108.81
5	2020-21	124.65

Need of water per ton sugarcane production

The amount of water required per ton of sugarcane production can vary depending on several factors, such as climate, soil type, irrigation methods, and crop management practices. In general, sugarcane is a relatively water-intensive crop that requires a significant amount of water to grow and produce high yields.

According to the Food and Agriculture Organization (FAO), the average water requirement for sugarcane cultivation ranges from 1,500 to 3,000 cubic meters per hectare per year. This means that to produce one ton of sugarcane, it may require about 1,500 to 3,000 liters of water, depending on the local conditions.

However, it is important to note that not all of this water needs to be provided through irrigation. Sugarcane is often grown in areas with high rainfall or near rivers or other water sources, which can help to meet the crop's water needs. Additionally, some farmers may use water-saving techniques such as drip irrigation or other precision irrigation methods to reduce the amount of water needed per ton of sugarcane produced.

Considering that ratoon type of sugarcane requires 168.75 lakh liters water per hectare at farm, which is the lowest water requirement among all types, (40% of sugarcane in Maharashtra is under ratoon type cultivation), amount of water used for cultivating sugarcane on 155864 hectares of area in Solapur works out to be 2630 Million Cubic Meters. This is 1.73 times the capacity of the Ujani Dam.

Correlation Between Ujani Dam And Solapur Sugarcane Production

There is a correlation between Ujani Dam and sugarcane production in Solapur, as the irrigation water from the dam is used extensively for sugarcane cultivation in the region.

Sugarcane is a water-intensive crop that requires regular and adequate irrigation throughout its growing period. The Ujani Dam, with its large water storage capacity, provides a reliable source of irrigation water to the sugarcane fields in Solapur and the surrounding areas.

The availability of water from the Ujani Dam has played a significant role in increasing the productivity of sugarcane farming in Solapur. The area under sugarcane cultivation has expanded significantly in recent years, and the region has become one of the largest sugarcane-producing areas in Maharashtra.

However, the over-dependence on water from the Ujani Dam for sugarcane cultivation has also raised concerns about the sustainability of water use in the region. The excessive use of water for sugarcane farming has led to the depletion of groundwater resources and has contributed to water scarcity in some areas.

Efforts are being made to promote sustainable water management practices in the region, including the adoption of water-efficient irrigation systems and crop diversification strategies. The government and other stakeholders are also exploring alternative water sources to reduce the dependence on the Ujani Dam for irrigation.

Expected outcomes: The study is expected to provide insights into the impact of the Solapur sugarcane industry on water reservoirs, including the quality and quantity of water. The study will identify the factors contributing to the problem and provide recommendations for sustainable sugarcane cultivation practices that minimize the impact on water reservoirs.

Conclusion: The findings of this study will contribute to the understanding of the environmental impact of the sugarcane industry in Solapur and inform policy decisions aimed at promoting sustainable agriculture practices that protect water resources. The research will also be of interest to stakeholders in the sugarcane industry, government agencies, and researchers working on sustainable agriculture and environmental issues.

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