

WATER FOOTPRINT ASSESSMENT FOR SUSTAINABLE WATER USE: A CASE STUDY OF A LEADING TYRE MANUFACTURER

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1. Introduction

Water is a vital resource for sustaining life on Earth, yet freshwater scarcity has become one of the most critical global challenges. Industries also heavily rely on water in every aspect. The aim of the study is to conduct an in-depth analysis of all water consumption processes, and the wastewater treatment process of a plant, which is currently classified as having medium to high water stress. Ensuring efficient water use is essential for both enhancing sustainability and securing the long-term viability of the plant.

2. Research Methodology

The research employs a quantitative approach to analyse the plant's water consumption over the past three years through numerical and graphical data. The study utilizes a descriptive research design and a deductive approach to effectively investigate water usage patterns. Data collection methods include direct observations, informal interviews, and company reports. Various analytical tools, such as Minitab, Excel, and the Rainwater Harvesting Calculator Tool, along with guidelines from the Water Footprint Manual and ISO 14046, are used to conduct the analysis.

3. Findings and Discussion

The results, presented through regression models and R-squared values, reveal that 74.7% of variations in total water consumption can be explained by variations of man-days, and 74% of variations of process water can be explained by using production. The various potential monthly water savings can be achieved in each month by targeting the lowest mean consumption represented in October. Additionally, the greywater footprint is calculated as 74.5m³/Day.

4. Conclusion and Implications

The findings offer valuable insights into optimizing water usage by giving deep attention to the water behaviour of plants. If the company is able to install a proper rainwater harvesting system, it will be able to collect around 37000m³ /Year. The management can use water saving potentials as a target for each month.

Keywords: Greywater footprint, Rainwater harvesting, Sustainable water management, Tire manufacturing, Water footprint