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# Wastewater Treatment Facilities in the Bushbuckridge Local Municipality, South Africa

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## Abstract

Water contamination is a global problem that primarily affects rural communities that use these water sources for daily domestic activities. The review objective was to decide whether the emanating from the Bushbuckridge Region's Waste Water Treatment Works (WWTWs) adds to the contamination of the Sand Stream Catchment. Thulamahashe and Dwarsloop were the two WWTWs where the investigation was carried out. Participants responses to a questionnaire were gathered. For the purpose of determining physicochemical parameters and coliform counts, monthly water samples were taken from the treatment plant and Sand River. The study discovered that the Sand River Catchment was primarily polluted by WWTWs. Unprecedented mechanical and technical difficulties confront the WWTWs. Raw wastewater has been discharged into catchments as a result of numerous system failures at the WWTWs as a result of aging systems and pressure on deteriorating facilities. Besides, the review uncovered those elements like populace development, unfortunate activity and support of WWTWs, poor planning and an absence of thoroughly prepared staff added to WWTW disappointment. Both WWTW effluents met the National Water Act of South Africa's effluent discharge standards for pH (between 6.90 and 9.30), EC (between 20.80 and 87.50 ms/m), ammonia (between 7.22 and 86.80 mg/L as N), nitrate/nitrite (between 0.10 and 0.73 mg/L as N) and ortho-phosphate (between 0.01 and 6.50 mg/L as P). During some of the study's months, COD levels in both WWTWs exceeded the limit (ranging from 25.00 to 149.00 mg/L). The study also found that E. coli counts were low upstream but high downstream for both catchments and at the WWTW's point of discharge. As a result, the study established a link between the condition of WWTWs and water quality parameters, as well as a link between wastewater treatment plants and poor water quality. The study recommends taking efficient measures to deal with the issues.

**Keywords:** Waste water treatment works • Water pollution • Water samples

## Introduction

The wastewater must be managed throughout the entire water cycle because it is a component of the cycle. The term "wastewater" refers to water whose quality has been altered by anthropogenic substances. Chemicals and a wide range of microorganisms are two examples. By far most of wastewater, including agrarian overflows, isn't gathered or treated worldwide. As a result, they typically do not receive any treatment prior to being released into the environment. Underdeveloped nations treat approximately 28% of their wastewater, while developed nations treat the majority of their wastewater. However, the option for wastewater management is limited in African nations due to a lack of financial capital for the construction of wastewater facilities. Sub-Saharan Africa is one of the driest regions in the world, receiving very little precipitation on an annual basis. Accordingly, it is likewise delegated water-focused, as its water frameworks are regularly overburdened because of quickly developing populaces and fast urbanization. Settlement growth has resulted from poor urban development and population growth, which eventually increases water demand, wastewater discharge and heavy water resource pollution. 60% of the urban population in Sub-Saharan Africa is thought to live in shanty towns with inadequate and unreliable sanitation facilities. There were reports that there were no statistics on the generation and treatment of wastewater in 32 of the 48 countries in Sub-Saharan Africa.

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## Description

Since the Water Act (Act 54 of 1956) was enacted in 1956, it has been required in South Africa for wastewater to be treated to permissible standards before being discharged to the water resource from which it was initially obtained. In South Africa, treated wastewater effluent has been crucial in providing additional drinking water and meeting the demand for water. Around 14% of South Africa's total potential water resource is spent on wastewater treatment. WWTWs became increasingly stressed as the demand for water increased due to population and economic growth. Simultaneously, the productivity of the majority of these treatment plants in the evacuation of chemico-physical and pathogenic and marker species is generally low because of the weakening offices, notwithstanding deficient support and absence of qualified staff. In many municipalities, the wastewater treatment facilities are in poor condition, posing significant threats to the ecosystem and the people who live nearby. Authorities in charge of water and sanitation have been under pressure to find ways to preserve the quality of water resources as a result of this situation [1].

The municipal WWTW in the Sand River Catchment is managed, among other things, by the Bushbuckridge Municipality, a Water Services Authority. The Dwarsloop and Thulamahashe WWTW are owned by the municipality. These WWTWs are answerable for the treatment of wastewater to lessen the natural substance and supplement level and inactivate microorganisms from wastewater prior to delivering it into the getting climate. Specific requirements must be met before wastewater effluent can be released into the environment. Therefore, it is essential to monitor the quality of wastewater discharged into water sources in order to draw attention to the state of water sources and provide an incentive for the long-term intervention of the government, which is the focus of this investigation. In order to get rid of contaminants and pathogenic or disease-causing microorganisms, water treatment is essential.

Second, effluent that has been disposed of must be guaranteed to be suitable for reuse or to meet the required standards before it can be released into the environment without harm. In addition, witnesses stated that the advantages of delaying or eliminating the requirement for additional water supply sources should outweigh the costs of maintaining potable water [2].

When wastewater reclamation facility effluent is connected to a drinking water distribution network, direct potable reuse occurs. The water must abide by increasingly stringent regulations, both in terms of the number of variables monitored and the pollutant limits that can be exceeded, resulting in treatment costs that are quite high. Water quality boundaries of concern are waste coliforms, E. coli, disintegrated oxygen (DO), substance oxygen interest (COD), chloride, alkali, nitrate, phosphate, complete suspended solids (TSS) and electrical conductivity (EC) as per the standard strategy. The quality of a water resource is affected when any of the aforementioned elements are present, which in turn contributes to the catchments pollution. The quantity and quality of effluent that can be used to irrigate the land or discharged into the environment of the receiving water should be specified by a Wastewater Treatment Works (WWTW) [3].

To meet regulatory standards for water discharge and maintain low construction and operation costs, WWTWs must remove a significant quantity of pollutants, thereby increasing efficiency and minimizing environmental impact. In order to evaluate the technical dependability of the WWTW and the potential environmental harm caused by the treated effluent, additional criteria must be taken into consideration. Sewage effluents that have not been properly treated can contaminate water resources, resulting in elevated levels of nutrient and salt, decreased oxygen levels and an increase in the number of pathogens present in the water body. According to previous research, the deteriorating state of municipal WWTW infrastructure in South Africa is the primary factor that contributes to the country's pollution issues and poor community health issues. In the Sabie Sand Catchment, the microbiological water quality in every one of the four sub-catchments is of central issue. Counts of Escherichia coli (E. coli) were high during the investigation, according to the report.

Overflows from infrastructure manholes in the sewage system, illegal solid waste disposal, burst sewage reticulation pipelines and non-functional pump stations could have contributed to these high E. coli counts. Because these catchment areas are the primary sources of water for industrial, domestic and agricultural uses, all of these pose serious health risks to the people whose livelihoods depend on them along the sub-catchment. The contamination of water sources is a global issue that mostly affects rural communities, which use untreated water from these sources every day for their own use. As a result, the goal of this study was to find out how much pollution is caused by WWTWs in the Sand River Catchment and use this information to suggest ways to improve riverine water quality by finding pollution sources and their effects [4].

Open-ended questionnaires, assessment forms from Waste Water Treatment Works (WWTWs) and water quality monitoring for microbiological and chemical variables were used to collect data. During both dry and wet seasons, water samples were taken from October 2019 to September 2020. Using sterile, thoroughly cleaned 1 L plastic bottles, samples were collected monthly in accordance with the Department of Water and Sanitations sampling guides standard procedures. The unique site name, the sampling date and time and the location of each bottle were recorded with tags. Sample bottles containing sodium thiosulphate to neutralize chlorine were used for microbiological analysis. Following that, the samples were meticulously packed and transported in an ice-packed cooler box to avoid any potential physical, chemical, or biological changes. Within 24 hours of collection, the samples were transported to the Zamangwane Water Technology Laboratory for analysis [5].

## Conclusion

The following physical parameters were examined in the water samples that were collected: pH and the conductivity of electricity The HACH model HQ30D multi-parameter portable pH and conductivity/TDS meter was utilized for the in-place measurement of these parameters. According to the manufacturer's instructions, the instrument and probes were calibrated for pH with buffer 4 and 7 solutions and for EC with 141.3 mS/m. The water samples total suspended solids (TSS) were analyzed using a gravimetric technique. The DR600 (HACH) spectrophotometer was used to measure the concentrations of ortho-phosphate, which is phosphorous, nitrate/nitrite, ammonia and chemical oxygen demand (COD) in water samples.

In accordance with the requirements of Tshwane University of Technology (TUT), all ethical codes of conduct were adhered to. Before the study began, participants were informed of the study's purpose and scope.

## Acknowledgement

None.

## Conflict of interest

None.

## References

1. Manickum, T. and W. John. "Occurrence, fate and environmental risk assessment of endocrine disrupting compounds at the wastewater treatment works in Pietermaritzburg (South Africa)." *Sci Total Environ* 468 (2014): 584-597.
2. Sibanda, Timothy, Ramganesh Selvarajan and Memory Tekere. "Urban effluent discharges as causes of public and environmental health concerns in South Africa's aquatic milieu." *Environ Sci Pollut Res* 22 (2015): 18301-18317.
3. Pittmann, Timo and Heidrun Steinmetz. "Polyhydroxyalkanoate production on waste water treatment plants: Process scheme, operating conditions and potential analysis for German and European municipal waste water treatment plants." *Bioengineering* 4 (2017): 54.
4. Shak, Katrina Pui Yee and Ta Yeong Wu. "Optimized use of alum together with unmodified cassia obtusifolia seed gum as a coagulant aid in treatment of palm oil mill effluent under natural pH of wastewater." *Ind. Crops Prod* 76 (2015): 1169-1178.
5. Herbig, Friedo JW. "Talking dirty-effluent and sewage irreverence in South Africa: A conservation crime perspective." *Cogent Soc Sci* 5 (2019): 1701359.

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