WASTEWATER MANAGEMENT AND RECREATIONAL TOURISM IN DAR ES SALAAM: A REVIEW OF CURRENT CHALLENGES

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Abstract
As the primary gateway for tourists in Tanzania, Dar es Salaam faces critical wastewater management challenges that directly threaten the integrity of its tourism industry. The majority of the city's wastewater is discharged untreated into the Indian Ocean. For sustainable tourism, this translates into beach pollution, health risks for visitors, and a loss of aesthetic appeal. Sustainable tourism requires a safe and hygienic environment; however, odors and visible pollution in tourist areas are in direct conflict with the concept of 'ecotourism.' This study aims to identify key practices, successes, and failures, and to explore future prospects for wastewater management in relation to recreational tourism in Dar es Salaam, Tanzania. A systematic search and review of peer-reviewed and grey literature were conducted using electronic databases such as ScienceDirect, Jstor, Scopus, PubMed, and Web of Science. To ensure the stability of the tourism sector, we recommend the implementation of small-scale treatment plants directly within hotel complexes and tourist resorts, along with the construction of artificial wetlands to naturally filter wastewater. Furthermore, essential collaboration between municipal authorities and tourism operators is required, focusing on financing the modernization of the sewerage network in key locations.

Key words: ecotourism, sustainable tourism, tourism infrastructure development, recreational water quality, Tanzania

Introduction

The current era of rapid population growth and industrialization presents a critical challenge in the form of increasing waste, which in developing countries such as Tanzania poses an existential threat to sustainable tourism and the well-being of residents (Yao et al., 2023; Nayeri et al., 2024). Although modern wastewater treatment plants utilize complex physical and biological processes, untreated sewage sludge remains a problematic residue in cities such as Dar es Salaam, which, if not properly managed, causes odor, greenhouse gas emissions, and the spread of diseases, which is in direct contradiction to the vision of ecotourism (Singh et al., 2014; Hreiz et al., 2015). The alarming situation, with only 10 % of the population connected to sewage, is leading to a phenomenon of "vomiting" and massive pollution of the Indian Ocean, which, due to institutional inefficiency and corruption, is devastating coral reefs and biodiversity crucial to international visitors (Wilson, 2015; The Nature Conservancy, 2021). The future stability of the sector therefore depends on overcoming the financial deficit of water authorities and implementing resilient decentralized systems, such as small-scale treatment plants and artificial wetlands directly in hotel complexes, which will transform Dar es Salaam into a clean and competitive gateway to East Africa (Sweya et al., 2018; Wawa, 2020).

Material and methods

A systematic search and review of peer-reviewed and grey literature from electronic databases such as ScienceDirect, Jstor, Scopus, PubMed, and Web of Science was thoroughly utilized to identify articles related to the issue.

Results

The issue of wastewater management in Dar es Salaam is the subject of intensive research, especially in connection with rapid urbanization and the protection of marine ecosystems, which are crucial for tourism. Below we present a synthesis of available scientific papers and reports, classified into categories according to their focus (Table 1).

The critical state of sanitation in Dar es Salaam, where only 25 % of wastewater is adequately treated (EWURA, 2020), directly discredits Tanzania's reputation as a safe and sustainable destination. This infrastructure deficit is causing a demonstrable 22 % drop in hotel occupancy in tourist-attractive areas such as Kigamboni Beach (Waycott et al., 2025). Massive microbial contamination in the Msimbazi

River estuary, exceeding standards by 800 %, combined with the incidence of cholera, seriously threatens the health of visitors and destroys coral reefs crucial for ecotourism (WHO, 2018; The nature Conservancy, 2021). The future stability of the sector therefore depends on the implementation of decentralized technologies (DEWATS), which, according to the World Bank (2024), could increase annual tourism revenues by US$7.1 million and restore the city's status as a competitive gateway to East Africa.

Tab. 1: The summary of the key articles and themes collected and analyzed.

Themes Studied	**Citations**
Current wastewater treatment status in in Dar es salaam	Singh et al., 2014; Hreiz et al., 2015; Wilson, 2015; Worrall et al., 2017 Sweya et al., 2018; Todd et al., 2019; EWURA, 2020; Wawa, 2020; The Nature Conservancy, 2021; UN-Habitat, 2021; Catherine, Augustina, 2022; Yao et al., 2023; Nayeri et al., 2024
Technologies applied in wastewater treatment	Chaggu et al., 2002; NEMC, 2007; BioInnovate Africa, 2014; Kasala et al., 2016; Sinharoy et al., 2019; Wawa, 2020; Catherine, Augustina, 2022; Datola, 2023
Socioeconomic Impact and Tourism	Lau et al., 2020; Mohammed, 2020; Said, Msuya, 2020; World Bank, 2024; Mollel, Mwendapole, 2025
Environmental Degradation	Waycott et al., 2005; Yao et al., 2023; Bakari et al., 2025
Infrastructure and Demographics	Sinharoy et al., 2019; EWURA, 2020; Selemani Msuya, 2025
Public Health	WHO, 2018; Kitole et al., 2024
Technological Solutions (DEWATS)	McFarlane et al., 2014; UNEP / BORDA, UN-Habitat, 2018

Discussion

A closer look at the issue of wastewater management in Dar es Salaam reveals a critical disconnect between Tanzania’s ambitions for sustainable tourism and the reality of its sanitation infrastructure, where uncontrolled sewage discharges directly detract from the coastal recreational potential and threaten public health (Wawa, 2020).

According to published studies, anaerobic digestion (AD) is an innovative solution for tourism resorts and urban centers, which can effectively stabilize sludge, eliminate pathogens and reduce waste volume (Siddiqui et al., 2023). Implementing AD within the framework of a circular economy allows for the production of biogas for energy independence of facilities and the extraction of nutrients for sustainable agriculture, which increases the ecological credit of the destination (Alengebawy et al., 2024). This technological approach not only protects water resources from contaminants such as pharmaceuticals, but also significantly reduces greenhouse gas emissions, thereby supporting the global goals of sustainable tourism (Huang, 2024; Kegl et al., 2025).

Conclusion

A comprehensive analysis of the available literature (EWURA, 2020; World Bank, 2024) clearly demonstrates that the current critical state of sanitation infrastructure in Dar es Salaam is in direct conflict with the principles of sustainable tourism, with uncontrolled discharge of untreated sewage irreversibly degrading coral ecosystems and mangroves crucial to Tanzanian ecotourism (The Nature Conservancy, 2021). Effective management of urban infrastructure and modernization of sanitation systems, including the use of physical, chemical and biological processes in wastewater treatment plants (Hreiz et al., 2015), appear to be priority steps for the long-term sustainability of this East African metropolis.

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Souhrn
Kritický stav sanitace v Dáresalámu, kde se čistí pouze 25 % odpadních vod, přímo brzdí udržitelný turismus a devastuje korálové ekosystémy (EWURA, 2020). Pokles hotelové obsazenosti o 22 % v oblasti Kigamboni potvrzuje, že znečištění a zdravotní rizika (cholera) podkopávají konkurenceschopnost destinace (WHO, 2018). Řešením je implementace decentralizovaných technologií (DEWATS, anaerobní digese), které v rámci cirkulární ekonomiky mění odpad na bioplyn a živiny. Podle Světové banky (2024) by tato transformace mohla zvýšit příjmy z turismu o 7,1 mil. USD a vytvořit z města bezpečnou, ekologickou bránu do východní Afriky (Sweya et al., 2018).

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