

# **Reflections on Sustainable Water Management in Buildings: Investigating Water Conservation Strategies In Gauteng Province**

**Ngaka Mosia**

Lecturer

Department of Industrial Engineering

School of Engineering

College of Sciences Engineering and Technology

University of South Africa (UNISA)

Pretoria, South Africa

mosian@unisa.ac.za

**Kemlall Ramdass**

Professor

Department of Industrial Engineering

School of Engineering

College of Sciences Engineering and Technology

University of South Africa (UNISA)

Pretoria, South Africa

n@unisa.ac.za

**Koketso Masenya**

Lecturer

Department of Industrial Engineering

School of Engineering

College of Sciences Engineering and Technology

University of South Africa (UNISA)

Pretoria, South Africa

mosian@unisa.ac.za

## **Abstract**

Sustainable water management in buildings is a critical issue in Gauteng Province. due to the country's water scarcity challenges and the need to alleviate pressure on water resources. This study focuses on investigating water conservation strategies specifically tailored to the Gauteng Province. The research aims to identify and evaluate effective approaches and technologies that can be implemented in buildings to promote sustainable water use and mitigate water waste. A mixed-methods research design is employed. Data on water consumption patterns, conservation measures, and building characteristics are collected through surveys and interviews conducted with building occupants, facility managers, and water utility providers across various regions of Gauteng Province. Water flow measurements and monitoring systems are utilized to capture real-time information on water usage in selected

buildings. The study findings reveal that implementing water-efficient fixtures, such as low-flow toilets and faucets, can significantly reduce water consumption without compromising user comfort. Rainwater harvesting systems exhibit promise in supplementing non-potable water needs, particularly for irrigation purposes and toilet flushing, thereby reducing reliance on the strained municipal water supply. Greywater recycling systems show potential for recycling water from sinks, showers, and laundry, providing an additional source of water for non-potable uses in a water-stressed environment. Furthermore, the study explores the importance of raising awareness and fostering behavioral change among building occupants through educational campaigns and water conservation programs. By engaging individuals and encouraging responsible water use, substantial water savings can be achieved at the individual and community levels, contributing to sustainable water management in buildings.

### **Keywords**

Conservation, Engineering, Water, Infrastructure and Behavior.

### **Biographies**

**Ngaka Mosia** is a lecturer at the University of South Africa. He holds a Master of philosophy in Engineering Management degree from the University of Johannesburg. Ngaka has presented various national and international conference papers and published several journal papers. He is a member of SAIIE, IEOM, NADEOSA and SASEE and has more than 20 years' industry experience on various levels.

Kemlall Ramdass is a full Professor and associate director of quality in the School of Engineering in the college of science, engineering and technology. He is the first full professor in the department Industrial Engineering in the University of South Africa. He earned a master's in engineering management from the University of Johannesburg and PhD in Engineering Management from University of Johannesburg. He has published journal and conference papers. His research interests include manufacturing, simulation, optimization, reliability, scheduling, manufacturing, and lean. He is a member of IEOM, SAIIE, ECSA and SASEE.

**Koketso Masenya** is a lecturer in the department of industrial engineering, in the college of science engineering and technology, at the University of South Africa. She has taught courses in production management and entrepreneurship and innovation for engineers. Ms. Koketso Masenya is an emerging researcher and member of woman in engineering. She is a member of IEOM and SAIIE.