

THE SUSTAINABLE DAM SILTATION MANAGEMENT STRATEGY FOR ENHANCING WATER SECURITY

The Water Research Commission (WRC) presented the National Siltation Management strategy at the 18th Southern African Energy Efficiency Confederation's (SAEEC) Annual Conference in September 2023. This strategy was highlighted as a catalyst for sustainable dam management, leading to improved water storage capacity.

Water is a finite resource, and its sustainable management is vital for ensuring the survival and prosperity of any nation. Efficient water resource management is of strategic importance especially to a country such as South Africa, as we are water scarce country. Mitigating dam siltation is a critical aspect of this management, as it poses a significant threat to the country's water security.

The Challenge of Dam Siltation

Siltation is a severe concern for South Africa's water infrastructure, as it leads to the accumulation of sediment in water bodies. This process eventually reduces a dam's storage capacity, impairs its ability to supply water, and hampers its flood control capability. Siltation is driven by various factors, such as soil erosion, deforestation, and land-use practices, making it a complex problem that requires a multifaceted approach to be addressed.

The National Dam Siltation Management Strategy

South African government in partnership with the WRC has recognised the critical importance of managing dam siltation and has developed a comprehensive strategy to address this issue. The strategy encompasses various elements, each contributing to the overarching goal of ensuring water security. The national dam siltation management strategy holds strategic importance for the nation's water security in several ways:

Ensuring Sustainable Water Supply: By addressing siltation, we can safeguard our reservoirs' water storage capacity, ensuring a sustainable and consistent water supply for domestic, industrial, and agricultural needs.

Mitigating Drought Vulnerability: Reducing siltation contributes to drought resilience. Maintaining dam levels can act as a buffer during periods of water scarcity, minimizing the impact of droughts on communities and agriculture.

Flood Risk Reduction: Unmanaged siltation can reduce a dam's ability to manage floodwaters effectively. Clearing sediment allows for more effective flood control, protecting downstream areas from the devastation of floods.

Enhanced Biodiversity: Effective siltation management positively impacts the ecosystems associated with these water bodies. Healthy dams and rivers support biodiversity, contributing to the nation's environmental sustainability.

Economic Growth and Development: Reliable water supply underpins economic activities. By protecting dams from siltation, South Africa ensures a conducive environment for economic growth and development as we accelerate industrialisation.

Hydropower Generation: Hydropower contributes to the energy mix and as a renewable energy source. Effective siltation management in dams ensures that hydropower generation remains viable, reducing the reliance on fossil fuels and decreasing greenhouse gas emissions associated with electricity production.

The dam siltation management strategy not only enables the safeguarding of water security but also has far-reaching implications for climate change mitigation and adaptation. Through the reduction of greenhouse gas emissions, enhancing climate resilience, and supporting sustainable agriculture, this strategy aligns with global and national efforts to address the climate change crisis head-on. It exemplifies the interconnectedness of water resource management, environmental sustainability, and climate action, highlighting the necessity of integrated approaches to address the complex challenges of our time.

Through a multifaceted approach that encompasses prevention, early detection, maintenance, and public engagement, the country is taking proactive steps to address the challenges posed by siltation through this strategy. Ensuring the availability of water resources is not only essential for meeting the basic needs of South Africa's citizens but also vital for the nation's long-term sustainable development and resilience in the face of a changing climate and growing water demands. Through the implementation of strategic siltation management, South Africa is working to secure its water future.

Catalysing Sustainable Development

Managing siltation is crucial in achieving several Sustainable Development Goals (SDGs) including 6, 7, 11, 13, 14, and 15. It effectively addresses a wide range of environmental and socio-economic challenges and plays a significant role in ensuring

clean and reliable water resources. By proactively preventing and minimizing siltation in rivers, reservoirs, and dams, we can preserve water quality and maintain adequate water storage. This is essential in achieving universal access to clean water and sanitation, benefiting both urban and rural communities.

Efficient siltation management is critical for the sustainable generation of hydropower. It is imperative to maintain dam capacity and ensure consistent energy production, thereby reducing dependence on fossil fuels and facilitating the transition to affordable, sustainable energy sources.

Siltation management aids in urban development by reducing flood risk, a critical aspect of creating resilient and sustainable cities. It ensures that urban areas are better protected from the adverse impacts of flooding, thus contributing to the development of safe, inclusive, and sustainable communities.

Unmanaged siltation exacerbates climate change and extreme weather events. To mitigate these risks, it is crucial to effectively manage siltation by reducing the impact of floods and enhancing climate resilience. Protecting water bodies from siltation is a direct action to support climate action and combat climate change.

Healthy aquatic ecosystems are essential for marine life and biodiversity. Siltation, if left unaddressed, can negatively affect these ecosystems by altering water quality and habitat conditions. Siltation management contributes by preserving the biodiversity of aquatic environments, including oceans, rivers, and estuaries.

Proper siltation management also benefits terrestrial ecosystems by maintaining water quality and reducing soil erosion. Healthy dams and rivers support plant life and terrestrial biodiversity, contributing to the overall preservation of life on land.

Effective Siltation management is an integral part of achieving the Sustainable Development Goals (SDGs). It not only addresses water-related challenges but also has far-reaching impacts on energy, climate, urban development, biodiversity, and environmental sustainability. By focusing on effective siltation management, we can make significant strides toward a more sustainable and prosperous future for all, in accordance with the global goals set out in the SDGs.



Lesego Gaegane

Senior Project Manager: Water Research Commission & SAFEE Committee Member

Lesego Gaegane is a Sustainability professional with a Chemical Engineering Degree. She has 16 years of working experience in all Industrial Policy Action Plan sectors. Lesego has implemented strategic energy management, water efficiency and water resource management projects over the past 15 years. Her role included driving policy change within private companies to enable them to have sustainable development principles and practices. Lesego is a member of the Institution of Chemical Engineers (IChemE), a member of the International Water Association (IWA), a member of the Society for Ecological Restoration, a member of the Global Women's Network for the Energy Transition Women in Energy Expert Platform and member of the Circular Economy Club. She has been a member of the Southern African Energy Efficiency Confederation (SAEEEC) for the past 12 years. She is currently a board member of the South African Females in Energy Efficiency (SAFEE). Lesego is committed to improving processes to maintain efficiency and productivity for sustainable practices in the industry. She has a strong passion for mentorship to develop and capacitate young professionals.