

## The Role of Knowledge and Institutional Challenges to the Adoption of Sustainable Urban Drainage in Saudi Arabia: Implications for Sustainable Environmental Development

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**Abstract :** Saudi Arabia is facing increasing challenges in managing urban drainage, due to a combination of factors including climate change and urban expansion. Traditional drainage systems are unable to cope with demand, resulting in flooding and damage to property. Consequently, new ways of dealing with this issue need to be found and Sustainable Urban Drainage Systems (SUDS) appear to be a possible solution. This paper suggests that knowledge is a central issue in the adoption of Sustainable Urban Drainage approaches, as revealed through qualitative research with representative officials and professionals from key government departments and organisations in Riyadh. Semi-structured interviews were conducted with twenty-six participants. The interviews explored the challenges of adopting sustainable drainage approaches, and grounded theory analysis was used to examine the role of knowledge. However, a number of barriers have been identified with regard to the adoption of sustainable drainage approaches, such as the marginal status of sustainability in drainage decisions; lack of technical standards for other unconventional drainage solutions, and lack of consideration by decision makers of contributions from environmental and geographical studies. Due to centralisation, decision-making processes are complex and time-consuming, resulting in the discouragement of the adoption of new knowledge and approaches. Stakeholders with knowledge of sustainable approaches are often excluded from the hierarchical system of urban planning and drainage management. In addition, the multiplicity of actors involved in the implementation of the drainage system, as well as the different technical standards involved, often causes problems around coordination and cooperation. Although those with procedural and explicit knowledge have revealed a range of opportunities, such as a significant increase in government support for rainwater drainage in urban areas, they also identified a number of obstacles. These are mainly related to the lack of specialists in sustainable approaches, and a reluctance to involve external experts. Therefore, recommendations for overcoming some of these challenges are presented, which include enhancing the decision-making process through applying decentralisation and promoting awareness of sustainability through establishing educational and outreach programmes. This may serve to increase knowledge and facilitate the adoption of sustainable drainage approaches to promote sustainable development in the context of Saudi Arabia.

**Keywords :** climate change, decision-making processes, new knowledge and approaches, resistance to change, Saudi Arabia, SUDS, urban expansion

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