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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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Urban drainage in Saudi Arabia is an increasingly challenging issue due to factors such as climate change and rapid urban expansion. The existing infrastructure, based on traditional drainage systems, is not always able to cope with the increased precipitation, sometimes leading to rainwater runoff and floods causing disturbances and damage to property. Therefore, there is a need to find new ways of managing drainage, such as Sustainable Urban Drainage Systems (SUDS).

This thesis places knowledge as 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. Twenty-six semi-structured interviews were conducted during fieldwork in 2013 and 2014, which explored the challenges in adopting sustainable drainage approaches, and through a Grounded Theory analysis, the key role of knowledge was revealed.

This research identifies barriers to change in favour of 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 in other disciplines such as contributions from environmental and geographical studies. Due to the form of centralisation revealed, 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 drainage implementation and the different technical standards cause problems around coordination and cooperation.

Three types of knowledge of sustainable approaches and unconventional experiences were revealed across government departments and institutions. From those participants who have procedural and explicit knowledge, a range of opportunities (e.g. significant increase in government support) and obstacles (e.g. the deficit in specialists on sustainable approaches) were revealed regarding adopting new approaches.

The thesis presents recommendations for overcoming some of the challenges revealed in the context of Saudi Arabia; such as enhancing the decision-making process through applying decentralisation, and promoting awareness of sustainability through establishing educational and outreach programmes. This would enhance knowledge and facilitate the adoption of sustainable drainage approaches to promote sustainable development.