



Cross-cultural management of freshwater on resource constrained islands, Australia

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Groundwater is often the primary source of freshwater supply on remote small islands and its existence as a freshwater lens is extremely vulnerable to over-extraction, pollution and seawater intrusion. Ensuring long-term sustainable management of the groundwater resource is of utmost importance when there are growing population demands, risks of sea-level rise and climate change. Advanced engineering technologies are often economically unfeasible in remote areas and there is a limited knowledge and understanding of the aquifers and the surrounding environment to conduct appropriate water management planning. Development of management strategies in remote indigenous island communities requires multi-stakeholder engagement to ensure that the local indigenous cultural significance of water and governance traditions can be included to inform water management policies and involve the community in decision-making processes. The main objective of this research was to evaluate the fresh groundwater resources of a complex, resource-constrained island setting, and develop a transdisciplinary approach for devising community-led adaptive water management strategies that integrate the findings of the scientific investigation and socio-cultural aspects of water supply in a participatory framework. The research supports the development of a robust and workable water management plan for the community of Milingimbi Island, which is part of the Crocodile Islands group in North East Arnhem Land, Australia. The project is currently midway through its research program with the initial hydrogeological conceptual model developed and initiation of the numerical groundwater model. Participatory 3D mapping has been one of the key social research components undertaken to provide a tangible platform for dialogue between the local community and other stakeholders. Engagement of the local indigenous ranger group and traditional landowners in field data activities and monitoring of hydrological observations has been crucial to the research program. The project has involved bringing together varying and different perspectives, new hydrogeological knowledge and understanding and socio-cultural indigenous aspects, including: (1) 'balanda' (westerner) scientific knowledge with the development of the conceptual model of the groundwater system and how it responds to varying hydro-climatic conditions and stresses, (2) strategic planning from the utility provider who is responsible for the operation, management and delivery of the resource, facilitation of participatory engagement workshops with the inclusion of local Yolngu culture and tradition supported by social science researchers and (3) the end-user, the local indigenous community that relies on it for their needs and survival and whom have traditional and cultural values associated with gapu-mangutji' (soaks and water holes) and how the water and land resources are used. Ultimately, the research hopes to deliver a robust and workable water management plan for the community of Milingimbi Island that has integrated cutting-edge hydrological science and socio-cultural aspects together with the local Aboriginal knowledge.