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Thermal Spring Governance in Arid Regions: Community Perspectives and Local Governance at Al Hammam, Oman

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Abstract

Thermal springs are important yet understudied resources, particularly in arid regions. This study investigates community perceptions and management practices of Al Hammam Thermal Spring in Muscat, Oman's hottest geothermal spring (60–70°C). The spring has been managed as a typical Falaj, compromising its ecological integrity. A structured questionnaire survey of 60 residents in December 2025 assessed spring usage, governance perceptions, management satisfaction, and future development preferences. Findings emphasize the spring's importance to local livelihoods and rural identity, highlighting its diverse uses. Agriculture is the village's main economic activity, with flood irrigation widely used; however, adoption of modern irrigation methods remains limited, leading to inefficient water use. Respondents value the spring for its environmental, aesthetic, and therapeutic benefits, yet report dissatisfaction with government services, regulatory enforcement, and tourism management. Respondents notably rated community involvement in spring management highly, reflecting strong local stewardship. Most favor government-led tourism development and conservation-focused protection strategies over private-sector tourism development. These findings reveal governance gaps and community priorities but do not indicate environmental degradation, as the study did not directly assess hydrological or ecological conditions. The results support a more participatory governance model that enhances institutional collaboration and local engagement in monitoring and sustainable tourism planning. This model involves collective stewardship, equitable resource use, local monitoring, and shared decision-making, complementing traditional and government-led water management systems. Integrating community knowledge with systematic environmental monitoring strengthens the evidence base for balancing resource conservation, local livelihoods, and sustainable tourism at Al Hammam and other hot springs in arid regions.

Keywords: *Al Hammam thermal spring; arid regions; falaj irrigation; socio-economic value; sustainability; water governance*