Assessing the multiple values associated with the beneficial reuse of coal seam water. A case study in the Surat Basin, Queensland Australia

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Research Context

Large amounts of coal seam water (CSW) are produced as a biproduct of coal seam gas (CSG) extractions. When treated, CSW becomes a valuable source of water available for various beneficial re-uses (see Figure1). Current management is often ad hoc, defaulting to least-cost equations of distribution with little regard to broader sustainability goals or multiple stakeholder interests and values (Evensen 2018). This is reflected in the sparse literature on CSW reuse, which has a strong techno-economic focus and neglects the wider social implications. We argue that incorporating a wider spectrum of values beyond economic considerations, could enable CSW reuse schemes to deliver a wider range of benefits for local and wider communities.

The **aim** of this research is to identify the range of values associated with CSW reuse in Queensland and construct a framework that supports the consideration of multiple values in decision-making.

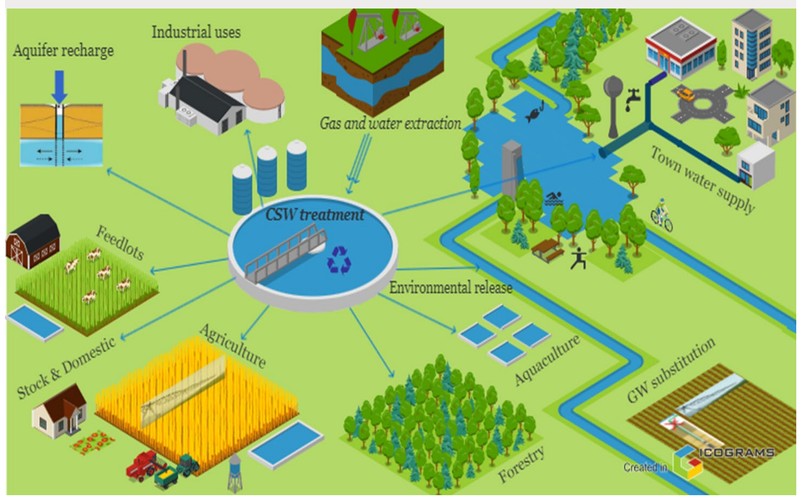


Figure 1: [Illustration of CSW reuse option in the Surat Basin, Queensland (made using *Icogram* website 2023)]

Case Study Location

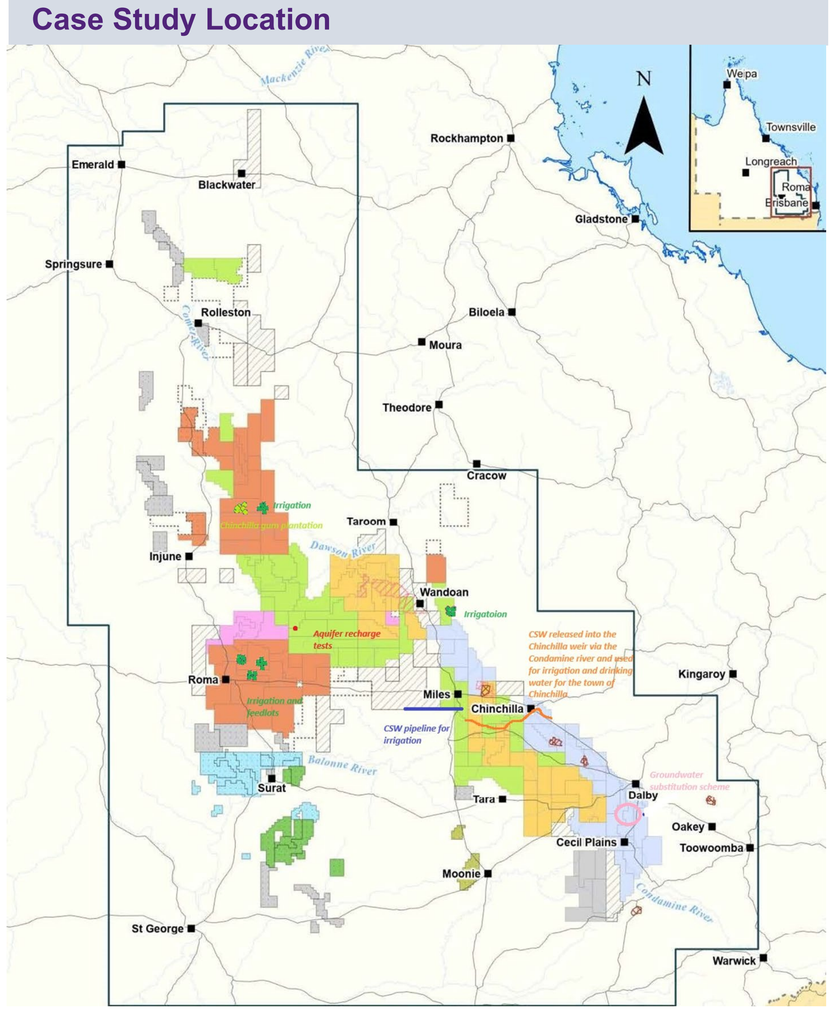


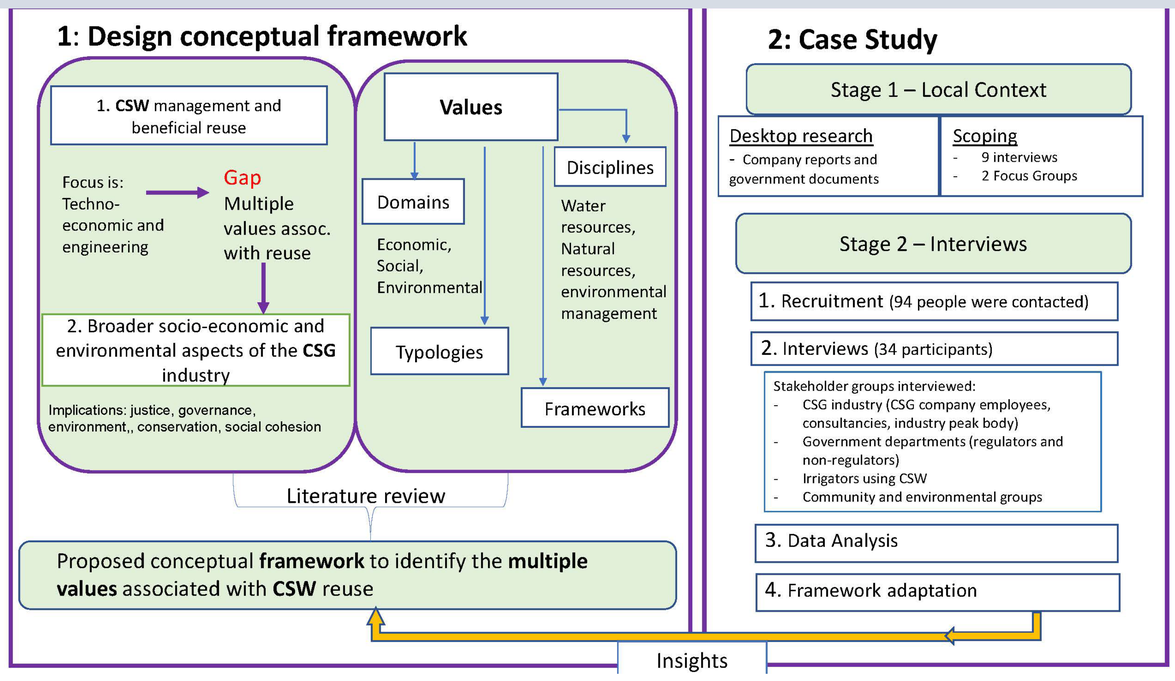
Figure 2: [Location of CSG development areas in the Surat Cumulative Management Area (CMA) (OGIA 2021) and approximate locations of CSW reuse schemes]

Why are values important?

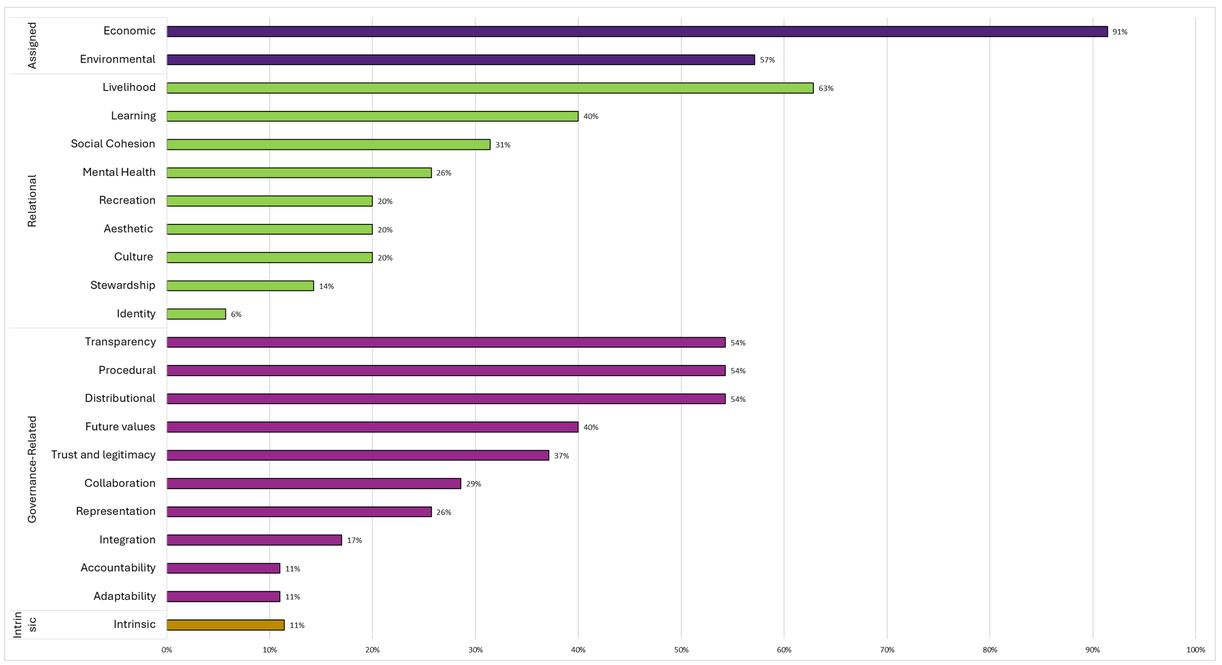
Human values (i.e., what people find important) determine how decisions are made (Schultz et al. 2018). Nevertheless, current decision-making systems as well as academic frameworks too often fail to consider the diverse set of human values and their relationship with natural resources, including water and the environment (Arias-Arevalo et al 2018).

Overlooking the diverse mix of values can result in "inequitable sharing of benefits, inadequate reconciliation of negative impacts and costs, unsustainable solutions, unintended consequences, risks, and weakly performing policies and institutions" (United Nations World Water Development Report UNESCO 2021 pg. 154). It may contribute to conflict between different stakeholder groups, whilst considering only a narrow set of values can be seen to favour particular interest groups (Witt et al. 2019). Recognising and articulating the full range of values, using the developed conceptual framework below, helps align decisions with stakeholder priorities, leading to more equitable outcomes and enabling the design of more effective policies and programs that are more socially legitimate, context-sensitive and enhance sustainable development (Chan et al. 2012).

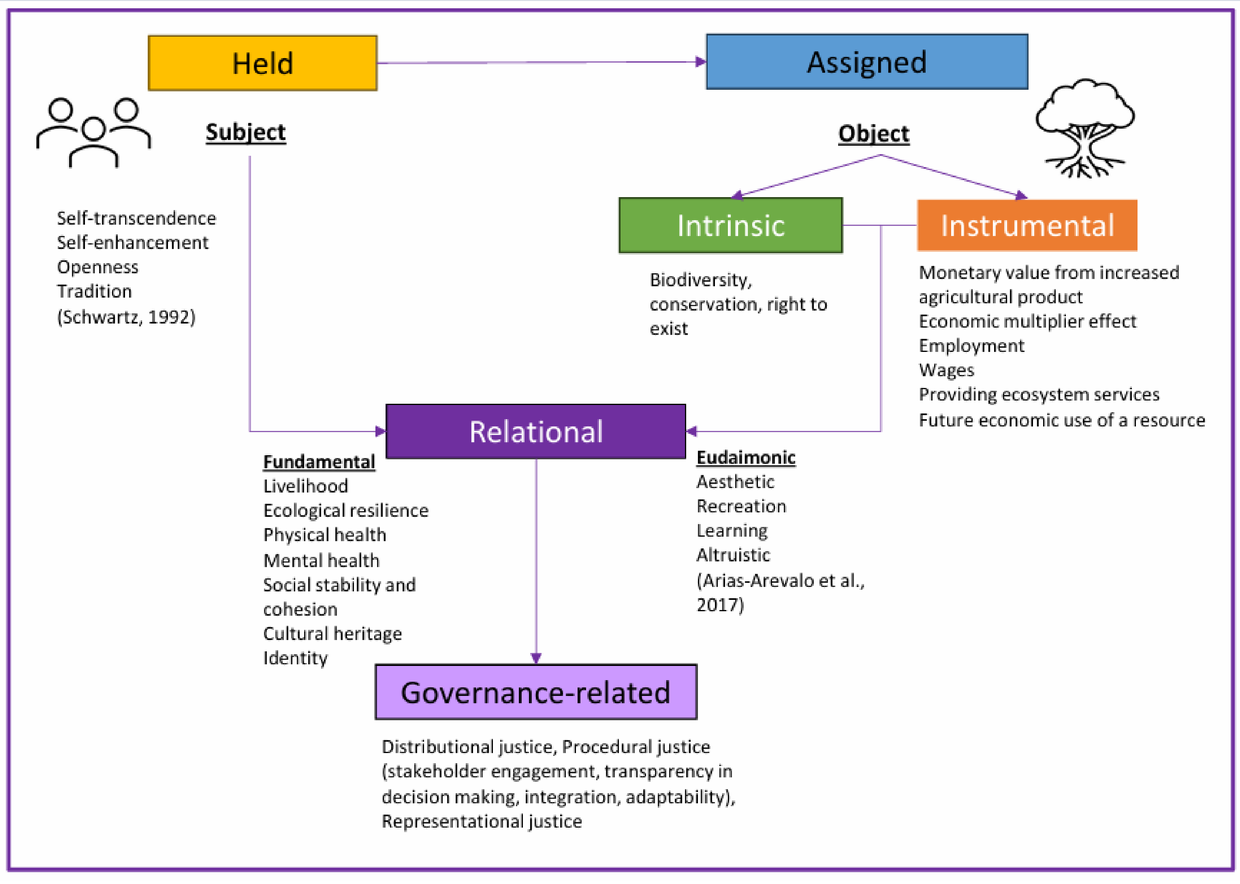
Methods



Case Study Results



Conceptual Framework



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