

Qualitative analysis themes from interview data for: *Jackson, et al. (2019). Identifying and overcoming barriers to sustainable collaborative water governance in remote Indigenous Australian communities*

37 High level themes emerged from the data in the first round of coding, some with sub-themes, based on an inductive process of thematic analysis of interviews and key project documentation. The table presents the NVivo Codebook extract – initial coding categories based on inductive identification of themes and number of files and references. Descriptions applied helped to determine the themes and were subsequently refined and clustered into five high level categories and thirteen barriers as described in the paper.

Table S1. Themes generated from first cycle coding of practitioner interviews in remote Indigenous community water management, Australia

Name	Description	Files	References
Barriers or challenges	Broadly, any factors identified that constrain, impede or prevent the trial, application and implementation of collaborative, community-based management approaches to sustainable community water. Factors include, but are not limited to, actions, tools, techniques, people, practices, methods, frames or values.	27	174
Broader Social Benefits & Outcomes	Relates to perceptions of benefits beyond technical infrastructure or water and energy sustainability including community development or economic development opportunities.	14	34
Community Engagement Design within projects_programs	Relates to what was designed/or ideas within planning stages, prior to implementation and the extent of or capacity for community engagement design into projects, programs.	26	319
Community Engagement or Involvement	All aspects of engaging community members or leading to engaging community	24	229
Champions /In-Community Manager or contact	Relates to interviewee references to key people within communities who act as champions or leaders in water management and community engagement	15	30
Community Engagement Methods	Relates specifically to the mechanisms use to involve or engage communities e.g. - communications, materials, techniques, tools and so on	22	111

Name	Description	Files	References
Employees in community - engagement	Relates to local employees in water sector - this node differs to general community engagement	10	31
Community Needs, Wants & Goals	Relates to perceptions of community needs, preferences in terms of outcomes or longer-term goals and objectives - across a broad range of areas.	11	30
Complexity	Relates to the complexity of managing water or working in communities, the specific problems and issues, or of the system as a whole.	10	20
Conflict	Relates to any perceived conflicts, or conflicting views or ideas that lead to disharmony within the community or between community and outside agencies.	8	13
Confusion	Relates to uncertainty and confusion about a process or purpose or situation or technology etc.	4	7
Continual or Social Learning	Relates to learning from previous experiences and implementation or from other regions or sectors, lessons, sharing information and structures that support these	17	38
Control and influence	Relates to the ability to exert control or influence what pathways or actions are taken (sub-theme related to 'what they know best' or what's perceived as easiest to control or influence it)	4	7
Cultural Practices, Values, Meanings and Perspectives	Relates to interpretations or perspectives, practices driven by cultural values and norms and traditions whether Indigenous or organisational, in relation to how water is managed.	25	148
Best Practice	Relates to perception of good or best practice in terms of organisational culture or engaging with Indigenous people or in sustainable water.	11	20
Clash of cultures	Relates to mismatch in viewpoints and understanding due specifically to socio-cultural factors, focus on Western and Aboriginal or Torres Strait Island worldviews, practices, traditions, values, norms, taboos	10	21
Community view of Government	Relates to how Indigenous people or a community views or has expectations of government and government services or resources or funds.	12	18

Name	Description	Files	References
Water behaviours and practices	Relates to social and cultural practices and norms that influence individual (within an organisation or household) behaviours around water use and management	11	22
Data and Information	Relates to data and information processes, handling, collection, value of, use of.	22	86
Smart Meters	Relates to smart meters, metering systems, and associated data outputs, how they are used, value of...	9	19
Economic & Financial	Relates to anything to do with economy, economics of projects and funding, cost effectiveness, investment, economic development in communities and pricing/charging for resources	20	143
Costs & cost effectiveness & budget allocation	Relates to perceived or actual costs and value of operating a program/strategy/engagement approach or infrastructure and whether it is perceived as cost effective, criteria considered to determine this	11	26
Economic development in communities	Relates to broader economic development features and factors, i.e. the need for, causes, results, beyond projects at a larger scale	6	12
Funding - Project	Relates to background and context on who funds and initiates projects and what they fund and don't fund, how the funding is distributed, timing and so on	20	53
Pricing and charging	Anything that comments on pricing, charging for water or energy	10	22
Enablers & opportunities	Factors that facilitate collaborative, community-based sustainable water management approaches and their implementation and uptake and likely success. Factors include, but are not limited to: actions, tools, techniques, people, practices, methods, frames or values. Opportunities may not have evidence as enabling, but show promise.	21	98
Frameworks and Tools	Relates to any frameworks, theories, tools, methods that were used or recommended by interviewees or in projects or within water management	6	15
Sustainable Livelihoods	Anything about sustainable livelihoods	3	5
Future-plans, long-term planning, or	Relates to future demand and considerations of need for the longer-term, e.g.	16	50

Name	Description	Files	References
future-proofing	planning, strategy		
Housing	Relates to housing - public housing, department of housing, private housing, e.g. maintenance, building materials, equipment, responsibilities and so on	13	25
Independence or Dependency	Relates to perceptions of the independence or dependence of Indigenous communities in relation to economy, decision-making and in relation to government	7	14
Informal channels & non-official pathways	Relates to interviewee referencing going around “official” channels to overcome problems and barriers in relation to sustainable water and energy. Communications, maintenance etc.	5	5
Infrastructure Governance and Management	Relates to the governance and management of infrastructure including roles and responsibilities, processes and structures in place or needed	28	292
Institutional Structures	Relates to structures and processes of government, industry, those organisations that have responsibility for water and the interactions between them	26	109
Processes followed or required	Relates to governance or management processes that are employed, deployed, used, required etc.	24	82
Prioritisation processes	Relates to how service providers prioritise communities or infrastructure decisions and/or how communities prioritise goals and objectives	16	36
Roles & Responsibility	Relates to who does what or who should be doing what and the breakdown of those roles (and how effectively they work)	26	113
Land Ownership_Tenure	relates to land ownership, tenure of land, native title, access to land, disputes and so on	5	7
Leadership	Relates to individual, organisational and community leadership and how that emerges or is facilitated. Includes leadership for sustainability and in water and energy management.	11	39
Leaks and Maintenance	Relates to water leaks, maintenance processes, leak detection and identification (diagnostic tools or processes) and reporting processes	19	43

Name	Description	Files	References
Participation and Collaboration	Participation in broader activities (differs from community engagement node which focuses on how communities are engaged by service providers) including communities or other stakeholders. Relates to collaborative processes	24	94
Partnership building and relationship building	Relates to working together across or within organisations. Relationships, efforts at or need for building of relationships between communities and other stakeholders. Examples of or reference to partnership approaches.	23	85
Processes	Relates to processes - the how of things (not as specific to infrastructure governance processes node). Includes 'how things work' in communities	24	76
Program_Projects	Relates to programs or projects for W&E or Sustainability - drivers for, implementation and project governance, results, lessons or evaluations. Includes reference to specific projects	27	610
Drivers for Projects	Relates to reasons projects came into being.	23	82
Evaluation and Results	Relates to the process of evaluation of the thing implemented or perceptions of how successful a process, methods, strategy was in achieving the purpose.	15	73
Lessons for designing W&E projects	Relates to lessons for design in future - that weren't implemented or tested	25	171
Project Governance	Relates to how projects are set up in terms of ownership, funding, responsibilities and how these are managed throughout the project lifespan	23	78
Projects of interest	Potential case study examples referred to by interviewees	20	69
W&E Projects What Was Done	Relates to things that have been implemented in relation to water or energy projects, programs or activities	24	116
Reflections on objectives and past approaches	Relates to interviewee reflecting on or questioning value of standard practice or past approaches to engagement and sustainability	12	52
Problems associated with standard practice	Relates to observed or experienced impacts and consequences from examples that have been implemented	10	32
Resource availability or constraint	Relates to making resources - time, people, materials, available for community-based	10	24

Name	Description	Files	References
	water/energy management		
Self-interest and protecting own interests	Relates to where self-interest is presented at cost to others, whether SPs to community or vice versa, employees, leaders etc.	9	16
Skills, Jobs, Capacity, Training & Education	Broad category - relates to need for or experiences with these - within communities or service provider/management organisations	24	116
Strengths	Relates to perceived strengths of regions or communities or Indigenous people - relevant in that they can be drawn on or built on for future	2	3
Sustainability & Resilience	Relates to broader concepts of sustainable communities and resilience amongst community, system, environment or people	12	38
Technical or technology & Infrastructure	Relates to technical issues or solutions or technology/ies. Includes water/energy infrastructure at community and household level, tools, hardware and technologies for engagement or education or to facilitate interactions between community and service providers	18	62
Theory of Change	Relates to perceptions of how change in communities occurs, or behind design process etc.	15	46
W_E_Demand Management	Relates to achieving water or energy efficiency or conservation or reduction measures	23	108
Water Restrictions	Relates to a method of demand management that switches water off or in other ways seeks to reduce consumption through restricting supply or consequences associated with using water at particular times	3	11
Water Quality & Health Issues	Broad category relates to quality of water and health and safety – issues, concerns, consequences from management actions or community practices and behaviours, policy or regulatory rules and environments	11	31
Water Security - source	Relates to long-term and short-term supply of water and its abundance, security and sustainability including - aquifers, ground sources, desalination etc.	15	48

Note although there were 26 interviewees, two interviewees were interviewed on two separate occasions during the eighteen month period due to the first interview being cut short.