

REMOTE INDIGENOUS COMMUNITIES AND WATER SECURITY: Rethinking how the Australian water industry delivers services

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KEYWORDS

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ABSTRACT

Safe and effective drinking water and sanitation is a basic human right. Despite global and Australian commitments to Sustainable Development Goal 6, water and sanitation service levels in remote Indigenous communities in Australia have frequently been identified as unreliable, unsafe and unpalatable. Key conditions for improved water and sanitation outcomes were identified.

These include technology for water and sanitation that is fit for purpose, people and place; capacity-building, training and ongoing support for local Indigenous service operators; and all personnel involved in delivery require a level of cultural competency to the local and Indigenous context.

INTRODUCTION

While the majority of Australians have access to safe drinking water and wastewater services, service levels in remote Indigenous communities are generally of a lower standard than in urban areas (Productivity Commission 2016). Furthermore, services to Indigenous communities in remote and very remote Australia often do not meet the standard generally available in non-Indigenous communities of a similar size and location, and have been observed to be consistently unreliable and suffer major disruptions (Productivity Commission 2016, WSAA 2022). Poor quality drinking water, sanitation and hygiene-related challenges often exist in these communities and have been found to contribute to inequitable health outcomes (Hall, Barbosa et al. 2017).

While significant investment in water infrastructure, regulation and management of remote Indigenous communities by government has improved access to clean

water in recent decades, challenges remain, with many services in remote areas not meeting basic regulatory requirements or the Australian Drinking Water Guidelines (ADWG) (AECOM 2010, WSAA 2022). It has been documented that improvements are needed for the supply and use of water and wastewater services in Indigenous remote communities (Hoverman and Ayre 2012, Ross, Delaney et al. 2014, Hall, Barbosa et al. 2017, Beal, Jackson et al. 2018, Jackson, Stewart et al. 2019). The Australian Government's *Report on the Implementation of the Sustainable Development Goals* (Australian Government 2018, p.50) states:

"Rural and remote communities in particular may not have the same level of access to water and sanitation services as urban centres. This is particularly the case for remote Aboriginal and Torres Strait Islander communities and can have important flow on effects to health outcomes."

For the Australian water industry to make a difference in remote Indigenous communities, it will require new ways of 'doing water business' along with framing problems and solutions from the Indigenous perspective. Achieving such a difference will require more than a simple transfer of engineering-driven approaches from urban areas.

In response, this research sought to understand the context and then identify helpful approaches based on evidence, to:

- Characterise the challenges and barriers to currently achieving safely managed and resilient water and sanitation services in remote Australia;
- Identify opportunities for strength-based actions; and
- Provide guidance on principles for delivering community-led outcomes in remote Indigenous communities.

BACKGROUND: DRIVERS FOR THE WATER INDUSTRY TO SUPPORT SDG 6 IN AUSTRALIA

The Australian water industry committed to support the seventeen Sustainable Development Goals (SDGs) with the launch of 'Global Goals for Local Communities' by the Water Services Association of Australia (WSAA) – especially in realising SDG 6 to ensure water and sanitation for all (WSAA 2017, Wsaa 2018).

The SDGs provides a framework for the water industry to tackle water challenges at local, national and international levels to deliver broader value to the customers and communities they serve. The framework can enable and empower water utilities to make a broader contribution towards a prosperous, sustainable and equitable society, that extends beyond their mandatory requirements and scope of operations (WSAA 2017, Wsaa 2018).

The commitment to supporting the SDGs, particularly SDG 6, provides a strong driver for the water industry to explore how they can contribute to improving water service outcomes in remote Indigenous communities. The '2030 Agenda for Sustainable Development' with its goals and targets makes the pledge that 'no one will be left behind' and that 'we will endeavour to reach the furthest behind first' (UN 2015). In Australia, progress towards eliminating the gap in well-being outcomes between Indigenous and non-Indigenous Australians has not been on track despite the 'Closing the Gap' agenda of the past decade; Indigenous communities have been largely 'left behind' in an inequitable gap of essential services (DPMC 2019, Australian Governments and the Coalition of Peaks 2020, Lowitja Institute 2022).

The urban water sector could contribute to attaining SDG6 in remote Indigenous communities through capacity transfer and other support. However, many challenges exist to such participation. In particular, there is a need for urban utilities to gain legitimacy to cross the jurisdictional boundaries of their (non-remote) geographic areas of operation. Other challenges include repeated shifts and failures of past and current policy and program interventions (Moran 2016), and a lack of understanding and knowledge of how to ensure locally suitable programs (e.g. how to

ensure proposed programs will actually have long-term viability by being culturally, geographically and technically appropriate for remote community settings).

Such challenges can present a potentially negative platform for outsiders to introduce new initiatives in remote Indigenous communities. Nevertheless, an awareness of the particular circumstances of remote Indigenous communities is necessary to work towards meeting SDG 6 in Australia. Furthermore, there are promising efforts by utilities (WSAA 2022) working to address historical injustices, marginalisation and disadvantage experienced by Aboriginal and Torres Strait Islander Peoples.¹

METHODS

This research is based on the analysis and synthesis of existing literature on remote drinking water delivery in Indigenous communities. The geographical scope of the study was limited to the Northern Territory, Western Australia and Queensland where 90% of people in discrete Indigenous communities live (FaHCsIA 2010).

In the interest of informing implementation of on-ground water services predominantly by utilities, the sources included reports and journal publications by the authors. In particular, four social research projects conducted by the authors between 2016 and 2019 and relating to water and sanitation issues and services in remote Indigenous communities in Australia were co-analysed. These complementary projects included effective co-development pilot models for water management (Beal, Gurung et al. 2016, Beal, Jackson et al. 2018, Jackson, Stewart et al. 2019, Jackson, Stewart et al. 2019), opportunities for an urban utility to contribute to improving remote water service outcomes (ISF-UTS and QUU 2017), a review of priorities for meeting water, sanitation and hygiene needs (Hall, Barbosa et al. 2017), and roles and opportunities for the Australian water industry in remote settings (Abeysuriya, Soeters et al. 2019).

Quotes from these sources are provided to illustrate issues highlighted by the social research participants, with the type of organisation represented by the interviewee provided against each quote. The participants represent federal, state and territory government, Indigenous organisations,

¹ Please note that this document respectfully refers to Aboriginal and Torres Strait Islander

Peoples. This is the authors' preferred term for the original Peoples of Australia.

research organisations, water utilities and non-governmental organisations.

RESULTS: KEY THEMES FOR SUSTAINABLE WATER AND WASTEWATER SERVICES IN REMOTE INDIGENOUS COMMUNITIES

This section presents a selection of themes for illustrating some of the complexities, challenges and needs around remote Indigenous water and wastewater services. The four themes that emerged were:

- Water quality and quantity
- Drinking water management, governance and financing
- Water treatment technology and operations
- Mutual learning.

These themes are visually described in Figure A and are described in depth in the following sub sections.

Water quality and quantity

The basic requirement of ensuring water supplies of adequate quality and quantity that meet the needs of remote Indigenous communities comes with particular challenges. These include source water quality issues related to microbial and chemical contamination, and challenges for water service providers in building understanding of water supply sources and water use patterns that limit the ability to maintain water security. Issues of long-term water security are exacerbated in a changing climate due to unreliability of seasonal rainfall and increasing intensity and frequency of extreme weather events (Jackson, Stewart et al. 2019).

One report noted that drinking water supplies in remote Indigenous communities are at risk of both microbial contamination and chemical contamination by naturally occurring elements in deep artesian (bore) sources (Hall, Barbosa et al. 2017). The naturally occurring chemical contaminants found in the drinking water, including arsenic, cadmium, nitrates, uranium and barium which tend to increase towards inland Australia, can require the installation of advanced water treatment technologies due to the health risks from high concentrations (Hall, Barbosa et al. 2017). Poorly maintained drinking water infrastructure was linked to heightened risk:

“It’s quite chronic in cases ... [because] storage tanks [are] ... rarely

replaced ... They’re going to rust, they’re going to corrode ... Water supplies are 100% a [health] problem” (Indigenous organisation representative)

Issues of palatability and aesthetics have also been noted in communities reliant on bore water, with implications for health when soft drinks are consumed instead (Hall, Barbosa et al. 2017). There are implications for infrastructure maintenance as well, both at the household level and the water system (Anda and Dallas 2005).

“Hardness and total dissolved solids ... generally salinity ... pH is actually slightly too low ... iron, a little bit of manganese ... the consequences [on the water are a lack of lather] in terms of washing, [a build-up of scale] in terms of appliances.” (Water utility representative)

To add to water quality challenges, many Indigenous community members prefer to drink rainwater from household tanks rather than ‘town’ water supplied by service providers. A recent study of community preferences in three remote communities indicated a preference for the taste of rainwater with the odour and taste of treated (chlorinated) water preventing drinking from mains water taps (Jackson, Stewart et al. 2019). However, although a preferred source, associated health risks of poorly treated rainwater after long-term tank storage was also a concern raised especially by the government and local service providers.

Securing adequate water supplies to meet the needs of dispersed populations in often harsh physical environments with unreliable and seasonal rainfall and groundwater recharge come with particular challenges (Jackson, Stewart et al. 2019). Water supply options of a majority of remote Indigenous communities in desert or tropical climates are typically seasonally unreliable, prompting service providers to seek conservation and demand management measures including daily restrictions where water may be turned off several times a day (Beal, Jackson et al. 2018).

Understanding the source supply and size can inform planning and daily and long-term decision-making about infrastructure and use. The need for quality data and information to inform decision making for long term water security, was identified by several community water staff, for example:

"We need to find out about the aquifer. I used to talk to the guys [at State Government], they would know about the aquifer, but I don't know if [the staff] are still there. I want to know how big is the aquifer? How many more pumps can it take?"
(Community water manager)

Additionally, water services providers are often constrained by available baseline consumption data (across seasons and populations) needed to effectively target water management strategies at the community level (Beal, Gurung et al. 2016). Social research participants observed that most communities do not have automated disaggregated meters and rely on manual meter reads. These are often conducted in an ad hoc manner, and high-level assessments based on the community supply meter are used instead to estimate average per capita use (Christie 2010). This average can vary significantly from actual consumption values as communities and households are diverse in the number of occupants (permanent and visiting). The lack of understanding of water use drivers can lead to ineffective community engagement and inaccurate targeting of water use (Ross, Delaney et al. 2014, Beal, Jackson et al. 2018).

Social research participants pointed to the value of improved technologies for metering and monitoring household water use to inform infrastructure planning and strategies for engaging communities in water conservation activities.

"Smart meter or near real-time data allows us to identify leaks, we notify housing, housing is able to get work orders out and leaks are fixed."
(Water utility representative)

However, reliance on quantitative water consumption and quality data alone may not provide the required understanding of the context of household and community water use.

At the same time, practical considerations around installation, maintenance of equipment, mobile/internet reception and data downloads in relation to the local context need to be taken into account in considering smart meters. Furthermore, although local evidence-based planning is required to improve management efficiency, similar outcomes may be achieved by simply training community members in monitoring of existing water meters (Jackson, Stewart et al. 2019). This also contributes to

building capacity and understanding of water in the communities.

Engaging community members early in design of water management activities provides insights into the lived experiences of local people with the water system, their practices, preferences and issues to guide uptake and inform design of community projects.

In remote Indigenous communities, there has been documentation of high water use and limited water literacy (from a Western, built environment perspective), but limited analysis of actual patterns of water use (after accounting for leaks) (Beal, Jackson et al. 2018). Key to understanding higher water use in remote Indigenous communities is accurate and reliable data at the local level, taking the diversity of communities and high mobility in Indigenous communities in remote Australia into consideration, to avoid making generic assumptions.

For example, a 2016-17 study conducted in three remote communities in the Northern Territory (Central Deserts region) and tropical Far North Queensland showed that the total daily per person water use on average could fall between a wide range of 270 L/p/d to 1,500 L/p/d, with outdoor water use comprising up to 86% of total residential water consumed (Beal, Jackson et al. 2018). Five main drivers for outdoor water use identified in these communities include amenity, health, cleaning/washing, cooling and social/cultural needs. Some activities are traditionally the role of local government service provision (e.g. dust control) indicating that water conservation opportunities may exist through coordination between communities and local authorities.

Drinking water management, governance and financing

Arrangements for accountability, planning, financing, administering, regulating and monitoring are key determinants for enabling long term service delivery (Ross, Abey Suriya et al. 2014). Outlined below are issues arising from the complexity and confusion regarding roles and responsibilities, government funding priorities, water service provisions to public housing residents, and complex land tenure arrangements.

Complexity and confusion regarding roles and responsibilities

Under the Australian Constitution, state and territory governments are required to provide

residents with municipal and essential services (Australian Government 2010). However, the legacy of former missions/reserves where many Indigenous communities are now located has meant that Indigenous communities were often either ignored by state or local governments, or provided with community housing, infrastructure and essential services that was different to services provided to non-Indigenous communities (Wensing 2015).

The Commonwealth Government intervened in service provision to Indigenous communities in the 1960s, resulting in a number of different servicing arrangements reflecting a variety of historical factors. These included specific needs of communities at different times, and changing approaches to servicing Indigenous communities by state and local governments (Australian Government 2010). A 2010 review by the Australian Government (Australian Government 2010, p.210) found that arrangements for service delivery across Indigenous communities in Australia are “complex and inconsistent”, with some funding arrangements “(equating to) lower standards of service than that provided to non-Indigenous Australians living in communities of similar size and location”. These current arrangements create ambiguity for Indigenous communities concerning who is responsible for the delivery of the services within their community:

“When parliamentary questions come in from a community, or a question comes to a Minister from a community ‘help, I’ve got problems with my water quality’, it is amazing how many different agencies can say ‘this isn’t my problem, it’s the (Department of Housing)’, then the (Department of Housing) says ‘it’s not my problem, it’s the (Department of Water)’... and it just leads to confusion and inaction. It’s not clear. Whereas any other [non-Indigenous] town in the state has the capacity to get a question answered, or has access to their data on water quality as a citizen of the state. Aboriginal people in Aboriginal communities do not.’
(Water utility representative)

Government funding preferences capital investment over lifecycle needs

Funding for water service delivery (amongst other essential services) in Indigenous communities can be influenced by short-term

political cycles which are in turn, influenced by the priorities of the political party holding government at the time (Taylor, Moggridge et al. 2017, Jackson, Stewart et al. 2019). The highly politicised environment in which Indigenous Affairs operate was highlighted in the social research as affecting decision-making and subsequent funding and availability of resources and programs for water service delivery (amongst other essential services). Furthermore, there is little consideration of the lifecycle for safe water delivery systems, and project budgets commonly do not provide for ongoing operation and maintenance of the systems and building and sustaining local capabilities (Mosse 2018).

“I think the general philosophy is often that big infrastructure is a big capital expense and governments see it as an enabler for development and economic growth in most communities. So they’ll fund that sort of stuff knowing that, ... you’ve got to have power and water for the community to actually do anything. And those particular circumstances, there is some potential that you have some kind of a user-pays system but that’s a very different space in places like [community name].”
(Government manager)

Furthermore, the cost recovery model used in towns and cities is often not viable for small settlements due to high capital and operating costs for providing services in remote locations. Beneficiaries of the services often do not have the resources to pay for full cost recovery.

Structural challenges to funding and cost recovery for ongoing services

Most remote Indigenous communities are almost completely dependent upon government for services and local economic activity including employment and development opportunities (Ross, Delaney et al. 2014, Moran 2016). A majority live in public or community housing managed by government or community housing providers (Productivity Commission 2016). Water services are typically included as part of rental agreements, with no consumption charges for water use or individual water meters on public housing (Ross, Delaney et al. 2014, Noss Group 2017, Beal, Jackson et al. 2018). Provision of housing services in remote Indigenous communities faces a significant

and unavoidable revenue-cost shortfall, driven largely by the significantly higher costs of servicing remote communities. Maintenance and repair activities in remote Indigenous housing often range from between 1.4 and 4.5 times the cost of equivalent activity in 'mainstream' public housing, and can be up to 47 times higher for specific items (Nous Group 2017).

Improved coordination in property management and tenancy management has been identified as providing the greatest potential for gains to be made (Nous Group 2017). Poor coordination and management of public housing inhibits effective water and wastewater management. Complex reporting and maintenance processes can result in long lead times for repairs and fixing leaks, and also create confusion around responsibilities (Hoffmann 2001, Grey-Gardner 2008). A 'siloed' approach to management across agencies without integrated place-based solutions also contributes to some issues falling through gaps (Jackson, Stewart et al. 2019). Funding public housing maintenance has been raised as a key issue and barrier to effective household water management in the social research:

"The public housing maintenance budget per household is very small given the relative costs of labour and providing maintenance services in remote communities"
(Indigenous organisation representative)

Furthermore, water sector reforms in Australia over past decades have brought commercial disciplines to licenced water utilities through corporatisation. While this has resulted in efficiency gains and improved customer outcomes (WSAA 2018), the requirement for full cost recovery through pricing discourages utilities from seeking to service remote Indigenous communities.

"We as a corporation ... are required to act 'corporately', I suppose. ... the revenue we might receive [from servicing remote Indigenous communities] will be nowhere near what it would cost to provide these services. We are willing and able... but from a corporate perspective, ... we won't lead [a servicing initiative]."
(Water utility representative)

Conflicting land tenure arrangements for water and other essential services

Land tenure is important for service delivery, including for water services. Under current Australian law, any permanent fixtures on land are the property of the landholder (QPC 2017). Service providers need clear tenure arrangements in place to provide certainty for their ongoing investments and activities relating to service provision.

Land is usually held collectively by residents of discrete Indigenous communities, with an Indigenous organisation or Traditional Owner acting as trustee (Office of Township Leasing, QPC 2017). This can lead to convoluted processes for service providers to secure tenure, compared to processes in non-Indigenous communities, resulting in a complex patchwork of tenure arrangements that vary between and within the various jurisdictions (Wensing 2015). Separate native title interests overlay tenure across many remote and discrete communities, potentially adding further confusion (QPC 2017).

In Queensland, most land held by Aboriginal and Torres Strait Islander people in remote/discrete communities is Aboriginal freehold or land held in trust by the Indigenous council, which is unable to charge rates due to the structure- making it difficult to provide a stable funding base for essential services. For provision of social housing, the Queensland Government obtains 40-year leases from councils, providing a source of annual revenues for council operations (including water service provision) in lieu of rates (QPC 2017).

In the Northern Territory, the Aboriginal Land Rights Act (Section 19) allows businesses/organisations and individuals to lease land managed by land councils. Land councils need to consult with Traditional Owners and other affected Aboriginal communities regarding each lease proposal (Office of Township Leasing). An entire township may be leased under Section 19A of the Act, and parcels of land may subsequently be subleased by the government lessee in ways the Aboriginal land owners cannot control (Office of Township Leasing).

The complexities of land tenure for water service providers to Homelands in the Northern Territory was noted by research participants:

"The Traditional Owner ... is able to exempt the need for a lease if the infrastructure is being used [primarily]

for ... the benefit of the Traditional Owner or their community. You then start to get into the politics between Homeland Land Council and service provider as to whether infrastructure needs to have a lease or not. Because the bores exist ... to service that Homeland, they are not servicing anybody else. Can the Traditional Owner exempt ... service providers from needing a lease for an asset like that? That comes back to who's talking to who, there's a lot of politics involved in terms of ... It's a very murky area. ... For bores and generators, we haven't had to have a lease because that is clearly for the benefit of the Homeland, but it is still an ongoing discussion."
(Indigenous service provider representative)

Water treatment technology and operations

Sustainable water services are reliant on functional technologies – namely technological infrastructure that is designed, installed and operated to meet water quality and quantity requirement (Ross, Abey Suriya et al. 2014). Challenges relating to the selection of effective technologies, ensuring adequate skills and capacities for operation and maintenance, and compliance with the Australian Drinking Water Guidelines are outlined below.

Ensuring 'fit for purpose, people and place' technology solutions

The importance of technologies that are fit for purpose, people and place was repeatedly described through the social research. The issue arose because 'big city' thinking of system designers frequently prevails, resulting in capital solutions that are better suited to cities but inappropriate for remote communities (Mosse 2018). Options are often selected from more traditional water treatment and supply options without consideration of the whole of community perspective and reality that includes fluctuating population size during cultural gatherings (Ross, Abey Suriya et al. 2014).

The social research highlighted that decisions about water infrastructure on the ground are primarily made by engineering and technical officers, who are constrained by a funding environment which preferences capital expenditure and large infrastructure projects over small-scale, locally relevant and

collaborative water management activities that also build capacity within communities. This can lead to water technologies and practices being introduced in remote Indigenous communities which may not be ideally suited.

"We need to come up with a much more tailored approach. If we're going to put infrastructure in, we really need to think about what capacity is there to operate and maintain it? And if there's a shortfall how do we help to meet that? Otherwise we'll just end up in the situation where it will spend huge amounts of money to put infrastructure ... which has half its lifespan because it's just not run properly and it breaks down ... you have to go in there constantly and keep bailing the [service providers] out, because they've just never had the capacity to do it properly. It's a really typical short-term process thing."
(Federal Government Manager)

In some cases, innovations are undermined by cultural norms and taboos which are not identified by the implementers or services providers in advance:

"Composting toilets were put in one community to reduce water use. They spoke to people about them, then put them in. But people didn't use them because they felt really conspicuous because they were outdoors and everyone could see when they were going to the toilet and this was culturally uncomfortable. Because it was done badly, now composting toilets have a bad name up there. You need to talk it through properly with everyone."
(Federal Government representative)

Gaining a clear understanding of the local context is essential for service infrastructure, including monitoring technologies, that require concerted and culturally-appropriate consultation to ensure the technologies are desired, understood and used by residents with long-term relevance. This need for meaningful and sustained communication and engagement was emphasised by social research participants:

"..got to be ... lots of consultation to make sure that you're putting in place the right water [and wastewater] system. I think that wastewater treatment needs to be done really sensitively, but with real robust systems. I think it falls to ... having

proper accountability...”
(Research organisation
representative)

Capacity constraints for operation and maintenance of services

The long-term costs of operation and maintenance, including staff capacity and training, are frequently not allowed for in water service project budgets. This has implications for the longevity of infrastructure as noted above, as well as routine system performance.

“The [wastewater treatment] plants themselves have the capacity to treat to a very high standard, but because of the complexity it’s very hard to achieve that standard because of breakdowns and the lack of capacity of people to treat them. ... there’s a requirement for them to keep monitoring ... effluent. They might be discharging into a waterway; there’s no ongoing monitoring to see if they are meeting the standard.”
(State/Territory government
representative)

The considerable distance to larger townships and increased isolation during wet season means that water infrastructure maintenance is often reactive, with the lack of retention of adequately skilled and trained staff in remote areas being a significant issue (Hoverman and Ayre 2012, Beal, Gurung et al. 2016). High turnover of staff in remote areas further limits the community’s ability to maintain the water treatment infrastructure (Hall, Barbosa et al. 2017). Participants in the social research pointed out that greater involvement of local Indigenous people in service delivery roles is required:

“... more work [is needed for] getting some better training and getting a number of people together from the community to come together and train them up collectively ... that’s been an issue in terms of having the right people for the right amount of time to manage the plant so that they’re producing the water [that is treated to the required standard]”
(State/Territory government
representative)

Challenges for staff working cross-culturally have also been noted and form a basis for WSAA to rethink and redesign water service delivery in these locations. An appreciation of, and the cultural competency to respond to,

Indigenous history, cultures and contemporary social dynamics is needed if alternative and sustainable arrangements for essential services delivery are to be achieved (Hunt 2013). Participants in the social research reiterated that minimal staff training in cultural awareness occurred, with much community engagement delivered in culturally insensitive ways. Hence negative impacts can ensue, even where service providers are well intentioned. Comprehensive training and ongoing learning is required as outlined by the following interviewees:

“It’s not about blaming people, it’s about finding a way and prioritising what’s the most important thing to do and again helping with access to that ... you’re well-meaning, maybe, but not necessarily conscious of where your thinking is coming from. Or where your prejudice is coming from which might just be not being aware of people’s systems and their strengths”
(State/Territory government
representative)

“Very important lesson in the context of what I observe ... is that you can develop your own view of what the problem and what the solution is. But if you don’t take the time to listen and unpack it all you can find that you have your own way of thinking and it’s not necessarily taking the whole situation into account.”
(Consultant Project Manager)

Challenges in fulfilling the Australian Drinking Water Guidelines

The various state and territory government funded programs for provision of water services in remote Indigenous communities specify that water supply systems must be operated so water quality standards are consistent with the Australian Drinking Water Guidelines (ADWG). However, robust evaluation of programs is rare (Jackson, Stewart et al. 2019). Government agencies responsible for the programs recognise the practical and logistical challenges arising from remoteness, for example, to monitor water quality in the manner recommended in the ADWG (Hall, Barbosa et al. 2017).

“... a good essential services officer ... he’s taking these samples and he’s then putting them in an Esky with a couple of ice packs and he will then drop that off to the airport ... in the wet season where even if you’ve got an

airstrip Then you've got to hope that [when they reach the city airport], someone is there to pick them up within that time limit and get them to [the lab], where they can test it ... at the end of the day, you're getting maximum of 12 samples over a 365-day period.”
(Indigenous organisation representative)

These logistical challenges raise questions as to whether the risk management framework in the ADWG is being interpreted too prescriptively, specifying standards and operating procedures that are more appropriate to urban or large utility settings. Equitable access to programs and services in a remote Indigenous community means that standards need to be “broadly consistent, but not identical” to those that are appropriate for an urban community (FaHCSIA 2010, p.5).

Mutual learning

Water service provision and management in remote Indigenous communities typically operates from a Western, technocratic approach that has a limited appreciation of Indigenous perspectives of water that connects people integrally to their environment (Jackson, Stewart et al. 2019). It is unclear how the introduction of reticulated piped water supplies, amongst other things, may be changing Indigenous perspectives of water (Jackson 2006, Berry, Jackson et al. 2018). Concurrently, water literacy regarding domestic water services is widely considered to be low amongst remote Indigenous residents (Beal, Jackson et al. 2018).

However, there is a more contemporary appreciation and learning by Westerners about Indigenous ways of managing water. This presents opportunities for mutual learning and sharing of Western and Indigenous worldviews relating to the management of water resources and water services (Nelson, Godden et al. 2018). In this way, non-Indigenous people can provide the space to hear and co-develop systems with Indigenous community members- potentially resulting in different but more appropriate outcomes. This section highlights the need for learning and building sector capacity for collaboration and partnership in service delivery to remote Indigenous communities.

A systemic approach to water management which recognises the interrelations between the technical, environmental and social is

needed (Tesoriero 2010, Howarth and Monasterolo 2017, Jackson, Stewart et al. 2019). The concentration of decision-making far removed from service recipients has denied a sense of agency in remote communities despite the existence of significant local skills (Grey-Gardner 2008). Participatory governance processes are recognised as being essential, where service users are recognised as key stakeholders rather than passive recipients of services (FaHCSIA 2010, QPC 2017).

Water service providers are applying these participatory approaches in different ways and at different rates, because their conventional top-down hierarchical decision-making models have been effective in delivering infrastructure and improving public health. Inflexible program delivery goals and deadlines are often at odds with deeper community engagement methods and timeframes (Australian 2014, QPC 2017).

The social research identified the importance of one-on-one partnership building in improving service delivery in remote Indigenous communities. Building relationships within strict project timelines and high rates of staff turn-over inhibit partnership building (Jackson, Stewart et al. 2019). Research participants also noted the lack of skills building and training of staff for community engagement. Time constraints in each community due to a heavy workload meant they were limited in their ability to establish and engage in long-term relationships with communities.

“Engaging with a number of individual customers is expensive and complex. The assets being managed are expensive and we need to streamline that. ... How can utilities pursue this (community-based engagement) when the funding isn't there? Partnering with other organisations who want to achieve other benefits in communities, like adult education etc., where the activities are complementary. Building a relationship with customers is one of the benefits for us.”
(Water utility representative)

CONCLUSIONS

Synthesis of the social research projects and literature resulted in the identification of four broad themes of relevance to conditions for attaining sustainable outcomes. Firstly, water accessibility, potability and palatability needs

to be ensured all year round and to address existing issues of microbial and chemical contamination, unpalatability, and water source security.

Secondly, sufficient and sustainable funding for water and sanitation services is required to ensure appropriate and prompt response rates for maintenance and repair. Clarity of responsibilities between agencies must be addressed.

Thirdly, treatment technology for water and sanitation that is fit for purpose, people and place is crucial to effective and sustainable outcomes in combination with appropriate skills and capacities for local service operation and maintenance.

Finally, a respect for and understanding of cultural and historical aspects of the community, an appreciation and adoption of Indigenous ways of managing water, and authentic partnership development all contribute to beneficial mutual learning.

These four key conditions are relevant to the policy and practice by decision-makers and utilities to ensure adequate resources and appropriate processes to more rapidly close the gap in Indigenous equity and meet Australia's international commitments and contribute to supporting safer, more sustainable and healthier living conditions in remote Australia.

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FIGURE



Figure A: Suggested tangible contributions for consideration by utilities

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