The UN Sustainable Development Goals for Water and Sanitation:

How should Australia respond within and beyond its borders?

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The UN Sustainable Development Goals for Water, Sanitation and Hygiene: **How Should Australia Respond Within and Beyond its Borders?**

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OVERVIEW

Accessible and safely managed water and sanitation can provide a range of social benefits, including economic wellbeing, safety, upholding of rights, resilience during disasters, gender equity and public health.

Australia is positioned next to south-east Asia, where one billion people lack access to safe and accessible sanitation facilities. Half of the population in the Pacific island countries lack access to such facilities, while poor hygiene and unsanitary living conditions have contributed to children in remote Australian Aboriginal communities experiencing a higher rate of common infectious diseases than in large urban communities.

In 2000, the United Nations (UN) sought to improve access to clean, safe water (and, later, sanitation) as part of its global development agenda – which included establishing the Millennium Development Goals. These goals were significant in influencing the actions, strategies and investment focus of bilateral and multilateral development agencies, as well as influencing the foreign aid priorities of donor countries.

In 2015, the UN updated its development agenda, outlining 17 Sustainable Development Goals (SDGs) to be achieved in all countries globally by 2030. The SDGs included a goal specifically focused on water and sanitation (SDG 6) to 'ensure availability and sustainable management of water and sanitation for all'. Under SDG 6, six targets encompass the improvement of drinking water, sanitation and hygiene through reduced pollution, improved efficiency, integrated management, and protection of ecosystems; while two additional targets outline the implementation approaches. Water is explicitly mentioned in relation to four additional SDGs, those concerned with health (SDG 3), disasters (SDG 11), pollution (SDG 12), and environment (SDG 15).

Australia is one of the 193 UN member countries that formally agreed to the SDGs on 25 September 2015. Australia has outlined its commitment to the SDGs through its foreign development aid and other support, but has not clarified its intended domestic implementation of the SDGs. This new UN 'home-and-region' development perspective requires consideration of policy implementation questions as to how Australia should address the water-related aspects of the SDGs to attain equity and wellbeing both within its own borders and through assisting nearby neighbours. This policy challenge is explored in this discussion paper ahead of the high level political forum in July 2016, which Australia's Prime Minister is expected to attend.

There are at least three strategic options for Australia in supporting the attainment of the SDGs both domestically and within the Asia Pacific region. These can be termed a business as usual approach; a focus on removing specific 'roadblocks' to improvement; and adopting a more holistic, integrated approach to the attainment of the SDGs.

The business-as-usual approach would have little impact, since it would take a check-list or siloed approach which is likely to overlook the complex interlinkages, trade-offs, synergies, positive and negative feedback loops, and it could neglect the need for adequately preparing foundational conditions prior to interventions towards SDG targets. The removing 'roadblocks' approach provides a narrow obstacle-focused approach to the attainment of a diverse set of aspirational goals. Integrated thinking and operationalisation using a systems approach to problem-solving allows SDG targets to be identified that contribute to multiple goals, and prioritises these critical targets to increase the impact and feasibility of achieving the SDGs.

A 'whole of system' approach is recommended to guide Australia's planning in response to SDG 6 to ensure enhancements and avoid unintended or perverse outcomes. This discussion paper presents seven recommendations for Australian Government agencies to consider in their SDG planning and attainment:

- Recommendation 1 – Identify the status of SDG 6 challenges both within Australia and in our region
- Recommendation 2 – Apply SDG 6 targets both within Australia and in our region
- Recommendation 3 – Adopt appropriate government policy coordination arrangements and oversight
- Recommendation 4 – Monitor the achievement of the SDG targets in Australia and our region
- Recommendation 5 – Consider the SDGs as a coherent 'set' with interlinkages and feedbacks
- Recommendation 6 – Adopt a systems approach to ensure positive synergies and avoid perverse effects
- Recommendation 7 – Support SDG 6 through Integrated Water Resource Management frameworks.

A companion discussion paper from The University of Queensland to accompany this will be published in September 2016. It will propose a systems map of the 17 SDGs to achieve the best outcomes, and offer a practical road map for the implementation that reflects these recommendations.

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1. BACKGROUND

Water contributes to social equity and wellbeing

Water supports human survival from the broad ecophysical environment to crucial bodily needs, and is the foundation for many economic and domestic activities. Equity of water access, distribution, and ownership can influence levels of social wellbeing including in terms of bodily health, availability of green space and agricultural viability and energy generation (Goff & Crow, 2014). The influence of water on equity and wellbeing has been described as:

> *Like money, access to water is a prerequisite for many people to get a better life. As a consequence, water equity can be a matter of concern for justice, just as equity in incomes is.*
>
> Goff and Crow (2014), p.159.

The United Nations (UN) has identified that clean, accessible and safely managed water supply and sanitation can contribute to a sustainable environment (UN, 2000). Accessible and safely managed water and sanitation can provide a range of social benefits, including:

- **Economic wellbeing**: Improved management of water and sanitation can increase health and economic outputs through disease prevention and for recreational and agricultural needs (Prüss-Üstün, Bos, Gore, & Bartram, 2008). Assessments by the Asian Development Bank (ADB 2013) have identified that a $1 investment in clean water and associated sanitation can deliver up to $12 in economic and health benefits through increased productivity and avoided ill health (ADB, 2013).
- **Safety**: Ending open defecation can reduce vulnerability to physical attack and health issues from contact with faeces, especially for women and children (Schrecongost & Wong, 2015; UN, 2000).
- **Upholding of rights**: Survival rights provide the basic requirements for existence – including water. In addition, water is an environmental right – reflecting the right of people to a sustainable and healthy environment (Reisch, Ife, & Weil, 2013).
- **Resilience during disasters**: Safe water and associated sanitation is the equal-highest priority to food and shelter in disaster situations to prevent morbidity and mortality (Crisp, 2011).
- **Gender equity**: Negative impacts from unsafe water are higher for children and women, who more often transport, access, use and manage water for the household (Cleaver & Hamada, 2010; Manou, 2014; Schrecongost & Wong, 2015; UN, 2000).
- **Public health:** Providing clean, safe drinking and bathing water can reduce infectious diseases and its related toll on educational attainment, public health costs and economic productivity (Jenkins, 2016).

Challenges to achieving adequate drinking water and sanitation in remote Australia, Asia and the Pacific

Australia is positioned next to south-east Asia, where one billion people lack access to drinking water that is free of contamination (known as an 'improved' drinking water source) and sanitation facilities that separate humans from contact with their excreta (known as 'improved' sanitation) (WHO & UNICEF, 2014, 2016a). Only half of the population in the Pacific Island countries have access to such facilities (WHO ROWP, 2008). These issues are displayed in **Error! Reference source not found.**. Of interest, the Australian results indicate that the e ntire population has access to improved water supply and sanitation. However, this does not reflect the situation that poor hygiene and unsanitary living conditions have contributed to children in remote Australian

Aboriginal communities experiencing a higher rate of common infectious diseases than in large urban communities (McDonald, Bailie, Brewster, & Morris, 2008).

Table 1: Snapshot of 'improved' drinking water and sanitation in the Asia Pacific region (selected countries)

Criteria	Indonesia	The Philippines	PNG	Solomon Islands	Australia
% population with improved water supply (2014)	86.8	91.5	40	81	100
% population with access to improved sanitation facilities (2014)	60.6	73.2	19	30	100
% total deaths related to water, sanitation and hygiene (2002)	3.5	5.2	10.4	11.4	0.3

(Sources: (AECOM & EAWAG, 2010; Prüss-Üstün et al., 2008; World Bank, 2015))

Australia

There are hundreds of remote Aboriginal communities in Australia, ranging in population size from single family groups to more than 2000 people. The Australian Government has provided housing, water and sanitation to these communities since the 1970s (Bailie, Stevens, McDonald, Brewster, & Guthridge, 2010). However, residents in these communities suffer from water- and hygiene-related health concerns at a greater rate than the general Australian population (McDonald et al., 2008). These health problems can result from poor maintenance of water delivery and sanitation systems, unhygienic child toileting practices and overcrowding in homes. An example is in Western Australia, where a survey reported drinking water quality below the recommended Australian standards, and some water supplies in remote communities tested positive for *E. coli* or *Naegleria* microbes (AG WA, 2015). In addition, some water supplies exceeded safe levels of uranium by up to double the level allowed for under the Australian drinking water guidelines (NHMRC, 2011), and nitrate concentrations were above the safe recommended levels (AG WA, 2015). Some of this was attributed to ineffective and irregular testing regimes of the wastewater systems (AG WA, 2015).

Research recommends that multifaceted health promotion interventions are the most likely to improve water-related health outcomes in these communities. This includes encouraging behaviour change, infrastructure maintenance, and a broad program targeting sanitation, nutrition, education and primary health care (McDonald et al., 2008).

Asia

In south-east Asia, the UN has highlighted a number of regional water challenges: water-related vulnerabilities associated with natural disasters and climate change; a need for Integrated Water Resource Management (IWRM) that considers the impacts of and on water from other activities and sectors; and inadequate investments in water infrastructure (Karazhanova, 2015).

Specifically in Indonesia, safe drinking water and sanitation is anticipated to improve population health (ADB 2012). However, existing water and sanitation challenges include poor quality and ageing sanitation infrastructure, causing contamination to waterways and groundwater; decline in quality and quantity of urban drinking water – in part due to rapid urban population growth; and low community awareness of safe water and sanitation behaviour. These challenges are related to inadequacies in regulatory frameworks, institutional and governance arrangements, policy coordination and implementation, investment, and maintenance of treatment systems (AECOM and EAWAG 2010, ADB 2012). On the densely populated island of Java, in

particular, the 'hotspots' requiring urgent water infrastructure and management are the growing urban centres (ADB 2012).

In the Philippines, water and sanitation challenges include inadequately treated municipal and industrial wastewater and agricultural runoff polluting waterways and vacant land; inadequate water and wastewater management infrastructure and policies; and low investment (AECOM & EAWAG, 2010; UN Water, 2013; UNICEF, 2012). As a result, intestinal worm infection rates are higher than most countries in south-east Asia at 67 per cent of the population (UNICEF, 2012). In lower-income communities, schools often lack safe drinking water and sufficient toilets (UNICEF, 2012).

The Pacific

Pacific island countries are rated globally with some of the lowest rates of water and sanitation coverage (Hadwen et al., 2015; World Bank, 2015) (see Box 1). One of the contributing factors to low access to water and sanitation is rapid urbanisation, resulting in the expansion of informal settlements outside the larger cities. In Melanesia (including Papua New Guinea), this shift is occurring at up to four per cent annually (Schrecongost & Wong, 2015). These settlements often lack formal water and sanitation services, with inconsistent supply and from untreated sources, and sanitation consists of shared, open latrines or open defecation (Schrecongost & Wong, 2015).

An emerging risk to freshwater supplies and to existing water infrastructure in both Asia and the Pacific is that of climate change, causing an increase in occurrence and intensity of extreme weather events and sea-level rise. Given the interlinkages between disaster impacts and water and sanitation infrastructure, Integrated Water Resource Management could provide a holistic framework within which to manage current and future water resources (Hadwen et al., 2015).

Box 1: Water, sanitation and hygiene challenges of Pacific Small Island Developing States

Fifteen countries[1] in the Pacific region identify as Small Island Developing States (SIDS) (SIDS, United Nations, 2016). Although progress towards achieving improved water and sanitation has been made in some nations, the region overall did not meet the UN Millennium Development Goal for water and sanitation; by 2015 access to improved water sources had only reached 54.1% and improved sanitation 31.6% (WHO & UNICEF, 2016b). To address this, the UN will provide increased resources for achieving the Sustainable Development Goals (SDGs) in SIDS. SDG investment in water, sanitation and hygiene (WaSH) will emphasise greater resource allocation for mitigating and adapting to climate change (United Nations, 2015). Climatic changes such as increased severity of tropical cyclones have led to the destruction of WaSH infrastructure. Combined with high temperature increases, drought and poor hygiene conditions, this has resulted in infectious disease outbreaks (McNamara & Prasad, 2014; Meehl, 1996; Singh et al., 2001). Extreme climatic events and sea level rise also cause saltwater intrusion to freshwater sources that provide important drinking water supplies for many communities residing on coral atolls (Terry & Falkland, 2010). Furthermore, extreme events linked to climate change are anticipated to increase in both frequency and intensity across the Pacific region (Church, White, & Hunter, 2006; Webster, Holland, Curry, & Chang, 2005).

The impacts of climate change on WaSH are further compounded by rapid urbanisation in the Pacific SIDS (Lau, Smythe, Craig, & Weinstein, 2010). Limited affordability of housing within urban areas has led to an increase in informal (squatter) settlements (Davis, 2006), and those residing in such settlements have less opportunities to access formal WaSH services than those living in formalised urban areas (Schrecongost & Wong, 2015). Settlements have a high occurrence of WaSH-related diseases which may be transferred to the general public as inhabitants of informal settlements interact with the population at large. To address the needs of the growing informal population, Papua New Guinea has recently developed a WaSH policy which focuses on peri-urban and urban informal settlements and rural communities (Department of National Planning and Monitoring, 2015). Many other Pacific SIDS have focused WaSH policy development in rural areas (Solomon Islands, Ministry of Health and Medical Services, 2014; e.g. Fiji, Ministry of Works, 2012), while there is a lack of planning towards improving WaSH in informal settlements.

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[1]Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Timor Leste, Tonga, Tuvalu, Vanuatu

The UN Sustainable Development Goals

Access to clean, safely managed water and sanitation are key interventions for primary health prevention and could reduce the global disease burden by almost ten per cent (Cameron, Hunter, Jagals, & Pond, 2011; Prüss-Üstün et al., 2008). The United Nations sought to address this situation through its development agenda in 2000, the Millennium Development Goals (MDGs). These covered reductions in extreme poverty and hunger to promoting gender equity and reducing child mortality, by the target date of 2015 (SDGF, 2015). The 189 UN member countries that adopted the MDGs considered it the collective responsibility of both developed and developing countries to work towards these goals and their respective targets (DFAT, 2016a). The MDGs had a strong influence on the actions, strategies and investment focus of bilateral and multilateral development agencies, as well as influencing the foreign aid priorities of donor countries (Le Blanc, 2015). With regards to water, the MDGs sought to increase access to improved drinking water and sanitation. The drinking water target was achieved while the sanitation target was not achieved (Jenkins, 2016).

In 2015, the UN released its updated development agenda, 'Transforming Our World: The 2030 Agenda for Sustainable Development.' This agenda outlined 17 Sustainable Development Goals for achievement by 2030 (see Box 2), including one specifically focused on water and sanitation (SDG 6) to 'ensure availability and sustainable management of water and sanitation for all' (UN, 2015). These are displayed in Figure 1. The 17 SDGs resulted from intergovernmental discussions that reflect a diversity of concerns and interests, but is not presented in a coherent systemic structure that displays the influences of the goals on each other (Le Blanc, 2015). In contrast to the MDGs, the SDGs apply to all countries and citizens, irrespective of their level of development (UNESCAP, 2014; Watson, Thwaites, Griggs, Kestin, & McGrath, 2014).

Figure 1: United Nations Sustainable Development Goals 2015-2030 (UN 2015a)

Sustainable Development Goal 6: Water, sanitation and hygiene

Access to safely managed drinking water and sanitation is explicitly addressed in UN Sustainable Development Goal 6, as outlined in Box 2. Under SDG 6, eight targets are outlined. Six of these SDG 6 targets are provided that reflect the breadth of this goal; these targets are related to drinking water and sanitation, as well as addressing pollution, improving water use efficiency, integrating management and protecting ecosystems. Two additional targets outline the implementation approaches of Goal 6 through international cooperation, capacity-building and local community efforts (UN, 2015). For each target, a set of indicators detail how these targets can be monitored for progress and implementation (WHO & UNICEF, 2015).

SDG 6 encompasses the focus on 'water, sanitation and hygiene' (WaSH), particularly in targets 6.1 and 6.2. WaSH is an established focus on specific development and aid programs, such as those conducted by UNICEF and the World Health Organisation, and the associated foci of Australian aid programs. The focus on WaSH reflects a common understanding by these agencies that safe and sufficient drinking-water, alongside adequate sanitation and hygiene, can reduce child mortality, improve maternal health, combat infectious diseases, and contribute to environmental sustainability (UN Water, 2014). The SDGs have placed WaSH at their core by listing these within the first two targets, but have expanded the action on water provision beyond human use and interaction and towards a structural, ecosystem and governance approach (UN, 2015).

Box 2: The UN Sustainable Development Goal 6

Goal 6. Ensure availability and sustainable management of water and sanitation for all

Action targets:

6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all

6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimising release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity

6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate

6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

Means of Implementation:

6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies

6.b Support and strengthen the participation of local communities in improving water and sanitation

(UN, 2015)

Beyond SDG 6, water is explicitly mentioned in relation to SDG 3 (health impacts from water-borne diseases and contaminated water), SDG 11 (water-related disasters), SDG 12 (water pollution), and SDG 15 (conservation of freshwater ecosystems) (Jenkins, 2016; UN, 2015). This regular mention of water within the other SDGs beyond SDG 6 reflects the interdependence of SDG 6's successful attainment with other goals. This interdependence reflects a challenge and an opportunity, which is considered in the following section regarding options.

Australia's commitment to achieving the SDGs

Australia is one of the 193 UN member countries that formally agreed to the SDGs on 25 September 2015. In doing so, the Australian Government stated on its website that the SDG agenda:

> *'…helps Australia in advocating for a strong focus on economic growth and development in the Indo-Pacific region, and in promoting investment priorities including gender equity, governance and strengthening tax systems. It is also well aligned with Australia's foreign, security and trade interests especially in promoting regional stability, security and economic prosperity' (DFAT, 2015b).*

The focus on Australia's aid contribution to the Asia Pacific region reflects the financial and human resource investment that Australia has contributed to a range of government, non-government, corporate and multilateral organisations in the region to provide clean water and basic sanitation access and hygiene behaviours – totalling around AUD $170million over eight years (DFAT, 2015c). This water, sanitation and hygiene (WaSH) focus is particularly strong in the Pacific, with the Australian Department of Foreign Affairs

and Trade (DFAT) noting that Australia can contribute 'experience and expertise in managing complex water and sanitation challenges for sustainable economic growth and for good health' (DFAT, 2016b).

With WaSH increasingly being integrated with broader water management, the DFAT aid program on 'water for development' also includes water resource management, water infrastructure financing and policy reform, engagement with the private sector, innovation and capacity building – particularly in Asia (DFAT, 2016b). This aid contribution is complemented by initiatives that link with the private sector to enhance social development. This approach is outlined in the Australian Government's Independent Review of Aid Effectiveness, under Recommendation 21:

> *The power of business should be harnessed and business innovation should be encouraged, including through an annual consultative forum.*
>
> AusAID (2011) p.21

In the Pacific, the role of the private sector has been realised through activities such as those undertaken by the Australia-Papua New Guinea Business Council for a high-level council of business and government to work together to achieve improved development outcomes (Callan, 2012). Such aid and other support corresponds to the UN Economic and Social Commission for Asia and the Pacific (UN ESCAP) acknowledgement that the capacities of many countries to achieve the SDGs are 'inadequate to meet the level of ambition' (UNESCAP, 2014). In Asia, Australia uses its regional aid program to support the Association of Southeast Asian Nations (ASEAN) regional economic integration agenda and the aid-for-trade objectives under the Australian Government's aid policy (DFAT, 2014). For example, Australia's Mekong Water Resources Program aims to protect the 40 million people who rely on the Mekong River for their livelihoods and better manage the region's water resources for economic opportunities (DFAT, 2015a).

SDG policy implementation questions for Australia

Despite Australia's commitment to foreign development aid and other support for neighbouring countries in the Asia Pacific, it is noted that a domestic focus is not provided in the above description and statement. This is despite the intention of the SDGs to be applied to all situations where improvements could be achieved. Indeed, Griggs et al (2013) advised that the targets for the application of SDGs to both developed and developing countries will ensure that the resulting sustainable development has a total 'people and planet' coverage. For Australia, this domestic – as well as regional – focus would necessarily include considering the health issues noted previously in some Aboriginal remote communities and elsewhere.

With this new home-and-region perspective, the policy implementation question is therefore: *how should Australia approach addressing all water-related aspects of the SDGs to foster equity and wellbeing both within its borders and to nearby neighbours?* This policy question is explored in this discussion paper, and is prepared ahead of the UN high level political forum in July 2016, that will provide a progress review on the SDGs and to which Australia's Prime Minister was appointed as one of ten Heads of State and Government (UN News Centre, 2016). This forum is a new UN entity to replace the former Commission on Sustainable Development, and is mandated to integrate the agendas on human and social development with sustainable development, and provide political leadership on this progress to SDG attainment (DFAT, 2015b).

2. OPTIONS

Australia's public commitment to the SDGs creates an expectation from other country signatories that Australia will strive to attain the targets. There are at least three possible strategic options for Australia to support the attainment of the SDGs both domestically and within the Asia Pacific region. These can be termed a business as usual approach, removing specific 'roadblocks' to improvement, and adopting a more holistic, integrated approach to the attainment of the SDGs.

a) Business as usual approach

At a minimum, Australia could contribute to SDG 6 attainment within Australia (namely, remote Aboriginal Australia) and within the Asia Pacific by systemically planning responses against each target in a list-based approach – and applying the UN's recommended indicators to evaluate impact. Within Australia, the indigenous health budget could continue to be directed towards hygiene behaviours. Within the Asia Pacific, Australia could ensure that its aid funding supports the appropriate organisations to achieve the indicators in recipient countries.

b) Remove specific 'roadblocks' to improvement

An second approach to SDG 6 attainment is to initially identify and then remove the existing 'roadblocks' or challenges to SDG attainment. Two examples provided here are the provision of sustainable water infrastructure and to build institutional capacity – especially through governance mechanisms.

Infrastructure provision

There is a tendency by multilateral development banks and development organisations to focus on infrastructure provision to achieve water and sanitation access. For example, the Global Infrastructure Forum is a UN and Multilateral Development Bank event that states 'bridging the infrastructure gap is essential to achieving the Sustainable Development Goals and ending poverty' (World Bank, 2016). Similarly, Casier (2015) identifies that SDG attainment relies on infrastructure that is ideally sustainable over the longer term and across the lifecycle. With regard to SDG 6, the report proposed that 'sustainable water infrastructure will improve people's lives by providing access to water and help managing scarce resources in a sustainable manner' (Casier, 2015), which could occur at both a small, local-scale or a larger, urban-scale.

Effective governance

A number of publications identify how institutional capacity and associated governance mechanisms are critical to manage, maintain and monitor WaSH services – including WaSH-related infrastructure (Jenkins, 2016; Schrecongost & Wong, 2015). This includes coordination across implementing agencies, donors, civil society organisations and on-ground staff (Jenkins, 2016). A lack of governance mechanisms and supporting regulation can prevent the provision of essential WaSH infrastructure and delivery. This is pertinent in informal settlements, often in a peri-urban setting, where utilities may not be obliged to provide services, the delivery can be more complex than formal urban settlements, or service level targets for WaSH in informal settlements have not been established (Schrecongost & Wong, 2015).

Despite the value in concentrating efforts and investment in essential aspects that may be lacking in some contexts, including water infrastructure and effective governance, this focused approach may not result in attaining the breadth of the SDG 6 targets.

c) A holistic, integrated approach to the attainment of the SDGs

The business-as-usual 'list-based' or siloed approach has been oft-criticised by commentators as likely to overlook the complex interlinkages, trade-offs, synergies, positive and negative feedback loops, and not adequately preparing foundational conditions prior to interventions towards SDG 6 targets (Griggs et al., 2013; Juech & Michelson, 2011; Le Blanc, 2015; Nilsson, Griggs, & Visbeck, 2016). Without understanding these interlinked foundations, it is difficult to develop coherent and integrated policies, appropriate investment and implementation benefits (Le Blanc, 2015). The reducing 'roadblocks' approach provides a narrow obstacle-focused approach to the attainment of a diverse set of aspirational goals. In addition, it may result in unintended consequences if infrastructure needs are not developed with genuine participation of beneficiaries and using community-centre design approaches. Instead, Juech and Michelsen (2011) and Le Blanc (2015) propose that sustainable development responses require a move from this siloed thinking to *integrated* thinking using a systems approach to problem-solving. With this systems perspective, SDG targets can be identified that contribute to multiple goals, and prioritising these critical targets can increase the impact and feasibility of achieving the SDGs (Le Blanc, 2015).

The UN identified, from its experience with MDG attainment- particularly in Pacific Island countries, that development must initially address the 'root causes' of structural inequalities of development (UNESCAP, 2014). Towards this aim, a range of alternative models have been proposed, from models centred on economic growth to ones that are human- and justice-centred, and which use broader indicators of social progress that capture qualitative social aspects of wellbeing (Salvaris, 2015; Stiglitz, Sen, & Fitoussi, 2009; UNESCAP, 2014). Such approaches expand the conversation to embrace the range of interlinkages, interactions and synergies between development issues. Such interactions, including those between sanitation provision and water security, or water quality and associated health risks (Hadwen et al., 2015), may affect the ability to achieve other SDG 6 targets if these are not identified and managed holistically as a 'set'.

Currently, the systemic links between the SDGs and associated targets are not explicit (Le Blanc, 2015). However, there is an acknowledgement within the UN that the SDGs should be considered through an integrated approach (Nilsson et al., 2016), noting that 'sustainable development interventions cannot be put in an economic, social and/or environmental box' (UNESCAP, 2014). One UN organisation proposed a system-based approach to prioritise all SDGs that contribute to achieving the SDG 6 target (Karazhanova, 2015). Other commentators have emphasised that a holistic/ integrated approach to SDG 6 is needed, for example, to 'ensure that actions to achieve one goal are synergistic with achieving another goal rather than undermine them' (Watson, Thwaites et al. (2014), p.5). Such an approach would provide clearer policy guidance than the list-based approach. However, achieving 'policy coherence' could be challenging in a governance structure such as Australia's, where government departments are separated into issues-based portfolios, and decision-making processes do not necessarily include tools for identifying interactions and feedback impacts of different policies (Nilsson et al., 2016).

Integrated Water Resource Management (IWRM) is a systems approach that seeks to identify and understand the interlinkages and feedbacks between physical, economic and social sustainability aspects in a water catchment, community or other identified systems (Hadwen et al., 2015). Hadwen and Powell (2015) recommend that an IWRM framework to guide water and sanitation service provision would enable multiple issues to be considered together during decision-making on the SDG 6 targets. For example, programs that increased WaSH services could also build community resilience to future impacts of extreme weather events. The operationalisation and implementation of the IWRM approach may be new for many countries

considering how to implement SDG 6. For example, many Pacific Island countries experience limited inter-agency communication and low capacity of government administration (Hadwen et al., 2015).

Box 3: Incorporating catchment management is essential to support sustainable water quality and quantity for small rural communities

80% of Solomon Islands population reside in rural areas. Of these 23% (100,000 people) do not have access to an 'improved' water source. Typically, 'improved water sources' in Solomon Islands refers to centralised standpipes fed by piped untreated water from natural river systems. This metric is often used as an indicator of access to 'safe' water quality that is water of acceptable health-related quality. In many contexts the piping of water from reservoirs to areas of higher population density has greatly improved access to water of improved quality especially if the water is somehow treated to reduce the risk of faecal and sediment contamination that can be associated with population centres (Esrey, Potash, Roberts, & Shiff, 1991). However, in the Pacific context where many areas have low population density such as the Solomon Islands, many communities are without 'improved' water sources and access good quality water from natural streams draining forested catchments. In these systems, the dominant drivers of water quality are the land uses and ecosystem conditions in the catchment rather than the level of 'improved' infrastructure in the villages. The trend away from the MDG 7c (which focussed solely on 'halving of the population without access to improved water sources') towards the SDG 6.5 and 6.6 (which focus on integrated water resource management and protecting and restoring water-related ecosystems, such as forests) is an important step. Further recognition of the importance of managing land use within water catchments is critical for sustainable water supplies for remote rural communities of the Pacific (Postel & Thompson, 2005). Once these catchments are disturbed through extractive industries, such as logging and mining, it can create a generational scale dependence on 'improved' water infrastructure such as weirs, pipes and tanks to source and store water from alternative sources. In this sense, the careful management of 'unimproved' water sources such as natural streams can be a more effective tool to provide sustainable, clean sources of water for remote communities over the long-term. In contrast, an increase in the proportion of 'improved' water sources can in some cases be an indicator of poor catchment management, where the construction of infrastructure results from the loss of forests ecosystem service that previously underpinned water sources in rural areas for generations.

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3. RECOMMENDATIONS

Given that SDG 6 is one of 17 SDGs, and SDG 6 itself has eight targets, it has been noted that an immediate challenge is for countries to identify where to begin, and which goals and targets to prioritise to make the SDG development agenda achievable (UNESCAP, 2014). As described in the above section, a 'whole of system' approach is recommended to guide Australia's planning in response to SDG 6 to ensure enhancements and avoid unintended or perverse outcomes. To that end, the seven recommendations below set out some initial steps for Australian Government agencies to consider in their SDG planning and attainment.

Recommendation 1: Identify the status of SDG 6 both within Australia and in our region

To adequately initiate actions and prioritisation to achieve the SDGs, it is recommended that a baseline analysis is conducted to identify where Australia and its neighbouring regional countries are positioned against the indicators of the 17 SDGs. Once this baseline is known, resources and actions can be prioritised for action and investment. In Australia, the WaSH and broader water-related health needs of remote Aboriginal communities represent a comparatively small portion of the total Asia Pacific population that could benefit from SDG 6 attainment. However, the SDG 'home and region' focus emphasises that SDGs will not be attained by 2050 unless all communities and households benefit.

Recommendation 2: Apply SDG 6 both within Australia and in our region

Unlike in the previous MDGs, the new set of UN development targets require action on sustainability in the 'home' country of the signatories. For Australia, significant issues still remain on safe water, effective sanitation and adequate hygiene practices, to maintain required standards of public health and its associated effects on social wellbeing. This is particularly needed in remote Aboriginal communities. It is recommended that, in addition to supporting countries within the Asia Pacific region through targeted aid programs for WaSH, Australia must identify, scope, fund and operationalise the gaps in Australia in order to achieve SDG 6 at 'home'.

Recommendation 3: Adopt appropriate government policy coordination arrangements and oversight

To ensure that the SDGs are approached as an integrated set by the Australian Government and implementing organisations, it is proposed that relevant government arrangements are adopted at a federal level, but within an agency that can cooperatively work with states and territories. Such an agency would draw together interdisciplinary knowledge relevant to the diverse topics of the SDGs, would be in a central role with respect to engagement with the associated government departments, and would enable cooperative sharing of information, on-ground implementation initiatives, and monitoring and evaluation. The existing Department of Prime Minister and Cabinet could adopt this coordinating and oversighting role. This Department could work in close liaison with the Sustainable Development Solutions Network (SDSN), which was established internationally (with an Australian node) to support the implementation of the SDGs by the Australian Government and other stakeholders. Members of this network include research organisations, such as The University of Queensland, that can conduct research into the current status of SDGs and the existing needs for interventions to achieve adequate water, sanitation and hygiene, and can monitor the implementation of initiatives.

Recommendation 4: Monitor the achievement of the SDG targets in Australia and our region

The indicators that monitor the achievements of the UN SDGs are soon to be released in entirety. Once released, monitoring is required to measure progress against these goals. It is recommended that appropriate data sets are accessed to inform Australia's monitoring and evaluation, and to aid decision-making. Such data is gathered through partnerships and systems that include the World Bank's Wealth Accounting and Valuation of Ecosystem Services (WAVES), the UN System of Environmental-Economic Accounting (SEEA), the Global Environmental Monitoring Initiative (GEMI), the WHO and UN Joint Monitoring Program (JMP), and – specifically on water and sanitation – the Global Analysis and Assessment of Sanitation and drinking water (GLAAS).

Recommendation 5: Consider the SDGs as a coherent 'set' with interlinkages and feedbacks

All 17 SDGs are interlinked, and SDG 6 attainment is affected by the goals that provide the foundation conditions required for safe drinking water, effective sanitation, clean environments and effective governances to achieve the eight targets within SDG 6. It is recommended that the synergies and benefits underpinning the 17 SDGs are considered as a 'set'. Additionally, it is recommended that the eight SDG 6 targets are also considered as a set, and are arranged to identify the interlinkages at the target level. This should occur before Australian action plans to attain SDG 6 are developed.

Recommendation 6: Adopt a systems approach to ensure positive synergies and avoid perverse effects

To consider the 17 SDGs within a set, it is recommended that a systems approach is applied to identify the interlinkages. This task should be developed from a range of stakeholders with diverse disciplinary expertise, and mapped using a systems thinking approach. Once completed, this map can support the response to the research question of 'where and how should the Australian Government start to implement the UN Sustainable Development Goals?.' A second discussion paper from The University of Queensland will propose a systems map of the 17 SDGs to achieve the best outcomes for water and sanitation access. It will also propose a practical road map for the implementation of the eight SDG 6 targets in a way that reflects these recommendations. This will be published to coincide with the September 2016 International River Symposium in New Delhi, India, and discussed with water managers from the Asia Pacific region.

Recommendation 7: Support SDG 6 through Integrated Water Resource Management frameworks

IWRM is a popular and well-known concept for a holistic consideration of the physical, social and economic aspects of water management within a catchment. What is required is an appropriate enabling environment for adequate operationalisation and implementation of IWRM in Australia and the region. This includes development of IWRM-relevant decision support tools, planning, behaviour change mechanisms, consideration of financing and ownership mechanisms for water treatment and provision.

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