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Scope and purpose

With respect to matters and questions raised in the March 2017 Productivity Commission *Issues Paper* this submission provides comment and observations in the areas of rural and urban water services, effects of environmental change (climatic and demographic) and water allocation for Indigenous social, economic or cultural purposes

The contextual focus of this submission is on the productivity implications of the provision of domestic water from private (non-scheme) supplies in isolated communities and settlements, on farming and pastoral properties and commercial and industrial enterprises in regional Australia. Arguments made to support the contention that productivity can be maintained and enhanced and regional development sustained by ensuring that the private water sources used by people and businesses in rural and remote regional is adequate, secure and safe.

Domestic water is operationally defined as: *Water used day to day by people for indoor and outdoor household and commercial purposes including drinking, preparing food, bathing, washing clothes and dishes, brushing teeth, watering gardens, swimming pools and children's play.*

Securing adequate safe domestic water for rural and remote regional Australia goes beyond potable/drinking water supplies. As defined above, domestic water encompasses all uses by which people can come into physical contact with their water resources. And, because of its quality, the water may or may not be a risk to their health.

Setting the scene

As broadly framed by the *Issues Paper*: constitutionally, water resources management in Australia belongs to the states and territories. The exception is the Murray Darling Basin which is managed pursuant to the Commonwealth Water Act 2007. Currently, there is no National Water Plan and the water resources plans for each jurisdiction are in different formats and levels of completion. As well, the machinery of government used by Australian governments to manage the quantity and quality of supplies differ. In some cases, one department covers both and in others responsibility is vested in different departments. Consequently, information on the sources and quality of water for domestic purposes is spread across a range of governmental reports and papers in the technical and scientific literature.

Australia wide it is difficult to develop an appreciation of the scope of issues confronting the provision of domestic water supplies in rural and remote regions. Recognition of the

importance of ‘secure and safe domestic water’, as a key area of issue for maintaining rural productivity and ensuring sustainable regional development, needs to be underpinned by sound qualitative and quantitative information.

Rural and remote regional Australia is characterised by its geographically diverse biophysical and socio-economic regional conditions. Information on the provision of domestic water needs inter-jurisdictional coordination at regional and catchment scales. This would entail working with neighbouring jurisdictions and existing and future organizations to manage and protect the regional water supply. Protecting cross-border watersheds from inappropriate and unsustainable developments that would degrade water quality, is essential.

Communities, commercial enterprises and rural properties in rural and remote regions in Australia are largely dependent on poorly understood rainwater, surface and ground water resources. Additionally, primary industry based economic activity along with the people living in these regional areas can be severely imperilled by extreme weather, changing climatic conditions and the adequacy and quality of the accessible water sources. More specifically, these factors impact on the provision of domestic water supplies from rainfall capture, surface flows, and shallow and deep aquifers.
Community water services provided by individual LGAs differ greatly in towns and settlements with reticulated systems depending on the size of the population, levels of private and commercial demand and availability of resources. These have jurisdictional statutory protraction with respect to quality standards and health risk.

Private supply systems for homes, homesteads and commercial and community premises differ with sources being used, the adequacy of the resources and the amount of water being consumed by individuals. Australia wide, no statutory protection with respect to water quality and health is provided to people on farms, pastoral properties and commercial premises who are using private supplies. And arguably this has broad productivity implications.

Concerns have been raised over the quality of water that is available and the level of treatment for domestic use in regional Australia. Poorly managed domestic water supplies for homes in settlements or on rural properties can lead to outbreaks of disease causing serious illness that in some circumstances can lead to death. For example, considerable governmental and public concern is emerging over the potential lethal health risk from the amoeba *Naegleria fowleri.* Recently, this organism has been identified as the cause of death of four children from rural properties in Queensland.

Australia wide untreated domestic water from private sources is used in homes, homesteads and commercial premises in rural and remote regions. Sources of domestic water supplies include:

- Rainwater–collected from roofs and stored within a tank for future use.
- Surface water–drawn from rivers, creeks and dams which may or may not be stored in a tank prior to use.
- Groundwater–drawn from bores, wells or springs which may or may not be stored in a tank prior to use.
- Carted water–from a mains or town water supply, transferred by tanker and stored in a tank prior to use.

Commercial and community premises with private drinking water supplies include:

- Food outlets such as cafes, restaurants and mobile caterers
- Accommodation premises such as hotels, motels, guest houses, bed and breakfast, station/farm stay and backpacker accommodation
- Caravan parks and camping grounds, including education and social organisation camps

- Schools and child care centres
- Hospitals and residential aged care facilities
- Recreation and sporting facilities including community halls and show grounds
- Petrol stations and roadhouses
- Mines and remote project construction, operation and maintenance worksites

At the property and enterprise scale anecdotal information is readily available to illustrate that productivity on rural properties and commercial ventures can be reduced and personal health imperilled by sickness due to bacteria and viruses in the domestic water supplies being used. These illnesses are usually not reported. Jurisdictionally and nationally there are no formalised mechanisms to aggregate data on the impacts of poor quality domestic water on rural productivity that could easily be measured by:

- Surveying frequency of presentation to medical services
- Determining costs of medical services and pharmaceutical products
- recording time lost from and on the workplace due to water quality related illness
- assessing impacts of time lost on production schedules and harvested yields

In short, although productivity losses at the property scale are unquantified they could, when aggregated, be significant. And this is an avoidable loss if water sources are secured and simple treatment methods are used to reduce health risks.

Arguably, the provision of secure and safe domestic water supplies is an 'inter-jurisdiction' challenge that must be addressed as a matter of urgency if the vision for the sustainable development of rural and remote regions is to be realised. Especially, for example, if the proposals for the future large agricultural development in Northern Australia are to be implemented. Anecdotal information is available that people are concerned about the availability, cost and quality of the domestic water supplies where they could be living and this is a key factor in personal and family decisions to relocate to remote regions. Understanding of this potential impact on rural productivity needs to be moved from conjecture to measured data and synthesised information.

In this context, on-site knowledge of the quality of the water sources and levels of treatment used by LGAs, as well as for private and commercial premises, is required in order to:

- identify the adequacy and quality of the water resources being used
- dimension possible hazards and risks
- determine management actions that need to be taken when water supplies are found to be a potential threat to population health

Systematic information on domestic water conditions across Council areas could be obtained using the following:

- Structured and unstructured consultations with governmental bodies involved in the assessment and management of water resources and the provision of domestic water services at catchment and local scales in rural and remote regions.
- Surveys of water source and quality for public and private supplies.
- Surveys of water treatment provision for public and private supplies.
- Water quality awareness and risk management response activities at local community, individual home/homestead, public facility and commercial premises scales.

Annex A provides case information on an initiative to that demonstrates how potential health risks from private domestic water sources and supplies could be profiled and remedial action taken, as such, this would be one way to initiate a better understanding and quantification of the productivity dimensions of the issues relating to the adequacy and quality of water on

many farms and pastoral properties. As designed, this project provides a methodological approach that could be extrapolated to other LGAs and communities across Australia.

Case study work to date has shown that there are a range of relatively simple methods to dimension health risks and to treat domestic water at the household scale. Water quality screening and attitudinal surveys can be tailored to the capacity, capabilities and resources of the participating LGAs and communities of interest. Treatment could include in-line household scale filtration with either sand or activated carbon or a combination of both. Also, domestic supplies can be disinfected with either sodium hypochlorite (chlorine) or in-line ultra violet equipment. Chlorination is seen as a simple first step towards ensuring that the water is safe because it kills the pathogens that cause a range of illnesses. Other treatments can be introduced to improve taste and appearance. And in the simplest of all is to boil all water that is to be used for drinking, food preparation, cooking and personal oral hygiene.

In light of the ready availability of simple treatment techniques there is no reason that private supplies should be a health risk. In short, no household or commercial premises should have unsafe domestic water. Reduction of health risks from unsafe water must be a priority across rural and remote regional Australia. And there is no reason that rural productivity should be impaired by poor quality domestic water on farms, pastoral properties and regional commercial enterprises where non-scheme supplies are being used.

Responding to the Issues Paper

The Issues Paper states that the Commission will: *more closely examine the provision of rural and urban water services, including institutional arrangements and investment frameworks for water infrastructure (dams, channels, pipes, recycling and desalination plants)*. Further, the Paper says that: *Initial consultation and research suggests that the efficient provision of rural and urban water services is one of the areas least advanced in the NWI and there is scope for improvement.* Additionally, the point is made that: *The Commission will also look to determine whether there are new actions that should be pursued in light of current or likely future challenges affecting the management of water resources — for example, climate change and population growth*. Moreover, as stated in the Issues Paper, *a question for this inquiry is whether more needs to be done to ensure water planners are able to effectively manage the potential effects of the long-term impact of climate change (such as a significant decrease in water resources, affecting the consumptive pool and the environment in potentially different ways)*.

The Issues Paper notes that further progress was required in specific areas of planning, including:

- specific pathways to achieve Indigenous objectives through water planning.
- the need to integrate water *quality* objectives into water planning arrangements

Further, the Paper makes the point that: *the NWC noted that while progress had been made incorporating Indigenous social, spiritual and customary objectives into water plans, there had been no material increase in water allocation for Indigenous social, economic or cultural purposes*.

In providing a focus the Paper states that the *NWI seeks to achieve a number of objectives in relation to rural water services, including: promoting the efficient and sustainable use of water resources and water infrastructure; ensuring that infrastructure operators are financially viable; providing sufficient revenue for service delivery and facilitating the functioning of water markets. The actions agreed by the jurisdictions to deliver these objectives focus on cost recovery and institutional arrangements.*

Collectively, these statements in the Issues Paper are interpreted to mean the examination will cover major engineered supply sources and government or private sector schemes

providing reticulated services in rural and remote regions. And this approach is to be is commended because Australia wide 'urban water services' for many small towns and Indigenous settlements are of serious concern with respect to:

- adequacy of supply
- security of the sources under changing climatic and demand conditions
- quality the resource being used for domestic purposes

However, there is another scale at which productivity implications of rural water provision needs to be considered and that is for properties and premises that are dependent on private (non-scheme) supplies. Specifically, this is the scale at which the effects of environmental change (climatic and demographic) are first registered. Climatically the impacts are on the availability and hence adequacy of supply, and the quality of the resources being used. Rainfall, runoff and evaporation being the key climatic variables to be considered across catchments and on individual properties. Demographic implications are seen in the demand for high quality water for households, small towns, commercial and industrial enterprises, and Indigenous communities and settlements who are dependent on non-scheme supplies. And the Issues Paper is silent with respect to rural water at this scale.

One of the questions raised in the Issues Paper is: *How can the interests and needs of Indigenous people be better accommodated and represented in water planning processes?* Arguably, this this situation needs to be seen in the same context of the provision of adequate safe domestic supplies for farming and pastoral properties in rural and remote regions. And this is more than a public and environmental health problem and it needs to be addressed at the household, community/settlement and camp levels.

In short, specific pathways to achieve Indigenous objectives through water planning and the need to integrate water *quality* objectives into water planning arrangements should be brought down to another level if the productivity implications of domestic water provision is to be more effectively addressed for rural and remote regional Australia.

Annex A

Case Example
Securing Adequate Safe Domestic Water for Rural and Remote Regional Australia

The Project

The ***Securing Adequate Safe Domestic Water for Rural and Remote Regional Australia*** project was initiated at the ***SEGRA 2015*** Conference and championed by Etheridge Shire Council (ESC). During 2016 the project was progressed by ESC, the Institute for Land Water and Society, Charles Stuart University (ILWS-CSU, the SEGRA Foundation and collaborating universities and non-government organisations (NGOs).

The *SEGRA Challenge* has successfully catalysed a multi-partner project that aims to improve the adequacy and quality of domestic water for rural and remote regional Australia. As such, this initiative is a practical response to major concerns that people on rural and remote properties are at risk from poor quality private domestic water supplies (rainwater tanks, surface and groundwater).

The project outcomes are centred on educating communities about associated health risks, ensuring LGA's are resourced to provide safe domestic water and increased investment in simple cost effective water treatment technology. Philosophical underpinning of the project is provided by the contention that: *Local Government has a duty of care to reduce health risks to all residents and visitors by raising awareness of the issues, dimensioning the problem and helping residents to manage the quality of their household water supplies.*

The link to the project on the ILWS-CSU website is:
http://www.csu.edu.au/research/ilws/research/summaries/2016/securing-adequate-safe-domestic-water-for-regional-australia-2016-17

The overarching aim of this multi-staged collaborative action research project is to: *support the sustainable provision of adequate safe domestic water supplies for people in rural and remote regional Australia.*

The objectives to be achieved to attain the aim are as follows:

- Detail and evaluate the roles and responsibilities of governmental bodies with respect to the provision of public and private domestic water supplies.
- Document community attitudes, understanding and behaviour with respect to the provision of adequate secure and safe domestic water supplies.
- Provide broad quantitative and qualitative information on the sources, adequacy, quality and levels of water treatment of water being used by Local Government Authorities (LGAs) in meeting statutory water planning and services requirements.
- Document the status of sources, adequacy, quality and treatment provisions used privately in remote settlements and public facilities, commercial enterprises and isolated properties in vulnerable catchment areas.
- Propose long term integrated management measures to ensure that domestic water supplies for communities, individual homes, isolated homesteads, community facilities and business premises are adequate and safe.

For this project, domestic water is operationally defined as: *Water used day to day by people for indoor and outdoor household and commercial purposes including drinking, preparing food, bathing, washing clothes and dishes, brushing teeth, watering gardens, swimming pools and children's play.*

Securing adequate safe domestic water for rural and remote regional Australia goes beyond potable/drinking water supplies. As defined above, domestic water encompasses all uses by which people can come into physical contact with their water resources. And, because of its quality, the water may or may not be a risk to their health.

At the inception of the project, it was envisaged that product from the collaborative integrated research could include:

- documentation of the effectiveness of engagement, communications and information dissemination methods and techniques used
- hard data on what are the domestic water supply conditions in the subject catchments
- identification and evaluation of sustainable supply and treatment systems suited to drought stressed rural and remote locations
- peer reviewed papers and innovative communications and awareness materials

Outcomes seen as indicators of the success of the project could include the following:

- Measureable improvement in the quality of water being used for domestic purposes.
- Better informed community conversations on domestic water supply provision as measured by articles in the media, complaints to local authorities and letters in local papers.
- Reduced presentations to primary health care providers and hospital of people with sickness resulting from the consumption of unsafe water.
- Timely positive changes in governance to ensure that LGAs are better resourced to meet their statutory requirements in the provision of domestic water supplies.
- Measured increases in the level of investment in sustainability technology to ensure that domestic water supplies are safe.

Citizen science could be used for water quality screening and associated tasks to move the project further. Property holders could be taught simple water sampling and analytical techniques to determine and monitor the presence or absence of pathogenic and non-pathogenic organisms in water sourced from rainwater tanks, rivers, creeks, dams as well as shallow wells and deep bores. Spatial data management techniques and information management tools will be used to aggregate and interpret the results. Where sample results that show the presence of bacteria, property holders will be encouraged to have more detailed testing undertaken and treat the water being used for domestic purposes. Ongoing monitoring of supplies would be actively encouraged to ensure treatment is effective and health risks reduced.

Key supporting data gathering and analysis activities could include:

- Household telephone surveys to gather data on domestic water sources used, level and location water treatment, and knowledge of health risks from poor quality domestic supplies
- Community awareness raising activities that are tailored to the geographic and demographic realities of participating LGAs and communities
- Feedback from facilitated domestic water management workshops and demonstrations of treatment technologies
- Collation and review of local and regional and local media reporting of water quality and related health issues

Progress to date

Phase I of the project has been 'test-bedded' in two distinctively different regions (Gulf and Northern Darling). Work in both has provided setting for future research and related community engagement activities. The Gulf with an initial focus on Northern Australia and the Murray Darling Basin (MDB) through the regional LGAs and in collaboration with the Murray Darling Association (MDA). Support is also being provided by the Murray Darling Basin

Authority (MDBA). Considerable interest has been generated with the LGAs ad communities of interest in regional initiatives to assist Councils address the issue of poor quality private domestic water supplies and provide cost effect sustainability water treatment solutions suited to small towns, settlements and properties who are not supplied with scheme water.

The following was achieved with the project in 2016:

1. Engagement activities:
   - Raised governmental and institutional awareness of the regional development constraints and public health dimensions and implications of poor quality domestic water in towns, settlements and rural properties who are dependent on private supplies.
   - Found and catalysed potential institutional and university partners to the collaboration
   - Obtained formal acknowledgement from the MDBA, the MDA and the LGAQ and the QMDC to help further the intent of the initiative.
   - Motivated regional LGAs to become involved in raising awareness, dimensioning the water quality issues and reducing potential health risks.

2. Pilot water quality screening and questionnaire survey work undertaken in ESC:
   - Demonstrated the veracity of the approach and that quality results could be obtained.
   - Found that the *E. Coli* was present in all sources of domestic water being used in Etheridge Shire and this raises questions with respect to public and environmental health risks for other LGAs in the Gulf Region
   - Water treatment on rural properties was minimal and that this heightens concerns of risk from PAM
   - Provided case material to support further research.
   - Identified how the research approach could be refined for broader regional roll out of sampling and questionnaire survey's in the Gulf and other regions

3. The key finding to date from engagement and pilot survey activities are that:
   - Poor quality domestic water is a potential constraint to sustainable development in rural and remote regions in general and the MDB and Northern Australia in particular.
   - Community and personal awareness of possible health risks from poor quality domestic supplies (rainwater tanks, surface supples, shallow and deep bores) is poor.
   - Attitudinal and behavioural change towards the issue of poor quality domestic water is pivotal to reducing health risks in rural and remote regions.
   - Simple and cost effective water treatment technologies are available to reduce the threat from pathogens in all sources of water used for domestic purposes.
   - Proactive collaboration between Local Governments and their communities is essential to ensuring that the health of people living in rural and remote towns and on properties is safeguarded.

4. Project documents
   The following documents chart the initiation and delivery of Phase I up to the end of 2016:
   - Phase I *Research Program* (April 2016)
   - Phase 1 *Progress Report* and *Working Paper* (September 2016)
   - Phase II and III *Research Program* (October 2016)
   - Phase I *Progress Report* (December 2016)
   - Sitrep 20/01/17

Collectively, this body of information reflects the product from the $50 000 investment made by CSU to enable ILWS to deliver the initiative to this date. To this must be added the in-kind contribution that has been made by (for example):

- CSIRO Land and Water with respect to informing the project team and Forum participants in Albany of the risks from PAM arising from *Naegleria fowleri*
- SEGRA Foundation in engagement meetings in the Gulf and Darling basin regions
- ESC and collaborating partners (including QHealth) in pilot sampling, questionnaire survey and engagement activities in the Gulf Region
- UNE in project review and engagement meetings in Goondiwindi
- QMDC and Conservation Volunteers in exploring how 'citizen science' could be used for the project and the realities of field data collection
- ROCs in organising presentations and discussions at LGA meetings in the Gulf and Northern Darling Basin regions
- individuals in the subject regions and beyond who are committed to reducing health risks from poor quality domestic water supplies and ensuring that this area of issue is not an impediment to sustainable regional development

Arguably, the in-kind contribution for work in the Gulf and Darling region by partners to the collaboration would be in excess of $100 000. Alone, the ESC had expenditure in the order of $35 000 for the pilot water sampling and QHealth would have incurred similar costs. For project initiation, this is viewed as a good return on investment.

A key objective has been to embed the initiative so that it will generate future research and consultancy income in order to:

- produce focused outcomes that have immediate utility to participating LGAs and their communities
- develop a broad methodology that could be applied Australia wide
- catalyse the actions need to *support the sustainable provision of adequate safe domestic water supplies for people in rural and remote regional Australia.*