

Water Infrastructure Options Paper

Response from the International Association of Hydrogeologists Australia

The **International Association of Hydrogeologists (IAH)** is a scientific and educational organisation for scientists, engineers, water managers and other professionals working in the fields of groundwater resource planning, management and protection.

The **IAH Australia** is a non-profit organization with the following objectives:

1. promote international and national cooperation between involved scientists and engineers.
2. sponsor international and national technical/management meetings and symposia on hydrogeology.
3. publish hydrogeological reports, papers and maps.
4. establish investigation commissions and working groups to report on special topics.
5. encourage the international application of relevant approaches and techniques for the benefit of the hydrological and human environment.

Groundwater makes up 98% of the fresh water on the planet. It currently makes up around a third of Australia's total water consumption, although this varies from location to location. In the Northern Territory, 90% of water is sourced from aquifers, while the highest concentration of groundwater use is in the Murray–Darling Basin.

In many regions of Australia, particularly in the outback, groundwater is the only available source of water – numerous townships, farms and mines are totally reliant on groundwater. In irrigation areas, groundwater supplies thousands of hectares of crops and pastures. Even large cities are dependent on groundwater; for example, about 70% of Perth's water comes from groundwater.

IAH Australia is pleased to be able to provide a submission on the Water Infrastructure Options Paper. IAH Australia is supportive of the long-term sustainable development of Australia's water resources. It believes that a balanced and sustainable approach to the use of water is critical to the ongoing development of sustainable communities and a sustainable environment.

IAH Australia is supportive of a number of the projects referred to in the Water Infrastructure Options Paper. However, we were disappointed with the relative lack of evaluation of the potential use and management of groundwater to assist in the long-term development of Australian agriculture.

GABSI

The IAH welcomes the Government's commitment to extending the Great Artesian Basin Sustainability Initiative (GABSI) for three years. We believe that the Initiative should be fully supported and appropriately funded. IAH Australia considers that greater protection for current GAB groundwater users should be instituted through the development of an overarching GAB management plan. Despite the Basin wide strategic management plan, the current arrangement of individual state plans may result in inconsistent management across the GAB.

NORTHERN AUSTRALIA

IAH Australia found it surprising that the Committee did not have a stronger focus on the development of groundwater resources in Northern Australia. With 90% of the Northern Territory's water use supplied by groundwater and large-scale groundwater irrigation areas (Daly River and Lower Burdekin Floodplain), there are further opportunities for groundwater development in the North.

The 2009 CSIRO Sustainable Development for Northern Australia: a comprehensive science review (CSIRO 2010) reported that: *'Capturing and keeping streamflow in northern Australia is difficult. Most of the rainfall occurs near the coast where it is mostly too flat to build dams.*

Capturing water in valleys doesn't overcome the problem of evaporation unless the dams are very deep – very few sites are suitable or near locations where there is likely to be significant demand for water. Consequently, large scale dams (like Lake Argyle) that can provide year-round water are not likely to be feasible for most of the north.

Small scale water harvesting of flood stream flow may be able to provide water that can be used in the early part of the dry season. An example of this could be diversion of a small portion of late season floods into a farm dam.

In regards to groundwater resources in Northern Australia the CSIRO review stated: *Groundwater has good potential capacity to provide future water sources for northern Australia. Each year, about 600 GL of renewable groundwater occurs across all of northern Australia; this may be able to support consumptive water use. However, groundwater pumping can change river flows by lowering water tables that feed them, with adverse impacts on conservation. Surface and groundwaters in northern Australia are often highly connected.*

Decisions about water use must take into account the interdependency of ground and surface waters. Taking groundwater from one point may influence surface water flow and function at another, and vice versa. A small percentage of groundwater may be able to support new enterprises. However, detailed data collection and consultation would need to occur in each location and for every development to ensure trade-offs are evaluated.

Based on this information, IAH Australia believes that in Northern Australia increased groundwater development will often be linked with Planned Conjunctive Use.

PLANNED CONJUNCTIVE WATER MANAGEMENT

IAH Australia believes that there are great social, economic and environmental benefits in further investigating planned conjunctive use of groundwater and surface water across Australia. Conjunctive water management applied in existing and new irrigation areas to great effect.

Evans et.al. (2014) states that *'Conjunctive use of groundwater and surface water in an irrigation setting is the process of using water from the two different sources for consumptive purposes. Conjunctive use can refer to the practice at the farm level of sourcing water from both a groundwater bore and an irrigation delivery canal or river. It can also refer to a strategic approach at the irrigation command level where*

surface water and groundwater inputs are centrally managed as an input to irrigation systems. Accordingly, conjunctive use can be characterized as being planned (where it is practiced as a direct result of management intention – generally with a top down approach) compared with spontaneous use (where it occurs at the property level – generally with a bottom up approach).

The planned conjunctive use of groundwater and surface water has the potential to offer benefits in terms of economic and social outcomes through significantly increased water use efficiency. It supports greater food and fibre yield per unit of water use.

There are a number of challenges facing Australia if it is to benefit from planned conjunctive water management:

- Overcoming the paradigm where surface water and groundwater is considered by both managers and users as separate resources with policy and management evolving in response to resource development, institutional and governance arrangements have within most states also evolved separately. The effect has been the establishment of 'boundaries' within the existing policy, statutory and regulatory framework that apply to the management of surface and groundwater resources.
- The lack of a single integrated institutional frameworks and robust governance structures that incorporate authority, accountability, transparency, stakeholder participation in planning and regulatory/compliance arrangements to allow full conjunctive management.
- Mechanisms to encourage voluntary behavioural change of water users .
- A cost recovery model that is used to fund the institutional arrangements that enable conjunctive management.

Managed aquifer recharge (the active recharge of aquifers) is part of a number of strategies that can be used to enhance conjunctive water management. Others include the use of water efficient delivery and on farm infrastructure, and the education of water users.

Implementing conjunctive water management will have the additional benefit of making rural communities more resilient to climate variability. The optimisation of conjunctive water management has enormous benefits:

- economic gains;
- increases in productivity;
- energy savings;
- increased capacity to irrigate larger areas;
- water resource efficiency; and
- infrastructure optimization.

IAH Australia considers that for communities to realise the benefits of conjunctive water management serious consideration should be given to funding a program to support the states, territories and the MDBA to investigate opportunities for planned conjunctive water management which will have long term benefits for Australia. Building new dams alone is very inefficient and expensive water management. Planned conjunctive use management offers a sensible cost efficient way forward for Australia.

References

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