GROUNDWATER ACTION PLAN
2020

Groundwater is a valuable resource for Australia that is currently overused and undermonitored. There have been significant efforts over the past 30 years to manage this resource but the focus has waxed and waned. There is no continuous national work programme to manage groundwater and aquifers at an acceptable standard. This has come about because it is largely a State responsibility and States have not appropriatly funded or maintained the management systems (largely monitoring bores and staff) to allow proper monitoring and management. The Federal government has developed an integrated groundwater data collection and reporting system under (BoM) but this is losing its value due to the declining monitoring network which provides the data.

There is general consensus that groundwater monitoring needs a major injection of funds to bring it up to a status where it becomes a reliable and competent management tool for good governance. A renewed effort to evaluate the current state of the monitoring system along the lines of the SKM report of 2012 with recommendations for improvements to bring it up to an acceptable level would be a first step.

Based on modelling to account for data gaps, the total asset replacement cost for these jurisdictional bore networks in 2010–11 dollars was estimated at about $900 million**.**

The new report should look at blocks of work that would enable costs and benefits to be evaluated from commercial and environmental viewpoints.

We need to maximise the amount of water that can be safely made available to agriculture and other users while improving our knowledge of its sustainability to safeguard future generations and also protect the ecological values and ecosystem service provided by the aquifers.

Work done in the Surat basin over the past decade could provide a template for such a report.

Australia's monitoring bore network plays a key role in providing vital information to support effective groundwater planning and management of Australia's groundwater resource, which accounts for approximately 30% of the country's total water use.

Several reports summarise the main issues.

The SKM report in 2012 discusses the current state of monitoring groundwater with discussion around deficiencies and aging infrastructure.

The GHD report in 2014 discusses the management constraints imposed by the above report and suggests solutions.

The ANU report Integrated Groundwater Management in 2018 explores broarder techniques for analysing groundwater management.

The Queensland UWIR 2019 report for the Surat Basin seems to be the most comprehensive analysis of groundwater management in Australia. The water extraction and reinjection (60GL/annum) for the past decade seems to have had minimal impact on the basin. This has been verified by the extensive monitoring and modeling carried out.

New Focus for this Report

While the changes on the demand side can probably be predicted with reasonable certainty, the processes that govern groundwater recharge are highly non-linear in both time and space and rely on rainfall amounts, distribution, intensity, frequency, temperature, evapotranspiration and soil moisture processes. Because of the spatio-temporal variabilities and non-linear processes (small changes in climate variables may lead to large changes in recharge), we will likely be stuck with large uncertainties on recharge estimates.

A pragmatic solution to this problem is to determine the actual recharge by monitoring groundwater levels and to use the data for adaptive management.

As we are recognising the role of groundwater for ecosystem services, GDEs and providing baseflow to streams, we should reconsider how we strategically locate our future groundwater monitoring networks to also monitor the health of ecosystems and impacts on ecosystem processes. New or updated bore networks therefore need to be optimised to both monitor the state of the resource as well as impacts on ecologic assets. Individual bores also need to be designed and optimised for both water level and water quality monitoring, whereas focus in the past has primarily been on water levels.

To support this report research into a number of issues should be initiated

1. Estimates of the spatial and temporal variability of groundwater recharge (the rate of recharge is the key sustainability parameter rather than aquifer volumes)
2. Ecological impacts of groundwater drawdown and better methods for determining environmental water requirements and determining the true costs of environmental degradation due to groundwater depletion;
3. Water quality changes (deterioration) due to groundwater depletion as well as changes in physical water management (e.g. water quality changes caused by MAR schemes).
4. Cost-benefit analysis of the true value of groundwater and processes that it support (including environmental, ecological social and cultural).
5. Sociological studies of alternative governance and management strategies (e.g. cooperatives etc.).

Next steps

1. Develop scope of work for design of monitoring system described above including timing of work to review progressive updates.
2. Award contract
3. Review outcomes and develop construction plan.
4. Award sub contracts on an aquifer basis to install monitoring system.
5. Review effectiveness of work on a regular basis.

A higher level review of aquifer connectivity and its effects should be studied as data emerges from the work.

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