

Beneficial use of Coal Seam Gas produced water – challenges and opportunities

Mr Danny Rattray¹, Dr David Freebairn²

¹*Horizon Soil Science And Engineering*, ²*Soil Scientist*

Coal seam gas (CSG) is extracted from coal seams which contain both water and gas. During CSG operations water is pumped out of coal seam to lower pressure to allow gas to flow to the surface. The water extracted is referred to as “produced water”. There are over 7000 active gas wells in Queensland producing around 5000 ML/month of produced water with industry targets to reach about 18,000 wells by 2050.

Management of produced water is mainly constrained by its high concentration of salts. Reverse osmosis produces permeate of high quality, but a concentrated brine stream by-product still has to be dealt with. Brine evaporation and eventual encapsulation is costly. Beneficial use of produced water for irrigation can reduce volumes requiring this level of management and create a production opportunity in dry environments.

Produced water is generally saline and sodic. Salinity can impact on plant productivity while sodicity can result in soil structure decline. Managing salinity requires leaching salts from the root zone into the regolith. While semi-arid landscapes are often saline and sodic at depth, beneficial use projects aim to move added salts below the root zone. Sodicity can be managed by addition of calcium and magnesium to water or soil. Where water exceeds trigger levels for metals such as Boron and Fluoride (ANZECC guidelines), recent research has demonstrated threshold levels that are sustainable.

The challenge for soil scientists is to provide solutions that minimise environmental risk while reducing costs and energy use. This requires: extrapolation of knowledge and models to non-traditional environments; on-going research; and testing the validity of models and guidelines used for setting resource use approvals.

This paper will present examples of applying soil science knowledge to a new environmental challenge.