

Are you aware that Queensland coal seam gas is a risk to food security? Table illustrates wide ranging discussion.

By Peter Dart and Col Lynam, (Members, The Royal Society of Qld)

Coal seam gas has had a short but contentious history in Australia. Worries about pollution and emissions have been making headlines, but less visible have been the concerns of agriculturalists. They say that expanding gas mining has the potential to threaten food security in Australia.

Coal seam gas (CSG) is a source of "natural gas" (about 80% methane) and most will be exported as liquefied natural gas (LNG). Advocates suggest using it for base load power generation while coal is phased out.

But there's controversy surrounding emissions from the gas. There is also the potential damage to the environment caused by the industry, particularly to agricultural land.

Governments at both the state and federal level are in a catch-up phase to amend existing laws, regulations and approvals for exploration and exploitation. They're trying to rein in what many regard as the too-rapid development of an industry we know too little about.

International capital is buying into the bonanza with future investment estimated at \$80bn for Surat Basin CSG alone. So, state governments with difficult bottom lines (think recent natural disasters in Queensland) are seeing CSG industry development in a very favourable light.

But long-term food security is threatened by this new industry.

Great land for agriculture

Australia is a major exporter of grain, shipping out enough to feed reportedly around 60 million people. Much production occurs on land that is also good for CSG extraction.

Prompted by community concerns about the loss of prime agricultural land to CSG mining, and industry lobbying to minimise restrictions on their access to these very lands, the Queensland Government released the "[Proposed criteria for identifying strategic cropping land to be used in drafting the new strategic cropping land legislation](#)".

But in NSW, the government has not yet released a policy. The developments in NSW – particularly coal mining and CSG projects planned for the Liverpool Plains and Hunter River valley – are not as advanced as those in the Surat Basin in Queensland.

The Darling Downs and Liverpool Plains with their heavy clay soils, reliable rainfall and extensive underground water resources are among the most productive agricultural lands in the world. These soils store enough water to tide crops over in times of low rainfall.

They have inherent soil fertility and soil organic matter that underpins their exceptional and reliable productivity.

Their natural topography enables laser levelling over large areas which with near universal adoption of conservation agriculture (minimum tillage, stubble retention, crop rotations) reduces erosion and conserves moisture, nutrients and carbon.

Water

To enable sustainable supply, farmers in the Surat Basin and Liverpool Plains have signed up to quite severe restrictions on extraction of underground water.

The CSG industry both uses and produces water and is not subject to the same compulsory rules on water extraction as farmers.

The initial phase of extraction requires water to set up the drilling and bore operation systems. This will come from shallow aquifers and will compete with farmers and towns.

As part of the process, large volumes of water must be pumped through the coal seams. The water coming out the other end is often too salty for use in agriculture. So what to do with it?

The Queensland Government has said that wastewater cannot be held in evaporation ponds to concentrate the salt prior to removal, but the technology is in a nascent stage.

The companies involved are exploring desalination through reverse osmosis: this requires a lot of energy. It also leaves an unknown volume of very salty brine residue for which disposal methods have not yet been developed (or regulated).

The water can perhaps be injected into shallower aquifers and be useful for future crop production. But methods to do this are still being modelled by the Queensland Department of Environment and Resource Management's Coal Seam Gas Water Feasibility Study.

Another unresolved issue is the possibility of contaminating existing aquifers with CSG water. This has already occurred in places. Such cross-contamination can lead to CSG emanating from farmers' bores used for irrigation and household use.

Certain mixtures of CSG with air can be quite explosive and people have been warned in the Surat Basin that they should leave their households while such an event is managed.

There is no requirement for CSG companies to explain in advance how they might deal with the contamination of aquifers.

Land

Each CSG well takes up about two hectares of land and requires access roads and underground pipes for the gas collection alongside them.

Although with more than 30,000 wells, this adds up to a rather large loss of land, the major problem faced by farmers is that a CSG well placed in their field can disrupt the water flow.

Roads are a major problem as they disturb the flood erosion control works that the farmers have developed and signed up to with government, in many cases.

Soils are not infinitely deep, and erosion is a major problem faced in agricultural production. It can take thousands of years to replace the most fertile topsoil that can be lost in just one erosion-breaching event.

An option is to locate CSG wells where they will not accentuate erosion and drill at an angle to the CSG source. It's more costly for sure, but it's less damaging to farm practice and the environment.

Once destroyed by compaction, once eroded, or mined, these soils cannot be easily brought back to production.

Some of the best cropping lands in Australia and the livelihoods of some of the most productive farmers in the world and their considerable food production are at stake. The precautionary principle was inserted into the *National Strategy for Ecologically Sustainable Development* in 1992, precisely to deal with complex, poorly-understood extractive processes like this.

After all, the CSG industry will not last much beyond the next 30-40 years, and the world's food supply needs to extend much longer than this.

Dr Peter Dart

School of Agriculture and Food Sciences
The University of Queensland, Qld 4072
p.dart@uq.edu.au

Title	code	source	date	Link
Warning on CSG impact 'ignored'	Political	The Australian	2/11/2011	https://www.theaustralian.com.au/business/mining-energy/warning-on-csg-impact-ignored-report/story-e6frg9df-1226211798824 https://www.gabpg.org.au/warning-on-csg-impact-ignored-report/
Interview with The Country Hour, ABC Regional Queensland	Political	The Country Hour, ABC Regional Queensland	15/03/2017	https://www.minister.industry.gov.au/ministers/canavan/transcripts/interview-country-hour-abc-regional-queensland
Fracking not a problem in Queensland says minister	Political	The Courier-Mail	21/03/2017	
'No-one is providing transparency': Audit questions compliance in Qld	Political	ABC News	9/03/2020	https://www.abc.net.au/news/2020-03-09/audit-questions-confidence-in-csg-regulation/12026136?utm_campaign=abc_news_web&utm_content=link&utm_medium=content_shared&utm_source=abc_news_web
EXCLUSIVE: Coal seam gas water spills into farmland as Condamine River tributary Charleys Creek bubbles	Farmers	Country Caller	30/08/2020	https://countrycaller.com.au/2020/08/30/exclusive-coal-seam-gas-water-spills-into-farmland-as-condamine-river-tributary-charleys-creek-bubbles/
Carbon capture storage trial in Queensland to demonstrate Morrison's promise to reduce emissions via 'technology'	Political	ABC News	11/02/2021	https://www.abc.net.au/news/2021-11-02/queensland-carbon-capture-and-storage-trial/100570436
Beetaloo Basin leaseholder Rallen Australia fights Santos fracking plan	Farmers	The Australian	15/11/2021	https://www.theaustralian.com.au/search-results?q=beetaloo-basin-leaseholder-rallen-australia-fights-santos-fracking-plan
State regulators direct three more wastewater disposal wells to indefinitely cease operations after 4.5 earthquake Monday	Political	Tulsa World	1/02/2022	https://tulsaworld.com/news/state-and-regional/state-regulators-direct-three-more-wastewater-disposal-wells-to-indefinitely-cease-operations-after-4-5/article_cf8bb04a-83ab-11ec-97c5-970e8b8e5fa8.html
Queensland has an important network of private conservation areas, but they're dangerously exposed to mining	Non-Govt	The Conversation	2/02/2022	https://theconversation.com/queensland-has-an-important-network-of-private-conservation-areas-but-theyre-dangerously-exposed-to-mining-175519
Santos says it can store 100 million tonnes of CO2 in Outback South Australia	Gas & Oil	The Australian	8/02/2022	https://www.theaustralian.com.au/search-results?q=santos-says-it-can-store-100-million-tonnes-of-co2-in-outback-south-australia
Queensland gas commission calls for urgent action amid allegations of illegal development	Non-Gvmt	ABC News	8/02/2022	https://www.abc.net.au/news/2022-02-08/calls-to-urgently-act-after-alleged-illegal-csg-development/100811422
Queensland's coal seam gas industry still has a big salt problem	Science	ABC News	28/04/2022	https://www.abc.net.au/news/rural/2022-04-26/queensland-coal-seam-gas-industry-big-salt-problem/100990978
Gasfield brawl forces commission to call for Government help	Political	IN Queensland	8/02/2022	https://inql.com.au/business/2022/02/08/gasfield-brawl-forces-commission-to-call-for-government-help

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Today's damning statement by the independent GasFields Commission confirms the concerns I've raised with the State Government	Political	Qld Parliament	8/02/2022	Pat Weir MP Shadow Minister for Natural Resources, Mines and Energy MEDIA STATEMENT
Landowner tensions blow up at Qld gas venture	Farmers	AFR	9/02/2022	https://www.afr.com/companies/energy/landowner-tensions-blow-up-at-qld-gas-venture-20220208-p59us3#
State Government calls for 'urgent action' to resolve disputes between farmers and Arrow Energy on the Darling Downs	Political	The Australian	9/02/2022	https://www.theaustralian.com.au/business/state-government-calls-for-urgent-action-to-resolve-disputes-between-farmers-and-arrow-energy-on-the-darling-downs/news-story/6393d7250a998c7b538c3bf52fa02dad
Gasfield brawl forces commission to call for Government help	Political	IN Queensland	10/02/2022	https://inql.com.au/business/2022/02/08/gasfield-brawl-forces-commission-to-call-for-government-help/
'Locked in' for years	Farmers	The Courier Mail	14/02/2022	https://www.couriermail.com.au/news/queensland/chinchilla/locked-in-for-years/news-story/617ee2e935dcc37aedb1b8fb433433a5
Six-day response time to coal bores spilling gas, water near Chinchilla 'prompt', Queensland government says	Farmers	Queensland Country Life	15/02/2022	https://www.queenslandcountrylife.com.au/story/7619544/six-day-response-to-bores-spilling-gas-water-prompt-govt/?src=rss&utm_email=4d56e98f6a
Downs farmer planning open forum with coal seam gas company	Farmers	Queensland Country Life	2/03/2022	https://www.queenslandcountrylife.com.au/story/7641712/downs-farmer-planning-open-forum-with-coal-seam-gas-company/
CSG to go east of the Condamine River for the first time	Gas & Oil	Queensland Country Life	2/03/2022	https://www.queenslandcountrylife.com.au/story/7639501/csg-to-go-east-of-the-condamine-river-for-the-first-time/?cs=4733#!
Gas industry and cattle industry cannot coexist, says major NT cattle producer	Farmers	ABC Rural	25/03/2022	https://www.abc.net.au/news/rural/2022-03-25/rallen-australia-fracking-concerns-gas-industry-cannot-co-exist/100931014#
ALP raises water recovery scare	Political	Country News	11/04/2022	https://www.countrynews.com.au/water/alp-raises-water-recovery-scare/
Fracking Company Pleads No Contest in Iconic Water Contamination Case in Dimock	Non-Govt	Desmog.com	12/04/2022	https://www.desmog.com/2022/11/30/fracking-coterra-cabot-pleads-case-dimock-water-contamination/
Queensland's coal seam gas industry still has a big salt problem	Science	ABC Rural	20/04/2022	https://www.abc.net.au/news/rural/2022-04-26/queensland-coal-seam-gas-industry-big-salt-problem/100990978#
Some of state's best farming land under subsidence threat	Science	IN Queensland	12/06/2022	https://inql.com.au/business/2022/12/06/some-of-states-best-farming-land-under-subsidence-threat/

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Value for money? Queensland departments have no idea, says auditor	Political	IN Queensland	14/06/2022	https://inql.com.au/news/2022/06/14/value-for-money-queensland-departments-have-no-idea-says-auditor/
Governing gas markets without a scientific lens has been an abject failure	Political	The Mandarin	14/07/2022	https://www.themandarin.com.au/194648-governing-gas-markets-without-a-scientific-lens-has-been-an-abject-failure/
This is Australia's most important report on the environment's deteriorating health. Here are its grim findings	Political	The Mandarin	19/07/2022	https://www.themandarin.com.au/194950-this-is-australias-most-important-report-on-the-environments-deteriorating-health-here-are-its-grim-findings/
Fracked: Govt claims a massive 'green' gas expansion in Queensland	Political	IN Queensland	1/08/2022	https://inql.com.au/business/2022/01/07/fracked-government-claims-a-massive-gas-expansion-in-queensland-would-be-green/
Australia's total coal mine methane emissions double official estimates, Ember report finds	Political	ABC News	6/08/2022	https://www.abc.net.au/news/2022-06-08/coal-methane-leaks-double-official-figures-ember-report-finds/101120112
Gas drilling crackdown 'doesn't go far enough'	Farmers	Countrycaller .com.au	2/09/2022	https://countrycaller.com.au/2022/02/08/gas-drilling-crackdown-doesnt-go-far-enough/
Pressure mounts on government to address allegations of illegal CSG drilling near Dalby	Farmers	Queensland Country Life	2/09/2022	https://www.queenslandcountrylife.com.au/story/7608008/pressure-on-govt-to-address-illegal-csg-drilling-allegations/
Mining and Pollution Is it really good enough that the department can only give "limited assurance" that the CSG industry is being adequately monitored and regulated?	Non-Govt	Gladstone Conservation Council and Darling Downs Environment Council	29/09/2022	https://www.facebook.com/Darling-Downs-Environment-Council-713057652126193/
How satellites are challenging Australia's official greenhouse gas emission figures	Science	ABC News	30/09/2022	https://www.abc.net.au/news/2021-12-03/satellites-are-challenging-australias-coal-mining-industry/100663676
Gas production costs in Queensland's Lake Eyre Basin will be 'staggering', report claims	Political	ABC News	3/10/2022	https://www.abc.net.au/news/2022-10-03/lake-eyre-basin-gas-fracking-costs-economically-unviable-report/101494586
Regulation of expanding Lake Byre Basin gas industry criticised in new report	Political	Queensland Country Life	5/10/2022	https://www.queenslandcountrylife.com.au/story/7928609/studies-critical-of-gas-development-impact-on-cooper-floodplain/
Researchers raise alarm on coal seam gas threat to Australia's richest farmland	Science	ABC Rural	7/10/2022	https://www.abc.net.au/news/rural/2022-10-07/coal-seam-gas-report-raises-alarm-on-threat-to-richest-farmland/101502318

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CSG 'irreversibly' damaging Qld farms, scientists say	Science	Queensland Country Life	11/10/2022	https://www.queenslandcountrylife.com.au/story/7936685/csg-irreversibly-affecting-qld-farms-scientists-say/
Environmental Protection and Other Legislation Amendment Bill introduced in government 'crack down'	Political	Queensland Country Life	14/10/2022	https://www.queenslandcountrylife.com.au/story/7942035/new-environmental-protection-laws-proposed-in-government-crack-down/
New documents reveal corrosion, leaking in coal seam gas wells, raising contamination fears	Science	ABC News	1/11/2022	https://www.abc.net.au/news/2022-11-01/documents-reveal-significant-csg-well-corrosion/101507572
Queensland opposition questions why landowners were not informed of contamination outside Linc Energy site	Political	ABC News	12/11/2022	https://www.abc.net.au/news/2022-11-12/linc-energy-project-site-bore-toxic-chemicals-landowners/101647142
Farmers fear Cecil Plains coal seam gas drilling could cause prime cropping land to subside	Farmers	ABC News	27/12/2022	https://www.abc.net.au/news/2021-03-28/farmers-fear-coal-seam-gas-could-cause-prime-ag-land-to-subside/13207950#

Table compiled by:

Col Lynam,

Earthquake Services

32 Coventry Place, Wishart, 4122

col.lynam@gmail.com