Coal seam gas: intersections with agriculture & water resource management

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Why are we talking about gas?

- Australia’s & the world’s energy use continues to rise
- Australia is seeking to cost-effectively transition to a lower carbon economy
- Australia has large quantities of CSG
- Global demand for LNG is rising
Why are we talking about intersection of CSG & agriculture?

Current coal
ca 75,000 ha
Small number of large assets
= few neighbours

Potential coal seam gas
<75,000 ha
Large number of small assets
= many neighbours
Intersection of CSG and agro-ecological zones
Intersection of CSG and sheep
Intersection of CSG and beef

Percentage of Australian beef (%)

- > 0.8
- 0.6 - 0.8
- 0.4 - 0.6
- 0.2 - 0.4
- < 0.2

GISERA
Gas Industry Social & Environmental Research Alliance
Intersection of CSG and irrigation

Australia's major irrigation areas
Intersection of CSG and grains
Intersection of CSG and horticulture
How much land will they share?

750 wells pa

15 yrs

25 yrs

11,250 wells

13,000 ha

18,750 wells

2%

21,000 ha

50 mmt pa

2,800 PJ

0.13 PJ/well

11,250 wells

21,000 wells

21,000 wells

59,000 ha

24,000 ha
What might this mean for agricultural production?
Intersections are not confined to the surface

<table>
<thead>
<tr>
<th>Gas industry water extraction</th>
<th>Agricultural industry water extraction</th>
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<tbody>
<tr>
<td>75-140 GL (Surat)</td>
<td>ca 140 GL pa groundwater</td>
</tr>
<tr>
<td>90-320 GL pa (total)</td>
<td></td>
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<tr>
<td>ca 11,000-21,000 bores</td>
<td>ca 12,000 bores</td>
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<tr>
<td>by-product</td>
<td>precious resource</td>
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<tr>
<td>ca 60% of costs</td>
<td>provides ca 1/3 of national agricultural value from &lt;1% of nation’s farm land</td>
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<tr>
<td>Not included in catchment management plans</td>
<td>Included in catchment management plans</td>
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How much do agriculture & CSG water interests intersect?

- Directly, probably not much and probably not often
  - Accessing water of different quality from different depths & geological formations

- Intersection of interest does not require access to common aquifers
Intersection of water resources

- Drawdown
- Depressurisation
- Contamination
- Subsidence
- Salt
- ‘New’ water resources
- Potential to offset existing withdrawals
What’s the balance between the pluses and minuses?

- Variable over space, time & stakeholders
- Dependent on industry rate & scale
- Defining impacts is a technical challenge, with incomplete certainty around:
  - Volumes & locations of produced water
  - Spatial variability of aquifer hydraulic properties
  - Duration of recovery periods
  - Rates & impacts of induced leakage
  - Impact of fractures and faults in determining local impacts
  - Cumulative regional-scale impacts of multiple CSG developments
Unresolved issues

- Intersection disputes driven by values as much as value
  - public vs. private benefit
  - agriculture vs. industry
  - rural lifestyle vs. industry development
  - resource access rights vs. autonomy
Thank you

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