

## Project Update – September 2015

### Interactions between Agriculture and Coal Seam Gas Development

This project examines how to best manage agricultural production and coal seam gas (CSG) development to maintain agricultural assets and long term productivity of both enterprises in southern Queensland. The research investigates on-farm interactions between agriculture and CSG development with a focus on farm logistics, operations, business management and profitability in three main production systems:

- Extensive grazing on native and improved pastures, which may include some cultivation,
- Mixed farming where grazing occurs with broadacre dryland cropping,
- Intensive dryland cropping.

Irrigated cropping has not been included in the research to date because there is very little CSG infrastructure on irrigated land at the moment. Irrigated production systems will be considered for inclusion if CSG infrastructure is established on these properties.

While water is a key issue for agriculture in relation to CSG development, this project does not specifically address groundwater issues. There is a range of projects, being completed by the UQ Centre for Coal Seam Gas, addressing groundwater impacts, hydrogeology and water quality.

The research focuses on interactions between agriculture and CSG in the operations phase.

The project is conducted by the School of Agriculture and Food Sciences at the University of Queensland. It is funded by the University of Queensland Centre for Coal Seam Gas ([www.ccsq.uq.edu.au](http://www.ccsq.uq.edu.au)), which is jointly funded by The University of Queensland and QGC, Santos, APLNG and Arrow Energy. The Queensland Department of Agriculture and Fisheries (DAF) is providing in-kind support to the project. Standards regarding research independence, confidentiality, ethical research methodologies and research integrity are maintained. The identity of all participating primary producers and others are confidential.

#### Aims

The project broadly has two main objectives:

1. To use quantifiable measures to understand the effects of CSG development on agricultural production and profitability;
2. To understand the factors that support or inhibit co-existence between CSG and agriculture and to investigate strategies to enhance co-existence.

The project has four specific aims:

1. To determine effective ways to measure the interactions and impacts of agriculture and CSG development on farm production and profitability;
2. To collect evidence that quantifies the effects of CSG development on agricultural production and profitability on farms in southern Queensland;

3. To define co-existence between agriculture and CSG and explain the factors and strategies that encourage or limit (constrain) co-existence using real examples; and
4. To communicate information and develop tools to assist farmers and the CSG industry to better manage co-existence in key agricultural production systems.

### **Stakeholders**

Stakeholders consulted during project development include:

- AgForce
- Queensland Department of Agriculture and Fisheries
- Queensland Department of Natural Resources and Mines
- Cotton Australia
- Condamine Alliance
- Basin Sustainability Alliance
- Queensland Murray Darling Committee
- South Queensland Regional Beef Research Committee
- CSG companies – QGC, Santos, APLNG and Arrow Energy.

The project team collaborates actively with research teams funded by the Gas Industry Social and Environmental Research Alliance (GISERA) investigating agriculture and CSG. That includes project leader meetings, joint project team meetings, and joint forums. These efforts ensure that the projects are coordinated and complementary.

### **The research team**

The project's researchers are:

- Jim Cavaye; Associate Professor (Project leader)
- Lisa Kelly; Research Officer
- Trish Rillorta-Goloran; Research Assistant (2015)
- Donald Cameron, Senior Lecturer
- Shelley Baldwin; Research Assistant (2014)
- Malcolm Martin; Department of Agriculture and Fisheries.

### **Advisors**

The following UQ staff also provide input and advice:

- Jo-Anne Everingham; Centre for Social Responsibility in Mining, Sustainable Minerals Institute, UQ
- Thomas Baumgartl; Centre for Mined Land Rehabilitation, Sustainable Minerals Institute, UQ
- Sue Vink; Centre for Water in the Minerals Industry, The Sustainable Minerals Institute, UQ
- Will Rifkin; Centre for Coal Seam Gas/Centre for Social Responsibility in Mining, Sustainable Minerals Institute, UQ.

### **Research Activities**

The research includes:

1. Collation of existing information
2. Landholder interviews and on-farm assessments,
3. Monitoring of case study sites,
4. Investigation of the meaning of co-existence and strategies to develop co-existence.

### **1. Collation of existing information**

Three working papers have been drafted where each is a comprehensive collation of existing information. This is to ensure that an extensive array of existing information is considered and that field research builds on what is already known and that the research conclusions are informed by current knowledge.

The working papers are first, an overview of interactions between agriculture and coal seam gas operations. This includes a description of the process of CSG development in relation to agriculture, the current governance arrangements for CSG development, the issues involved in agriculture and CSG, and an overview of current research.

A second working paper collates the various current understandings of co-existence, the spectrum of forms of co-existence, the factors that influence the development of co-existence and various definitions of the concept of co-existence.

A third paper brings together ways in which interactions between agricultural businesses and the CSG industry may be quantified, and it develops a set of quantifiable measures for assessing impacts of CSG activity on agriculture.

### **2. Landholder interviews and on-farm assessments**

Semi-structured interviews, on-farm assessments and Likert-scale scoring (and graduated scale of responses, such as somewhat negative, neutral, somewhat positive) were conducted with 47 landholders in the Maranoa and Western Downs regions of southern Queensland between April 2014 and March 2015. A set of quantifiable measures was developed to assess impacts using objective measures focused on business profitability, production, and farm management. Variables that were measured included business viability, business profitability, business net cashflow, production cost, labour cost, productive area, productivity, management time, ease of day-to-day management, ability to manage in difficult times, and overall effects.

In conducting assessments with landholders, it became clear that different landholders used different strategies to record or assess impacts. Across these strategies, some quantitative data was able to be recorded. The data were generally based on landholder experiences and observations, estimates and Likert-scale scores that we gathered.

Information was collected in the following ways:

- personal semi-structured interviews with landholders;
- collection of farm operation data and financial records, such as costs, where this was possible;
- field observations of CSG infrastructure and agricultural operations;
- industry and market data from government and peak industry organisations.

### **Selection of Landholders**

Landholders were selected as key informed persons based on the following criteria:

- They were established commercial agricultural producers, as opposed to sub-commercial or rural residential landholders;
- They had CSG infrastructure on their property;
- Their enterprise was representative of one of the three production systems (above);
- They had adequate farm records and/or the ability to provide adequate descriptive information about impacts;
- They did not have strong views opposed to, or in favour of, the coal seam gas industry;
- They were willing to participate in the research.

The research has university ethics approval, which ensures that the identity of all landholders, and their input into the research, is entirely confidential.

While 47 interviews and on-farm assessments were conducted, no ideas or points that were new to the researchers were raised after the first 28 interviews. Interviews beyond this 28 reinforced the range of issues already raised.

### **Analysis**

Feedback from landholders was analysed by collated quantifiable measures and Likert-scale scores. Verbal responses to interview questions were transcribed, and key points were identified and collated using computer software.

### **Results**

Research results are currently being collated, analysed, and described. The full results of the research are expected to be available by December 2015.

### **3. Monitoring of case study sites**

Four landholder properties are currently being monitoring for ten months to gain more detailed quantitative data and estimates of impacts. These measures include business viability, business profitability, business net cashflow, production cost, labour cost, productive area, productivity, management time, ease of day-to-day management, ability to manage in difficult times, and overall effects. This information will be included with other research results and will be available in January 2016.

### **4. Co-Existence**

Based on existing documented information and landholder feedback, co-existence is not a uniform situation that landholders and companies “achieve”. Rather, it is a complex and dynamic process that requires ongoing management. This process will be individual for each landholder’s circumstances, and it will involve biophysical, environmental, economic and human aspects. Existing information gives an overarching definition of co-existence involving nine principles, including knowledge, impact, capacity, context, coherence, flexibility, involvement, negotiation, and accountability. Collated information suggests that co-existence involves not just the management of biophysical, environmental, economic and human impacts and options for mutual benefit. It should also support relationship-building, accountability for actions and adaptation over time. The final results of this investigation of co-existence and strategies to develop it will be part of the research results available from December 2015.

**Project Contact**

**For more information contact:**

**Assoc. Prof. Jim Cavaye** School of Agriculture and Food Sciences, University of Queensland  
– Gatton Campus [j.cavaye@uq.edu.au](mailto:j.cavaye@uq.edu.au)