Project Order, Variations and Research Progress

Project Title: A study into how CSG and agriculture can operate in a shared space: costs, benefits, threats and opportunities

This document contains three sections. Click on the relevant section for more information.

1 Original Project Order

Project Order
Proforma 2011

1. Short Project Title (less than 15 words)

Project 2 – A shared space

Long Project Title	A study into how CSG and agriculture can operate in a shared space: costs, benefits, threats and opportunities.
GISERA Project Number	A2 1213
Proposed Start Date	July 2012
Proposed End Date	June 2013
Project Leader	Neil Huth

2. GISERA Research Program

☐ Biodiversity Research ☐ Marine Research ☒ Land Research

☐ Water Research ☐ Social & Economic Research

3. Research Leader, Title and Organisation

Neil Huth
Senior Research Scientist
CSIRO Ecosystem Sciences

4. Summary (less than 300 words)

Gas-farm development may require a greater level of 'sharing' than other examples of land use change or mixed farming enterprise development. Elements of each enterprise will become intrinsically intermingled in the same space. Furthermore, this space is often already more than just the location of a farm enterprise; it is the home of a farming family. The development of mixed enterprise gas-farms will bring costs and benefits to gas

companies, farm companies and farm families. This project will quantify, in various monetary and non-monetary terms, such costs and benefits.

5. Budget Summary (From Excel Budget Pack worksheet "Project Plan Summary")

Expenditure	2012/13 Year 1	2013/14 Year 2	2014/15 Year 3	2015/16 Year 4	2016/17 Year 5	Total
Labour	124,445					124,445
Operating	16,000					16,000
Total Costs	**140,445**					**140,445**
CSIRO	140,445					140,445
Total Expenditure	**140,445**					**140,445**

Expenditure per Task	2012/13 Year 1	2013/14 Year 2	2014/15 Year 3	2015/16 Year 4	2016/17 Year 5	Total
Task 1	140,445					140,445
Task 2						
Task 3						
Task 4						
Task 5						
Total Expenditure	**140,445**					**140,445**

Cash Funds to Project Partners	2012/13 Year 1	2013/14 Year 2	2014/15 Year 3	2015/16 Year 4	2016/17 Year 5	Total
CSIRO	105,320					105,320
Total Cash to Partners	**105,320**					**105,320**

Source of Cash Contributions	2012/13 Year 1	2013/14 Year 2	2014/15 Year 3	2015/16 Year 4	2016/17 Year 5	Total
Australia Pacific LNG	105,320					105,320
Total Cash Contributions	**105,320**					**105,320**

In-Kind Contribution from Partners	2012/13 Year 1	2013/14 Year 2	2014/15 Year 3	2015/16 Year 4	2016/17 Year 5	Total
CSIRO	35,125					35,125

Total In-Kind Contribution from Partners	**35,125**					**35,125**

	Total funding over all years	Percentage of Total Budget
Australia Pacific LNG Investment	105,320	75%
CSIRO Investment	35,125	25%
Total Other Investment		
TOTAL	**140,445**	**100%**

Task	Mile-stone Number	Milestone Description	Funded by	Participant Recipient	Start Date (mm-yy)	Delivery Date (mm-yy)	Fiscal Year	Fiscal Quarter	Payment $
Task 1	1.1	Initial Team Meeting and Literature Review.	GISERA	CSIRO	1.7.2012	30.9.2012	12/13	1st	26,330
Task 1	2.1	Surveys and Case Studies of farm and CSG stakeholder groups	GISERA	CSIRO	1.10.2012	31.12.2012	12/13	2nd	26,330
Task 1	3.1	Team Meeting and Synthesis of Results	GISERA	CSIRO	31.12.2012	31.3.2013	12/13	3rd	26,330
Task 1	4.1	Publication of results	GISERA	CSIRO	31.3.2013	31.6.2013	12/13	4th	26,330

6. Other Researchers (include organisations)

Researcher	Time Commitment (project as a whole)	Principle area of expertise	Years of experience	Organisation
Neil Huth	0.1FTE	Farming Systems Research, Modelling, Trade-off Analysis	>20	CSIRO
Neal Dalgliesh	0.1FTE	Farming Systems Research, Farmer Engagement, Farmer education	>30	CSIRO
Perry Poulton	0.1FTE	Farming Systems, Modelling, Farmer Engagement	>20	CSIRO
Oswald Marinoni	0.1FTE	Spatial analysis and modelling of geo-data, Informing land management decision processes	>15	CSIRO

7. GISERA Objectives Addressed

Research that improves and extends knowledge of environmental impacts and opportunities of CSG-LNG projects, enabling the CSG-LNG industry to better meet the expectations of relevant communities and the broader public.

Informing government, regulators and policy-makers on key issues regarding policy and legislative framework for the CSG-LNG industry.

8. Program Outcomes Achieved

Details are provided in *Section 13. Project Objectives and Outputs.*

9. Program Outputs Achieved

Details are provided in *Section 13. Project Objectives and Outputs.*

10. What is the knowledge gap that these research outputs will address?

The research outputs derived from this project will:

- document current CSG industry and farmer perceptions of costs and benefits of shared gas/farm systems
- document value systems underlying these perceptions
- estimate a range of key costs and benefits for comparison.

The research outputs will provide key knowledge and direction for subsequent research projects within the agricultural land management portfolio.

11. How will these Research outputs and outcomes be used by farmers or the CSG-LNG industry?

Research outputs will help to quantitatively and qualitatively inform farmers, CSG staff, government, scientists and the general community of the main issues facing the development of a shared CSG/farming landscape. Involvement of both farm and CSG professionals in the discussions will ensure that information is quickly shared amongst the various participants. The analysis will influence the direction of future work in the land management research portfolio, and is likely to be of considerable public interest.

12. Project Development (1 page max.)

The project was developed in consultation between APLNG and CSIRO staff. The proposed activity was discussed with members of various farmer/stakeholder groups and was endorsed as an important research need.

Much current public discussion arises from uncertainty within the farming community regarding the likely impacts and opportunities brought about by CSG development on farming land. These impacts are likely to differ between various types of farming enterprise (grazing, dry land cropping, irrigated cropping, mixed farming). This project will seek to identify and quantify costs and benefits where possible, and to identify

knowledge gaps where uncertainty may remain. This will influence the research agenda of other GISERA land management projects.

The work builds strongly on past and ongoing research activities of the project team in farming systems research based upon strong stakeholder engagement. Team members are currently involved on cross-disciplinary studies at the farm level in Australia, Asia and Africa. Such a farming "systems focus" will assist in the clear separation and analysis of issues within a shared space.

13. Project Objectives and Outputs

This project aims to provide insight into the costs and benefits of shared gas-farm systems through the eyes of farmers and gas industry professionals. Publication of the results from this project will provide the first synthesis of these issues within the scientific and mainstream literature. These insights will also inform decisions and directions in subsequent research projects, in particular the *Gas-Farm Design* project. The project will use a series of on-farm case studies and on-farm discussions to understand the value attributed to aspects of the shared system. A range of values identified by farmers will be collated from the case study discussions and methods sought for their evaluation. Formal economic costing will be applied where possible. However, just as importantly, the perceptions behind attributed values will also be explored. It is anticipated that there will be large differences in the values systems for farmers in irrigated cropping or dry land cropping and graziers. Landholders from a range of enterprises will therefore be included.

The key objective of this project is to develop a good understanding of the issues facing farmers and CSG staff within a shared gas/farming system including costs, benefits, threats and opportunities. The project will develop understanding, farm and industry linkages, and identify knowledge gaps that will feed into the larger assessments addressed by *Project 1, Project 3 and Project 4*.

Outputs include:

- Syntheses of costs and benefits of shared gas-farming systems.
- Surveys of the important issues facing those operating in shared Gas-Farming systems. These surveys will include representatives from different farmer stakeholder groups, farmers operating a range of farm enterprise types, and CSG staff operating in different industry roles.
- An analysis of these issues, including the various value systems underlying various perceptions or beliefs.
- A publication documenting the findings of the surveys, including a list of existing knowledge gaps

14. Project Plan

14.1 Project Schedule

ID	Task Title	Task Leader	Scheduled Start	Scheduled Finish	Predecessor
Task 1	Initial Team Meeting and Literature Review	Neil Huth	1.7.2012	30.9.2012	
Task 2	Surveys and Case Studies of farm and CSG stakeholder groups	Neil Huth	1.10.2012	31.12.2012	Task 1
Task 3	Team Meeting and Synthesis of Results	Neil Huth	31.12.2012	31.3.2013	Task 2
Task 4	Publication of results	Neil Huth	31.3.2013	31.6.2013	Task 3

Task 1.

TASK NAME: Initial team meeting and literature review

TASK LEADER: Neil Huth

OVERALL TIMEFRAME: 2012/13

TASK OBJECTIVES:

- Establish project team
- Gather background information for methodology and future publications
- Develop methodology for stakeholder surveys and their analysis
- Refine work plan according to stakeholder discussions

SPECIFIC DELIVERABLE: A document detailing relevant findings or methodologies from previous studies within the scientific literature.

Task 2.

TASK NAME: Surveys and case studies of farm and CSG stakeholder groups

TASK LEADER: Neil Huth

OVERALL TIMEFRAME: 2012/13

BACKGROUND: The project team has a long history of engaging with farmers to better understand farming systems. This work often employs surveys, discussion groups, or "kitchen table" sessions to capture information.

TASK OBJECTIVE: Gather relevant information to provide a good understanding of the costs and benefits of shared gas/farming systems, using a stratified sample of agricultural production systems.

TASK OUTPUTS: A variety of surveys, discussions and datasets on relevant issues.

SPECIFIC DELIVERABLE: Data in various forms for synthesis into a report into costs and benefits of shared gas/farming systems, for a range of enterprise types.

Task 3.

TASK NAME: Team meeting and synthesis of results

TASK LEADER: Neil Huth

OVERALL TIMEFRAME: 2012/13

BACKGROUND: The previous task provided for the collation of data from a wide range of subjects. This data will need to be synthesised into a coherent form and analysed for key results.

TASK OBJECTIVE: To, as a team, collate the results of surveys, case studies and data gathering into a coherent synthesis.

SPECIFIC DELIVERABLE: A team meeting, with relevant data analysed, discussed and interpreted. A brief report summarising findings.

Task 4.

TASK NAME: Publication of results

TASK LEADER: Neil Huth

OVERALL TIMEFRAME: 2012/13

BACKGROUND: Analysis of results should be mostly complete by Task 3. Results should be properly documented and communicated via scientific publication. Important points can be taken from this resulting document for communication via GISERA communication processes.

TASK OUTPUTS & SPECIFIC DELIVERABLES: A publication prepared for the scientific literature (journal and/or conference proceedings).

15. Budget Justification

The budget for this project has been approved by GISERA's Research Advisory Committee and Management Committee.

16. Project Governance

Project management tasks and dissemination activities are specified in *Section 14 Project Plan*.

17. Communications Plan

General communication will be managed by GISERA.

18. Risks

At this stage no unmanageable risks particular to this project are foreseen.

Capacity to deliver: All project staff have sufficient experience to lead and supervise the various activities and ascertain the research outcomes. Therefore the impact of unplanned key staff departure is low and can be mitigated.

There are risks inherent with working closely with human research subjects. Though the risks in this project are considered to be low, the project will be managed in accordance with CSIRO Human Research Ethics policies.

19. Intellectual Property and Confidentiality

Background IP (clause 10.1, 10.2)	**Party**	**Description of Background IP**	**Restrictions on use (if any)**	**Value**
Ownership of Non-Derivative IP (clause 11.3)	CSIRO			
Confidentiality of Project Results (clause 15.6)	Project results are not confidential.			
Additional Commercialisation requirements (clause 12.1)	Not Applicable			
Distribution of Commercialisation Income (clause 1.1)	Not applicable			
Commercialisation Interest (clause 1.1)	**Party**		**Commercialisation Interest**	
	Australia Pacific LNG			
	CSIRO			

2 Variations to Project Order

Changes to research Project Orders are approved by the GISERA Director, acting with authority provided by the GISERA National Research Management Committee, in accordance with the National GISERA Alliance Agreement.

The table below details variations to research Project Order.

Register of changes to Research Project Order

Date	Issue	Action	Authorisation
13/12/13	Recently available datasets were identified as being ideal for demonstrating differences in farmer concerns across the gas development areas and for illustrating possible impacts for ongoing agricultural productivity growth. The teams are still working to include these data in the project publication to add quantitative support to the findings of the group discussions.	Milestone 4 will be pushed back to February 2014.	Peter Stone

3 Progress against project milestones

Progress against milestones are approved by the GISERA Director, acting with authority provided by the GISERA National Research Management Committee, in accordance with the National GISERA Alliance Agreement.

Progress against project milestones/tasks is indicated by two methods: Traffic Light Reports and descriptive Project Schedule Reports.

1. Traffic light reports in the Project Schedule Table below show progress using a simple colour code:
   - Green:
     - Milestone fully met according to schedule.
     - Project is expected to continue to deliver according to plan.
     - Milestone payment is approved.
   - Amber:
     - Milestone largely met according to schedule.
     - Project has experienced delays or difficulties that will be overcome by next milestone, enabling project to return to delivery according to plan by next milestone.
     - Milestone payment approved for one amber light.
     - Milestone payment withheld for second of two successive amber lights; project review initiated and undertaken by GISERA Director.
   - Red:
     - Milestone not met according to schedule.
     - Problems in meeting milestone are likely to impact subsequent project delivery, such that revisions to project timing, scope or budget must be considered.
     - Milestone payment is withheld.
     - Project review initiated and undertaken by GISERA Research Advisory Committee.

2. Progress Schedule Reports outline task objectives and outputs and describe, in the 'progress report' section, the means and extent to which progress towards tasks has been made.

Project Schedule Table

ID	Task Title	Task Leader	Scheduled Start	Scheduled Finish	Predecessor
Task 1	Initial Team Meeting and Literature Review	Neil Huth	1.7.2012	30.9.2012	
Task 2	Surveys and Case Studies of farm and CSG stakeholder groups	Neil Huth	1.10.2012	31.12.2012	Task 1
Task 3	Team Meeting and Synthesis of Results	Neil Huth	31.12.2012	31.3.2013	Task 2
Task 4	Publication of results	Neil Huth	31.3.2013	28.2.2014	Task 3

Project Schedule Report

Task 1.

TASK NAME: Initial team meeting and literature review

TASK LEADER: Neil Huth

OVERALL TIMEFRAME: 2012/13

TASK OBJECTIVES:

- Establish project team.
- Gather background information for methodology and future publications.
- Develop methodology for stakeholder surveys and their analysis.
- Refine work plan according to stakeholder discussions.

SPECIFIC DELIVERABLE: A document detailing relevant findings or methodologies from previous studies within the scientific literature.

PROGRESS REPORT:

The initial team meeting was held in Toowoomba including all team members, and some representatives of the other GISERA Agricultural projects. Team members were given a brief description of the Human Research Ethics (HRE) Policies and review of the literature. HRE approval for stakeholder surveys, including required methodologies and safeguards, is complete and has been presented to project staff. HRE approval confirms that the project will follow National Standards for human ethics. Only stakeholder information documents require final approval. Literature review shows very little on the subject of CSG-farm co-existence in the peer-reviewed scientific literature. Some parallels to research on Wind Farms shows important insights as do some general papers describing co-existence issues in the Marcellus shale gas fields in the United States. Further review of literature on farmers' values systems is required.

Task 2.

TASK NAME: Surveys and case studies of farm and CSG stakeholder groups

TASK LEADER: Neil Huth

OVERALL TIMEFRAME: 2012/13

BACKGROUND: The project team has a long history of engaging with farmers to better understand farming systems. This work often employs surveys, discussion groups, or "kitchen table" sessions to capture information.

TASK OBJECTIVE: Gather relevant information to provide a good understanding of the costs and benefits of shared gas/farming systems, using a stratified sample of agricultural production systems.

TASK OUTPUTS: A variety of surveys, discussions and datasets on relevant issues.

SPECIFIC DELIVERABLE: Data in various forms for synthesis into a report into costs and benefits of shared gas/farming systems, for a range of enterprise types.

PROGRESS REPORT:

Farmer discussion workshops have been held in Roma, Chinchilla and Dalby. Twenty-two farmers from across these regions, with enterprises ranging from grazing, mixed cropping and grazing, dry land cropping and irrigated cropping, were involved in the discussions. Participants were selected with input from a wide range of stakeholder groups, including coal seam gas companies, agribusiness, environmental groups, farmer groups and local government and represented a mix in age and gender. Discussions included farmer perception on a range of topics, including feedback on research undertaken in other areas relevant to the co-existence issues for CSG in Queensland.

Task 3.

TASK NAME: Team meeting and synthesis of results

TASK LEADER: Neil Huth

OVERALL TIMEFRAME: 2012/13

BACKGROUND: The previous task provided for the collation of data from a wide range of subjects. This data will need to be synthesised into a coherent form and analysed for key results.

TASK OBJECTIVE: To, as a team, collate the results of surveys, case studies and data gathering into a coherent synthesis.

SPECIFIC DELIVERABLE: A team meeting, with relevant data analysed, discussed and interpreted. A brief report summarising findings.

PROGRESS REPORT:

A team meeting with staff from this project and collaborators from other GISERA agricultural projects (Perth, Toowoomba and Brisbane staff) has been held in Brisbane. Summarised results from the surveys were presented and discussed. A large range of issues had been raised by stakeholders across the areas of Health, Environment, Farm Business, Family Home, and Personal Issues. Analysis of the issues raised showed that most were caused by traffic, co-existence negotiation and impact on farm management. Recently available datasets on long term farm productivity and enterprise mix were identified as being ideal for demonstrating differences in farmer concerns across the gas development areas and for illustrating possible impacts for ongoing agricultural productivity growth. The teams will work to include these data in the project publication to add quantitative support to the findings of the group discussions.

Task 4.

TASK NAME: Publication of results

TASK LEADER: Neil Huth

OVERALL TIMEFRAME: 2012/13

BACKGROUND: Analysis of results should be mostly complete by Task 3. Results should be properly documented and communicated via scientific publication. Important points can be taken from this resulting document for communication via GISERA communication processes.

TASK OUTPUTS & SPECIFIC DELIVERABLES: A publication prepared for the scientific literature (journal and/or conference proceedings).

PROGRESS REPORT:

Draft scientific journal paper complete, approved by CSIRO publication system and GISERA Director as per GISERA publication policy.

Title: Farmers' perceptions of coexistence between agriculture and a large scale coal seam gas development

Neil I. Huth, Brett Cocks, Neal Dalgliesh, Perry L. Poulton, Oswald Marinoni, Javier Navarro Garcia

Abstract

The Coal Seam Gas (CSG) extraction industry is developing rapidly within the Surat Basin in southern Queensland, Australia, with licences already approved for tenements covering more than 24,000 km2. Much of this land is used for a broad range of agricultural purposes and the need for coexistence between the farm and gas industries has been the source of much conflict. Whilst much research has been undertaken into the environmental and economic impacts of CSG, little research has looked into the issues of coexistence between farmers and the CSG industry in the shared space that is a farm business, a home and a resource extraction network.

We conducted a series of workshops with farmers from across a broad region undergoing CSG development to explore farmers' perceptions of some of the issues arising from large scale land use change. Workshops explored the importance of place identity and landscape aesthetics for farmers, farmers' acceptance and coping with change, and possible benefits from off-farm income. We found that farmers believed that place identity was not well understood by CSG staff from non-rural backgrounds and that farmers struggled to explain some concerns because of the different way they interpreted their landscape. These differences were the cause of much frustration and farmers felt that this has led to severe impacts on mental health and wellbeing. Farmers felt that a change in culture within the CSG companies will be required if engagement with farmers is to improve and that efforts to employ local people in these communications was helping this. The workshops also identified a range of issues perceived by farmers arising from increased traffic volumes, impacts to mental health and wellbeing, place identity and loss of water resources for farmers. Finally, it was suggested that scientists and agricultural industry groups will need to work closely with farmers to develop understanding of these emerging issues and to develop solutions that are timely and relevant.