GISERA - Agricultural Land Management Case Study

Box 1 **Case Study summary**

Key findings

- High resolution aerial photographs were used to create a 3D model of the Darling Downs landscape
- Researchers used the 3D model to study how 'virtual' water would flow across that landscape
- Information on possible existing or emerging erosion damage was presented to stakeholders
- The project provided knowledge about the impacts of CSG access tracks in affected communities and how to reduce those impacts.
- Potential benefits include:
  - Less erosion, which should help maintain the efficiency of agricultural land.
  - Improved environmental outcomes through reduced sediment flows.
  - Social benefits associated with better understanding and levels of trust between the industry and the community.
  - Better placement of CSG access tracks to help reduce the need for track maintenance.
- ACIL Allen has estimated that if CSIRO's land mapping methodology was applied by Santos at their proposed Narrabri CSG project it could potentially provide a saving in access track maintenance costs of around $350,000 per year.

Innovation impact

The capability to create high resolution 3D maps using aerial images developed as part of this project has attracted interest from a broad range of groups. A number of other ways in which the technology might be commercialised/used are being actively pursued.

Source: ACIL Allen Consulting

This case study uses the evaluation framework outlined in the CSIRO Impact Evaluation Guide. The results of applying that framework to the Agricultural Land Management Case Study are summarised in Figure 1.

Figure 1 **GISERA Agricultural Land Management Case Study – Impact Framework Diagram**

INPUTS	ACTIVITIES	OUTPUTS	OUTCOMES	IMPACTS
▪ CSIRO investment and in-kind support ▪ APLNG and GISERA cash support	▪ Literature review ▪ Using aerial photography to create 3D models of the landscape ▪ Using the 3D models to assess the impact of access tracks on erosion ▪ Communicating the results to firms and communities	▪ Reports and papers which outline the soil outcomes of CSG development. ▪ Landform models which map interaction between water flows, woodland and roadways. ▪ Summary fact sheets to transmit the results of the research to the agricultural sector and the broader community ▪ Presentations to conferences and community meetings.	▪ Improved knowledge of and development of best practice activities on the effects of CSG access tracks on farm soil erosion. ▪ Processes for improved monitoring future erosion risks. ▪ Better informed CSG businesses ▪ Better informed farmers and communities ▪ Improved management of erosion risks via best practice design, management and monitoring of access tracks	▪ Reduced erosion and less damage to the environment from sediment flows into water ways. ▪ Improved land quality by decreasing impact of CSG tracks on farmland ▪ Increased productivity from agricultural land. ▪ Lower maintenance costs for CSG access tracks ▪ Improved industry best practice accompanying CSG development. ▪ Increased trust between landholders and CSG industry

Source: ACIL Allen

1.1 Background

The CSIRO Gas Industry Social and Environmental Research Alliance (GISERA) is a collaboration between CSIRO, Commonwealth and state governments and the gas industry established to undertake publicly-reported independent research. The purpose of CSIRO's GISERA is to provide quality assured scientific research and information to communities living in gas development regions focusing on social and environmental topics including: groundwater and surface water, biodiversity, land management, the marine environment, human health impacts and socio-economic impacts. The governance structure of GISERA is designed to provide for and protect the research independence of CSIRO and the transparency of research undertaken as part of GISERA.

GISERA aims to:

- carry out research and provide information for the benefit of Australian communities in CSG and shale gas regions and industry
- inform governments and policy-makers of key research outcomes.

One of the stakeholders interviewed for this project spoke favourably of GISERA's governance arrangements, commenting that:

> The CSIRO's use of a stakeholder reference group which includes community representatives is seen as very important from the point of view of building trust.[1]

Another stakeholder supported this view, stating that:

> I'm very supportive of GISERA as an independent trusted adviser on onshore gas. The governance arrangements that have been established provide a level of transparency that I believe is second to none when it comes to private funding of CSIRO research.[2]

1.1.1 Purpose and audience for case study

The purpose of this case study is to illustrate the economic impact of CSIRO research undertaken for GISERA. The exploration for and development of coal seam gas wells requires construction of many kilometres of access tracks. Those tracks need to cross cultivated, grazing and or forested land. Such tracks are known to have impacts on the landscape they traverse, including spreading weeds and increasing the risk of erosion. For example, previous research has indicated that a large amount of sediment found in waterways has origins in unpaved rural roads.[3] Although unpaved roads only make up approximately 1 per cent of a catchment, they may contribute as much as 40 per cent of the sediment in affected waterways.

This project initially aimed to gain a better understanding of the impact that access tracks had on the spread of weeds and erosion and provide information to help companies and communities to monitor and manage those impacts. However, early in the project it became clear that weed control measures were already well established across the region and the focus for the project was shifted wholly onto soil erosion associated with vehicle tracks.

1.1.2 Project origins and inputs

This case study examined two separate but linked projects, '*Making Tracks – Treading Carefully*' (Making Tracks) and '*Telling the Story*'. These research projects arose as a result of stakeholders' concerns regarding access tracks used by the gas companies to move the staff and equipment required for the exploration for and development of Coal Seam Gas (CSG) resources in the Surat Basin of the Western Downs region.

Origin Energy was concerned about the amount of money their access tracks were costing to maintain. Communities were concerned about the potential for the access tracks to damage the lands they run across. Origin Energy shared these concerns as minimising any degradation of farmland they are crossing helps to maintain good relations with

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1 Consultation with Ian Hayllor, Gasfield Commissioner, farmer and former chair of the Basin Sustainability Alliance.
2 Consultation with Nicole Hinton, Department of Industry Innovation and Science.
3 Croke, J. C., Hairsine, P. B. (2006). *Sediment delivery in managed forests: a review*. NRC Research Press Environmental Reviews, 14(1), 59–87. doi:10.1139/a05-016 and Motha, J. A., Wallbrink, P. J., Hairsine, P. B., Grayson, R. B. (2004). *Unsealed roads as suspended sediment sources in an agricultural catchment in south-eastern Australia*. Journal of Hydrology, 286: 1-18.

farmers whose land they are traversing and the community. Other CSIRO GISERA research has demonstrated that improved relationships with landholders is central to obtaining and maintaining the gas industry's social licence to operate.

The *Making Tracks* project was conducted to examine the impact of tracks on farmland, and *Telling the Story* was undertaken to provide information to members of local communities, including the research into the effects of CSG access tracks development on agricultural soil undertaken in *Making Tracks*. The ultimate aim of the research was to provide knowledge and information to stakeholders about how best to minimise any potential disruption to agricultural land by CSG exploration and development.

The *Making Tracks* project drew on the mapping, remote sensing and mathematical modelling expertise of CSIRO researchers in WA (who are now part of Data 61). Prior research had developed the methodology to produce a 3D model of any landscape from very high-resolution aerial photography. This project developed models at 20cm resolution. The 3D models have been validated through on-the-ground surveys which showed accuracy in ground elevation predictions approaching that which an on-the-ground surveyor could obtain (approx. 5cm). Other participants in the research were scientists from the CSIRO Agriculture and Food Business Unit and the CSIRO Land and Water Business Unit.

Making Tracks received total support of $564,089 over three years. Over 75% of this funding was provided by Asia-Pacific LNG. The remaining support was provided through in-kind funding from CSIRO. *Telling the Story* received support of $332,224. For this project GISERA contributed $210,000 in cash and CSIRO provided the rest through in-kind contributions. Thus the total support provided to both projects was $896,313. Origin Energy also gave in-kind support by providing access to its farm in the region, however this contribution has not been valued.

Table 1 Financial and in-kind support for the project

Contributor / type of support	2012/13 ($)	2013/14 ($)	2014/15 ($)	2015/16 ($)	2016/17 ($)	Total
	'*Making tracks*' project			'*Telling the Story*' project		
Cash						
Asia-Pacific LNG	137,320	163,200	126,240			**426,760**
GISERA				154,851	55,149	**210,000**
In-kind						
CSIRO	45,766	54,481	37,082	93,776	28,448	**259,553**
Total	**183,086**	**217,681**	**163,322**	**248,627**	**83,597**	**896,313**

1.2 Project activities

A first activity was to engage with key gas and agricultural industry operators to build links with them and identify issues and develop and test effective monitoring approaches. This was followed by a literature review and developing and implementing a methodology for monitoring weeds and erosion.

CSIRO researchers used high resolution aerial imagery to create a 3D model of the Darling Downs landscape. The survey area was a 34 km by 34 km block near Miles, Condamine, Wieambilla and Chinchilla West. Aerial images (with a resolution of 20cm per pixel) were taken looking straight down (nadir), backward and forward. The images were taken in four multispectral bands (red, green, blue and near infrared). The images were used to reconstruct detailed digital surface models (DSM) at a resolution of 20cm, and the multispectral data was used for analysing many land and cover indicators.

Researchers used the 3D model to study how 'virtual' water would flow across that landscape. The information about how water would flow across the landscape when access tracks were positioned in differently locations could then be used to project how the impacts of various track paths would differ from the perspective of minimising possible erosion.

The project monitored CSG (and existing farm) access tracks across a number of landscapes, and mapped the associated soil erosion that occurred as a result. Monitoring of the impacts of access tracks was also conducted by aerial photography and high-resolution satellite imagery.

To test the DSM, and hydrological models derived from it, a detailed survey of various land disturbance features was undertaken. Surveys include roadways, pipelines and pads and have been undertaken at approximately 2cm accuracy using high precision differential GPS. Vegetation surveys have also been conducted in order to test the airborne estimates of vegetation structure. In addition, various hydrological features, such as contour banks or erosion gullies have been located in the field and used to compare actual and predicted flow networks.

Results of the above activities were presented in reports and conference presentations and used to prepare information documents for distribution to members of the community.

1.3 Project outputs

The outputs of this project include:

- Information on possible existing or emerging erosion damage presented to:
  - Stakeholders through community events, agricultural shows, tech shows and scientific conferences
  - Industry and governments through Knowledge Transfer sessions, symposiums and industry forums
- An evaluation of processes for monitoring future erosion risks
- A documented history of erosion over the course of extensive land use change. This level of detailed information was previously unavailable and will extend scientific knowledge of important natural processes associated with access tracks.
- Reports and scientific papers
- Shorter documents that summarise the research findings and implications for presentation to members of the community.

1.3.1 Publications

The following are some of the publications that have resulted from this project: [

- CSIRO Agriculture and Food. (2016). *Access tracks and soil erosion* [Fact sheet]. Available from https://gisera.csiro.au/wp-content/uploads/2017/01/16-00767_GISERA_AG_Erosion2ppFactsheet_WEB_161201.pdf
- Vacher, C. A., Antille, D. L., Huth, N. I., Raine, S. R. (2016). *Assessing erosion processes associated with establishment of coal seam gas pipeline infrastructure in Queensland, Australia*. 2016 ASABE Annual International Meeting, Paper No. 162461210, 1-13. doi: 10.13031/aim.20162461210
- Huth, N. I., Poulton, P., Cacetta, P., Wu, X., Cocks, B., Wallace, J. (2015). *High resolution spatial modelling approaches for monitoring surface water and erosion impacts of coal seam gas infrastructure*. 21st International Congress on Modelling and Simulation. Modelling and Simulation Society of Australia and New Zealand, December 2015. 490–496.
- Antille, D. L., Eberhard, J., Huth, N. I., Marioni, O., Navarro-Garcia, J., Cocks, B., Schmidt, E. J. (2014). *Impacts of coal seam gas infrastructure development on agricultural soil: a case-study in southern Queensland, Australia*. ASABE and CSBE/SCGAB Annual International Meeting, Paper No. 141894028, 1-21. doi: 10.13031/aim.20141894028
- Neil I Huth, Andrea Walton, Brett Cocks (2016) Telling the story. Final Report. CSIRO, Australia.
- CSIRO Agriculture and Food (2016). *Agricultural land management knowledge transfer session* [PowerPoint slides]. Retrieved from https://gisera.csiro.au/wp-content/uploads/2017/02/Telling-the-Story-Knowledge-Transfer-Meeting-Small.pdf

1.4 Status of Outcomes and Impacts

1.4.1 Nature of Outcomes and Impacts

The research outcomes achieved in the 'Making tracks' project, along with other GISERA agricultural land research, are applicable to any community or industry involved in or affected by the laying of access tracks to access CSG wells, and/or the installation of the wells themselves.

The outcomes from this project are increased knowledge about the impacts of CSG access tracks in affected communities and how to reduce those impacts. The beneficiaries of the research are members of those communities and the CSG companies. The former benefit from an improved understanding of the potential impacts of the CSG industry on the landscape. They will also benefit from less erosion, which will help maintain the efficiency of agricultural land. The latter will benefit from better placement of the CSG access tracks to help minimise erosion of the tracks and reduce the amount of track maintenance that is needed.

The project also provided a forum for farmers and other rural community members to express their concerns about CSG and its range of economic, social and environmental impacts. These conversations provided both farmers and CSG companies with the opportunity to better understand each other's concerns and helped to build and maintain trust between the parties. Key findings from these conversations included:

- Relationships are being disrupted by perceived "simple mistakes" made by gas companies and contractors, which undermined the credibility of the CSG industry among farmers.
- Farmers are uncertain about the future of CSG, in particular the local impacts and broader issues surrounding CSG exploration.
- People's information needs vary according to proximity to the issue – people who were not directly affected required less detailed information needs than those that were. Hence a variety of communication styles were developed, ranging from high level dot point summaries to in-depth, detailed documentation and one-on-one conversations.

A stakeholder interviewed for this case study commented that:

> …the fact that a lot of the intensity has gone out of the arguments around CSG suggests that the information provided as a result of GISERA's research has helped to cool down the debate.[4]

Another stakeholder when asked if the GISERA research is helping to inform collaboration and engagement between industry, government & communities to address challenges and opportunities and develop solutions responded:

> I do – the work GISERA is doing is on the ground in communities and they – independent scientists – work with people in the communities talking with them about their concerns.[5]

1.4.2 Counterfactual

Similar research had been undertaken in North America to demonstrate the use of airborne survey methods to identify hydrological impacts of shale gas well access road networks. However, this US work was not undertaken at the detailed high resolution of the Australian study. In addition, no similar information was available that was relevant to Australian CSG fields.

It is unlikely that the project would have been undertaken without the expertise that CSIRO researchers had acquired in developing high resolution 3D terrain maps from aerial photography and using these to mathematically model water flows across a landscape. The financial and in-kind support provided by APLNG was also crucial to the success of the project. The researchers' ability to access the farm property owned by Origin Energy meant the project could proceed more quickly than otherwise would have been the case. Access to the Origin Energy property gave GISERA researchers

[4] Consultation with Ian Hayllor, Gasfield Commissioner, farmer and former chair of the Basin Sustainability Alliance.
[5] Consultation with Nicole Hinton, Department of Industry Innovation and Science.

the ability to demonstrate issues/risks of erosion without raising any confidentiality concerns for third parties (e.g. demonstrating issues on a particular farmer's land may upset that farmer).

1.4.3 Attribution

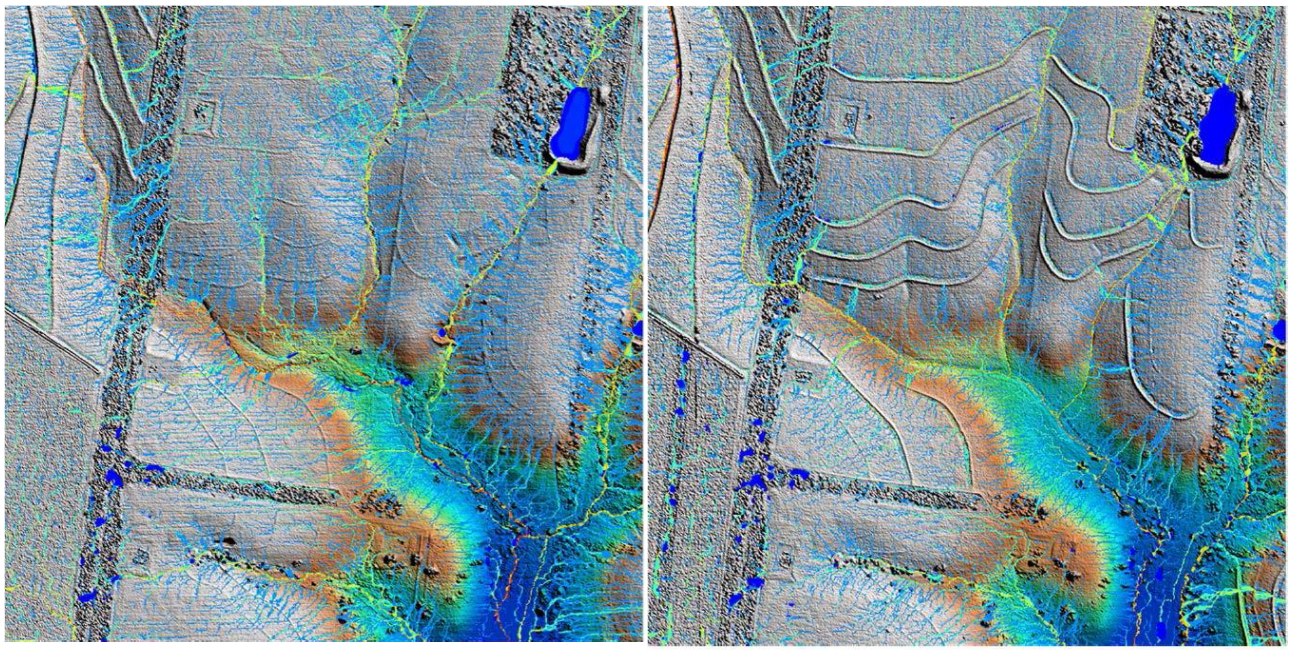
Based on the discussion in the preceding section ACIL Allen has attributed the benefits of this project equally between APLNG (Origin Energy) and CSIRO.

1.4.4 Adoption

The results of the project have been conveyed to stakeholders across Queensland, such as landholders in Chinchilla, Roma, the Toowoomba CSG Compliance unit and the Gas Fields Commission with the aim of increasing their understanding of CSG development and erosion issues and the relevance of this to the broader farming community. There is evidence that members of the community and CSG companies are changing behaviours as a result. For example:

- The manager at the farm owned by Origin reworked the farm's contour banks to improve the capture of water, based on the findings of the project (see Figure 2).
- Another farmer who participated in several engagement events was using the results to redesign his fence lines. He is now also participating in another GISERA project.
- Santos has suggested that they may use the technology to plan their access tracks should they proceed with the Narrabri project.

Figure 2 **'Before and after' photos of Origin Energy's farmland**



Note: Photo on left is from 2013 and photo on right is from 2015
Source: *Telling the Story - Knowledge Transfer Meeting*, CSIRO presentation on GISERA project

The two photos in Figure 2 are of a field on the Origin property "Monreagh" near Chinchilla. The left shows the digital elevation model of the soil surface in 2013 and the right one is the same area in 2015. Between those two surveys the farm manager had undertaken significant earthworks, including reworking the contour banks to better control overland water flows and levelling and cultivation of the gullied area at the lowest section of the paddock. The images show the significant changes in soil surface elevation as a result of those earthworks. Water flows are predicted to be much more effectively managed after this work.

The work done by GISERA has also helped inform the development of public policy, although more could be done in this area. One stakeholder noted:

> For policy development the research has provided evidence on which to base advice to government. DIIS have been talking to GISERA about how the research could be better used by the department.[6]

1.5 Assessment of impacts

1.5.1 Impacts to date

Impacts in terms of the provision of information to stakeholders began to occur relatively early in the project. This is a result of the communications element (Telling the Story) being a fully integrated part of the project.

There is evidence that farmers are making decisions and taking action as a result of having access to the information developed by this project. However, it is difficult to quantify both the amount of change occurring and what the value of any benefit might be. What is clear is that any changes made are only likely to add to the overall benefits delivered by this project.

It is unlikely that CSG companies would make changes to their existing access tracks as a result of the information flowing from this project. However, given that the information generated could significantly reduce the maintenance cost of access tracks it would be reasonable to expect that the approach developed by this project will be adopted over time as access tracks are constructed for new projects.

A February 2013 report that reviewed road maintenance costs for the Tasmania Grants Commission found that the cost of maintaining an unsealed road was just over $3,000 per kilometre.[7] The data in the ALGA National Local Roads Data Set for October 2013 states that Queensland spent some $125 million on maintaining a network of approximately 85,000 km of unsealed roads.[8] This suggests it costs an average of $1,470/km per year to maintain unsealed roads.

The Narrabri CSG proposal by Santos involves developing a project area of 95,000 hectares. A 2015 study found that well access tracks occupied 1.04 per cent of the project area.[9] This would mean that there would be some 9.5 million square meters of access tracks. If we assume that an access track is eight meters wide this suggests that the Narrabri project would require a total of around 1,200 km of access tracks.

A paper by Marinoni found that each CSG well required an average of 1.3 km of access tracks.[10] Santos has sought approval to drill up to 850 natural gas wells for the Narrabri gas project.[11] This suggests that they would need to construct 1,105 km of access tracks.

Based on the smaller of these two estimates of track length required for the Narrabri project and an annual average maintenance spend of $1,470/km this implies an annual total spend of around $1.62 million. If the use of CSIRO's land mapping methodology was applied by Santos and we assumed that the better design and placement of the access tracks helped to reduce maintenance costs by 10 per cent this would imply an annual saving in maintenance costs of around $162,000.

In addition, drilling of CSG wells in Queensland over the last eight years has averaged around 900 wells per year.[12] If we assume this average rate continues for ten years then some additional 9,000 CSG wells would be drilled in Queensland by 2028. This would require 11,700 km of access tracks to be built. A ten per cent saving on track maintenance costs would amount to an annual saving of about $1.72 million after ten years.

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6 Consultation with Nicole Hinton, Department of Industry Innovation and Science.

7 Tasmania Grants Commission Report, *Review of Road Maintenance Costs*, Jeff Roorda & Associates, February 2012.

8 ALGA National Local Roads Data Set – October 2013, www.jr.net.au/NLRDS/Reports/NLRDS%20Unsealed%20roads%202006%202011.pdf, accessed January 2018.

9 O. Marinoni, J. Navarro Garcia (2016) A novel model to estimate the impact of Coal Seam Gas extraction on agro-economic returns, Land Use Policy, Volume 59, Pages 351-365.

10 https://gisera.org.au/wp-content/uploads/2017/01/Journal-A-novel-model-to-estimate-the-impact-of-Coal-Seam-Gas-extraction-on-agro-economic-returns.pdf

11 https://www.santos.com/what-we-do/activities/new-south-wales/gunnedah-basin/narrabri-gas-project/ Accessed 24 January 2018.

12 http://www.australiaminerals.gov.au/__data/assets/pdf_file/0003/47622/Queenslands-petroleum-and-coal-seam-gas-2017.pdf

1.5.2 Potential future impacts

The approaches developed by this project for analysing and monitoring erosion in the Darling Downs region have potential applicability in a range of ways, including:

- The 3D mapping capability developed through this project has attracted the interest of governments for use in other environments where there are conflicting views on land use and where trust might be lacking (such as state forestry operations). There has also been interest from universities, including Stanford University in California.
- The approach could be duplicated across Australia.
  - While CSIRO does not have the resources to apply the technology beyond the Darling Downs region, they are currently seeking funding from the Commonwealth Department of Agriculture and Water Resources' Smart Farming Partnerships program for a project to create a similar data set nationally.
- The Grains Research and Development Corporation (GRDC) has also expressed an interest in the work, as have engineering firms and Natural Resource Management (NRM) groups.
- There has also been interest from educational institutions to use the technology as a teaching tool.
- Santos has suggested that they may use the technology to plan their access tracks should they proceed with the Narrabri project.
- The approach could potentially be replicated using drones, which would reduce the cost. Although this would primarily be practicable for smaller areas of land (paddock scale).

The communications element of this project has also provided very useful information on how best to communicate science information in situations where there is a lack of trust / conflict.

The project also identified a number of research gaps and future needs. CSIRO identified the need for research in other areas of CSG development, particularly the Wandoan region. Additionally, participants desired research into the next stages of CSG development post-construction phase, namely the potential regional decline during production, and the effects of the eventual closure and decommissioning of CSG development.

Workshop participants also expressed a range of ongoing concerns about CSG development, and as such there may be the need for further research in these areas. Areas of uncertainty included impacts to groundwater quantity and quality, salt and brine management, safe drilling, scale of development, impacts on housing and business in local towns, dust on pastures, forest disturbance, compensation, fairness issues, and impacts on future farm valuations.

1.5.3 Cost Benefit Analysis

Costs

Based on the R&D costs (both cash and in-kind) shown previously in **Table 1**, the present value of R&D costs incurred by APLNG, GISERA and CSIRO is $1.043 million in 2017/18 dollars under a 7 per cent real discount rate.

Benefits

As discussed in Section **Error! Reference source not found.**, the estimated potential benefits in reduced maintenance costs at the Narrabri CSG project area due to the application of CSIRO's land mapping methodology by Santos are approximately $162,000 per year.

ACIL Allen assumes that there is a 50 per cent probability that such benefits will be realised, and that there is a linear ramp-up in benefits over a 5-year period beginning in 2018-19.

In addition, the benefits from reduced maintenance costs for the CSG access tracks in Queensland are expected to be approximately $86,000 in 2018-19 and increase by the same amount each year before flat-lining at approximately $860,000 in 2027-28, under the assumption that there is a 50 per cent probability that such benefits will be realised.

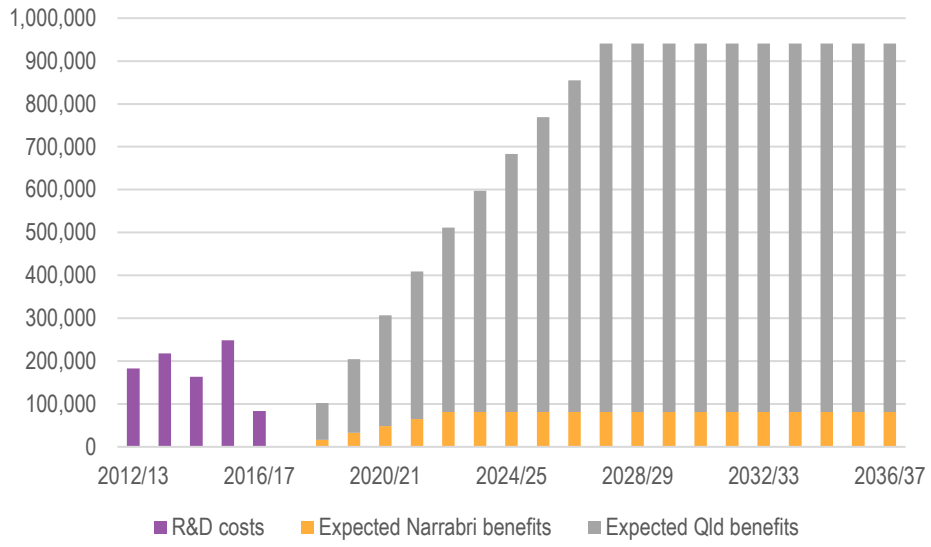
Under these assumptions, the present value of total benefits is estimated to be $6.105 million in 2017/18 dollars under a 7 per cent real discount rate over a 20-year analysis period (from 2017/18 to 2036/37).

Other potential benefits that have not been quantified include the environmental benefits from reduced sedimentation in nearby waterways that is made possible by improved design of access tracks. However, it is difficult to robustly estimate the value of avoided sedimentation due to data limitations.

Assessment of costs versus benefits

The annual costs and benefits of the CSIRO research project between 2012/13 and 2036/37 are shown in Figure 3.

Figure 3 **Costs and benefits of CSIRO agricultural land management research by year, 2017-18 to 2036-37 (2017-18 dollars)**



Source: ACIL Allen Consulting

The net present value (NPV) of the CSIRO research project, obtained by subtracting the present value of costs from the present value of benefits, is estimated to be $5.062 million.

The benefit-cost ratio (BCR) of the research project, obtained by dividing the present value of benefits by the present value of costs, is 5.85.

Sensitivity analysis

In the central case of the cost-benefit analysis, it is assumed that the CSIRO research project enables a 10 per cent reduction in the maintenance costs of CSG access tracks. If the research enables a 20 per cent reduction in maintenance costs, the BCR increases from 5.85 to 11.70. Conversely, if the research only enables a 5 per cent reduction in maintenance costs, the BCR decreases to 2.93.

In the central case of the cost-benefit analysis, it is assumed that the probability of the Narrabri and Queensland potential benefits being realised is 50 per cent. If this probability is 75 per cent, the BCR increases from 5.85 to 8.78. Conversely, if the probability is 25 per cent, the BCR decreases to 2.93.

In the central case of the cost-benefit analysis, it is assumed that 900 km of CSG access tracks will be constructed in Queensland annually. If the length of CSG access tracks constructed annually in Queensland is 1,100 km, the BCR increases from 5.85 to 7.01. Conversely, if the length of access tracks constructed annually in that state is 700 km, the BCR decreases to 4.69.

1.6 CSIRO's role as an Innovation Catalyst

The capability to create 3D maps using aerial images developed as a result of this project has attracted the interest of governments, universities, the Grains Research and Development Corporation (GRDC), the CSG industry, engineering firms and Natural Resource Management (NRM) groups.

This technology has been presented at multiple tech shows and scientific conferences. As a result of these presentations, CSIRO has received enquiries from farmers, farmer groups, industry (engineering companies) and government (federal) about the technology's use in other domains.

Project proposals have been submitted to see data platforms and workflows developed to make the technology available for broader application. A follow-on project has evaluated the technology for reef catchment monitoring and CSIRO is exploring options for commercialisation with Agricultural data service companies.

An ON Prime application is currently being developed as part of efforts to accelerate the commercialisation of the technology.[13]

[13] ON Prime is an open and collaborative CSIRO program for existing science projects as well as new technologies and projects that are still in development. ON Prime helps research teams to ensure that they are working on the right problem, it provides frameworks to create and test assumptions about their idea and provide recommendations towards next steps.