

Community wellbeing and local attitudes to coal seam gas development

Social Baseline Assessment: Narrabri project - Phase 3 Survey report

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Our gratitude goes to the research participants from the Narrabri shire who participated in our telephone survey and those who participated in the qualitative phase, which helped to inform the development of the survey items. In addition, we thank Q & A research for the professional and friendly manner in which they conducted our telephone surveys.

Executive Summary

This research establishes baseline measures of community wellbeing, community resilience and adaptation, and expected future wellbeing in the context of a proposed coal seam gas (CSG) development in the Narrabri shire of NSW. In addition, it measures and documents local attitudes and perceptions of CSG development and the CSG sector.

The Narrabri Gas Project is in an appraisal stage of development; if it were to proceed such baseline measures are important for measuring changes in community wellbeing over time, understanding and mitigating potential impacts, and helping to realise any opportunities.

What we did

Using a survey design, we conducted telephone surveys of 400 residents randomly selected from the Narrabri shire. We asked 183 questions about people's views towards quality of life and wellbeing in their community, how they felt their community would adapt or respond to changes from a possible CSG development, and what their expectations were for their community's future. We also asked them about their attitudes and perceptions of CSG and the CSG sector. The survey took 32 minutes on average to complete.

When

The survey was conducted over a six week period during March – April 2017. The planned timing of the survey was unexpectedly delayed by six weeks to avoid consultation fatigue of shire residents associated with the Environmental Impact Statement (EIS) for the Narrabri Gas project, which was announced in February 2017.

Where

The survey covered the Narrabri shire in north western NSW. The shire covers approximately 13,000 square kilometres and is home to approximately 13,000 people in 2016. The main centre is Narrabri with Wee Waa and Boggabri the next two biggest towns. The proposed gas project is situated approximately 20 kilometres south of the town of Narrabri.

Who

Participants were randomly selected using lists of landline and mobile phone numbers and we used quotas to achieve a representative sample. The response rate was very high for telephone surveys at 56%.

- The sample was representative based on the ABS statistics for gender, indigenous identification, employment status and living in-town / out-of-town.
- The sample was over-representative of older residents, so a weighted sample was used in analyses.
- The sample comprised two subregions: Narrabri and surrounds, and the 'rest of the shire' (Boggabri, Wee Waa and their surrounds)

What we found

A general comment about describing the results

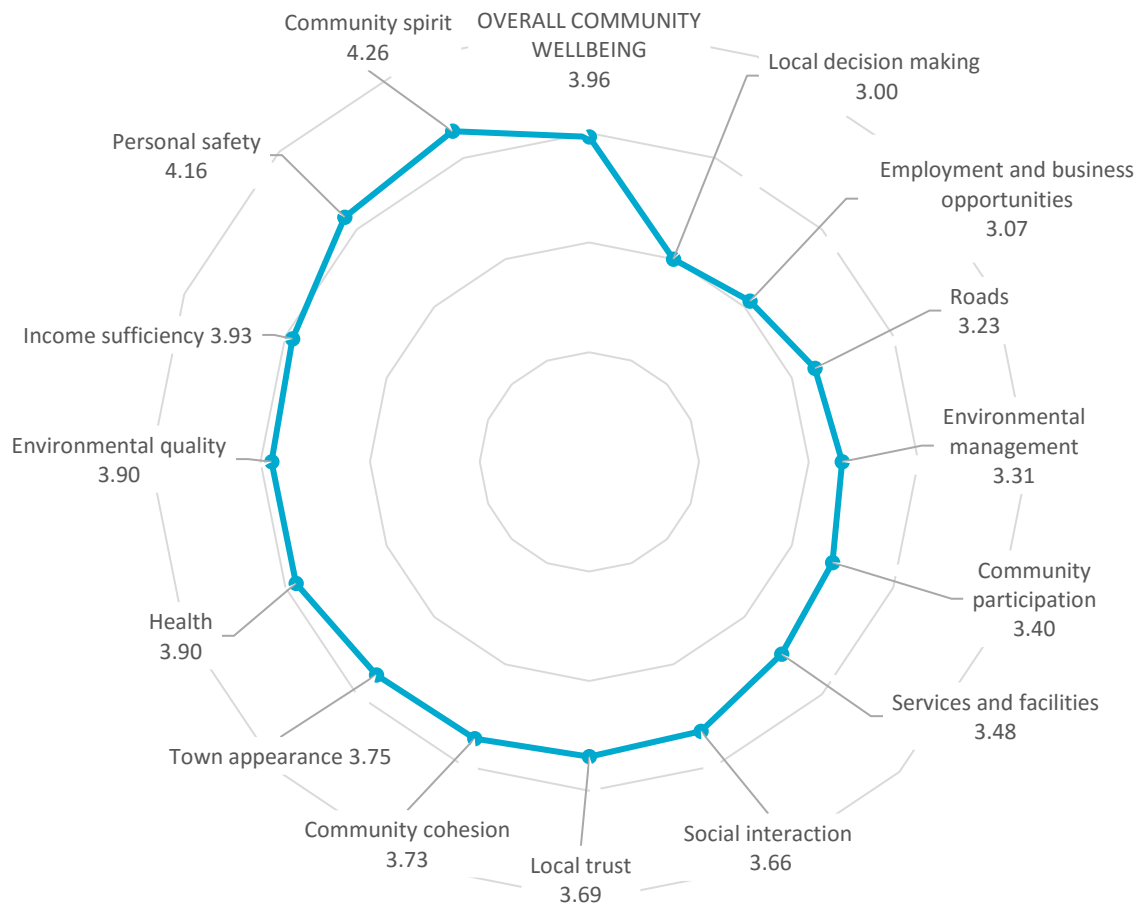
We typically report the results as average scores out of 5 using a scale from 1 to 5 where 1 is the least and 5 is the most. A score below the midpoint of 3 is considered negative or unfavourable on average. Where relevant, we describe results as statistically significant at the .05 level, this means that there was less than a five percent chance that the findings were due to chance.

Community Wellbeing: Fifteen dimensions evaluated by residents

Results showed overall community wellbeing to be robust; of the fifteen underlying dimensions thirteen were rated positively and two as borderline. Community wellbeing reflects a view that the community provides a good quality of life for its residents. The survey measures fifteen dimensions of community wellbeing covering social, economic, environmental, health, physical infrastructure, and political aspects. For example, dimensions of community wellbeing include perceptions of community spirit and cohesion, local trust, employment and job opportunities, environmental quality, local decision making processes, and level of services and facilities.

As shown in Figure 1, the highest rated dimensions were community spirit and personal safety with scores greater than 4 out of 5, demonstrating very positive perceptions. The lowest rated dimensions were local decision making and employment and business opportunities with scores close to 3 out of 5 indicating borderline perceptions of these dimensions.

Figure 1 Community wellbeing dimensions: Narrabri shire 2017



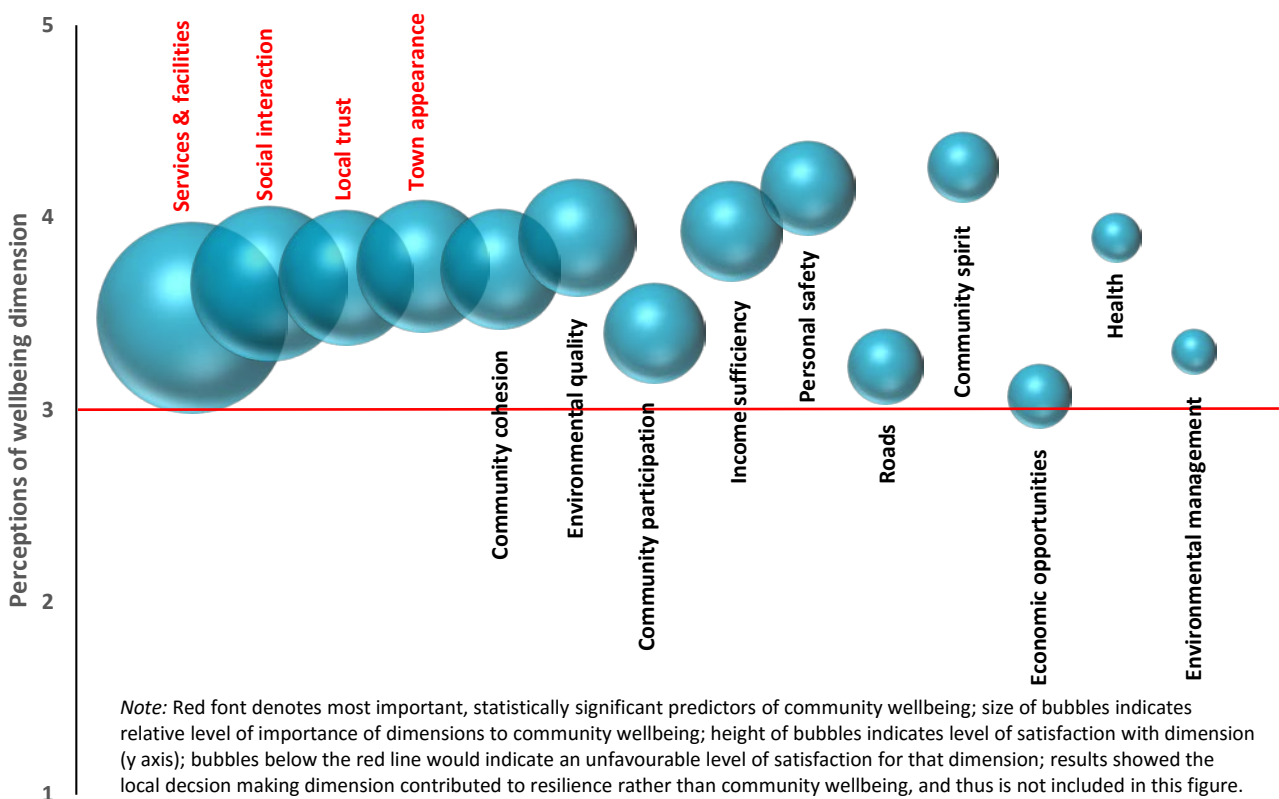
Most important dimensions for community wellbeing

Analysis showed the four key dimensions, or underlying drivers, that explained a sense of wellbeing in the community. See Figure 2. When residents felt these aspects of their community were strong they also viewed their community as a great place to live, a place that offers a good quality of life to all ages.

Important dimensions for a sense of wellbeing within the community

1. The level of *services and facilities* – for example schools, child care, medical and health services, sports and leisure facilities, community support services, food and other shopping,
2. The social aspects of community life such as *social interaction*
3. The level of *local trust* within the community
4. The *appearance of local towns* – for example clean with good parks and green space

Figure 2 Community wellbeing dimensions ordered according to importance: Narrabri shire 2017



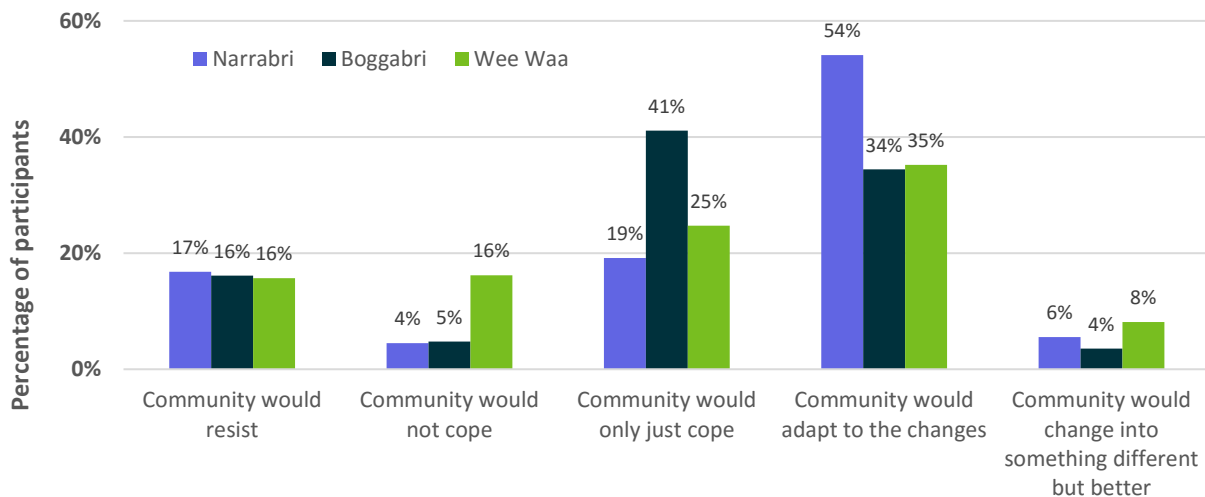
Key message

Identifying the underlying drivers of community wellbeing provides valuable information on where to focus scarce and valuable resources so that programs and initiatives can help to strengthen community wellbeing.

Community resilience and responding to change from a proposed CSG development

Across the Narrabri shire there was a diversity of views regarding how participants felt their community would cope and adapt to possible CSG development in the shire. These views ranged from people feeling their community would resist changes through to feeling their community would change into something different but better. As shown in Figure 3, these views also varied among the three different subregions. Residents in Narrabri and surrounds were significantly more likely to think their community would adapt to the changes, while residents in Boggabri and surrounds were significantly more likely to think their community would only just cope, and Wee Waa more likely to think their community would not to cope with possible CSG development.

Figure 3 Community perceptions of adapting to possible CSG development



Indicators of adapting to CSG development

Analyses identified aspects of community wellbeing and resilience that were linked to positive expectations of community adaptation to CSG development. When people felt there would be high community functioning then they expected their community would adapt and cope well with CSG development.

High community functioning

- ✓ Good sharing of information and working together on problems and opportunities
- ✓ Good planning, leadership, and access to information - working strategically
- ✓ Community involvement and perseverance – community commitment
- ✓ The environment is being managed well for the future: underground water, nature reserves, farming land
- ✓ Good environmental quality - low levels of dust and noise, and good air quality
- ✓ Good roads - satisfied with condition, safety and amount of traffic
- ✓ Effective local decision making processes and strong citizen voice - trust in local leaders and council, people feel listened to and heard, and that they are being kept informed
- ✓ Satisfaction with community participation - participation in community events, groups and local activities

Key message

When people feel that there are high levels of community functioning they would be more likely to perceive their community as adapting and coping well with CSG development if it were to occur.

Expectations about the future

On average, residents of the Narrabri shire rated their expected future community wellbeing ($M = 3.81$) less than current perceptions of wellbeing ($M = 3.96$), although they still expected their future wellbeing to be robust in three years.

When asked how they expected their wellbeing could change, Figure 4 shows almost one quarter expected it to improve, one quarter expected it to decline, and about half expected it to stay the same. As depicted in Figure 5, people who thought community wellbeing would decline expected it to drop considerably, in contrast people who thought it would improve expected it to increase by a modest amount.

Figure 4 Expected future wellbeing

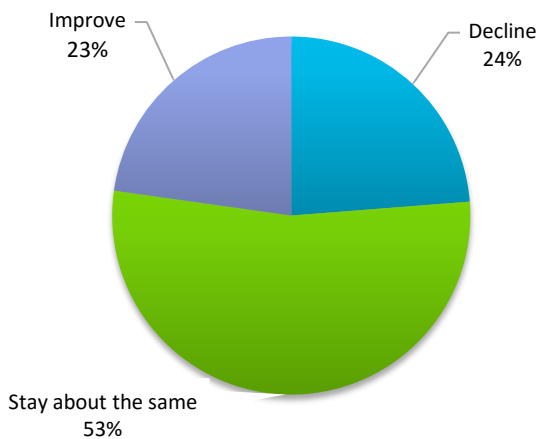
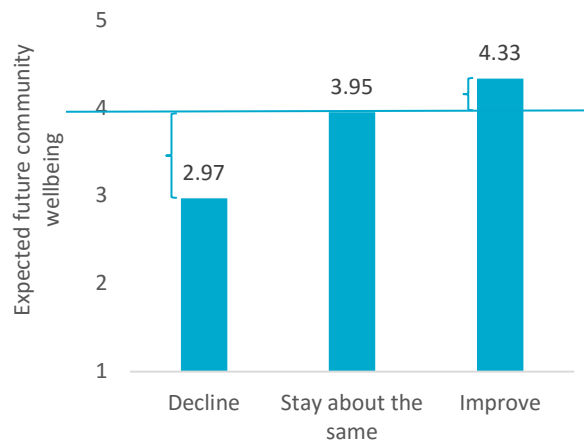


Figure 5 Differences in expected future wellbeing



Drivers of expected future community wellbeing

Expectations of future community wellbeing were largely explained by three factors: perceptions of *current community wellbeing*; perceptions of *resilience actions*; and the strength of a persons' *attachment to place*.

When community wellbeing and community resilience were perceived to be strong then people held more positive views about the future wellbeing of their community. Also, the stronger a sense of belonging and attachment to place the more positive people were likely to feel about its future. Attitudes about CSG development were not significant predictors of expected future community wellbeing.

Key message

If CSG development were to proceed, these results show the importance of proactively developing resilient responses to any proposed development as well as maintaining robust levels of community wellbeing if there is to be a sense of optimism and confidence about the future of the community.

Although current community wellbeing being is high, there also needs to be effective community resilience actions including a strong belief that all stakeholders can effectively work together to address potential problems and to maximise possible opportunities.

If people are not satisfied with community resilience actions and do not believe that local residents, government, business, and resource companies can effectively work together, they will feel less confident about the future of their community.

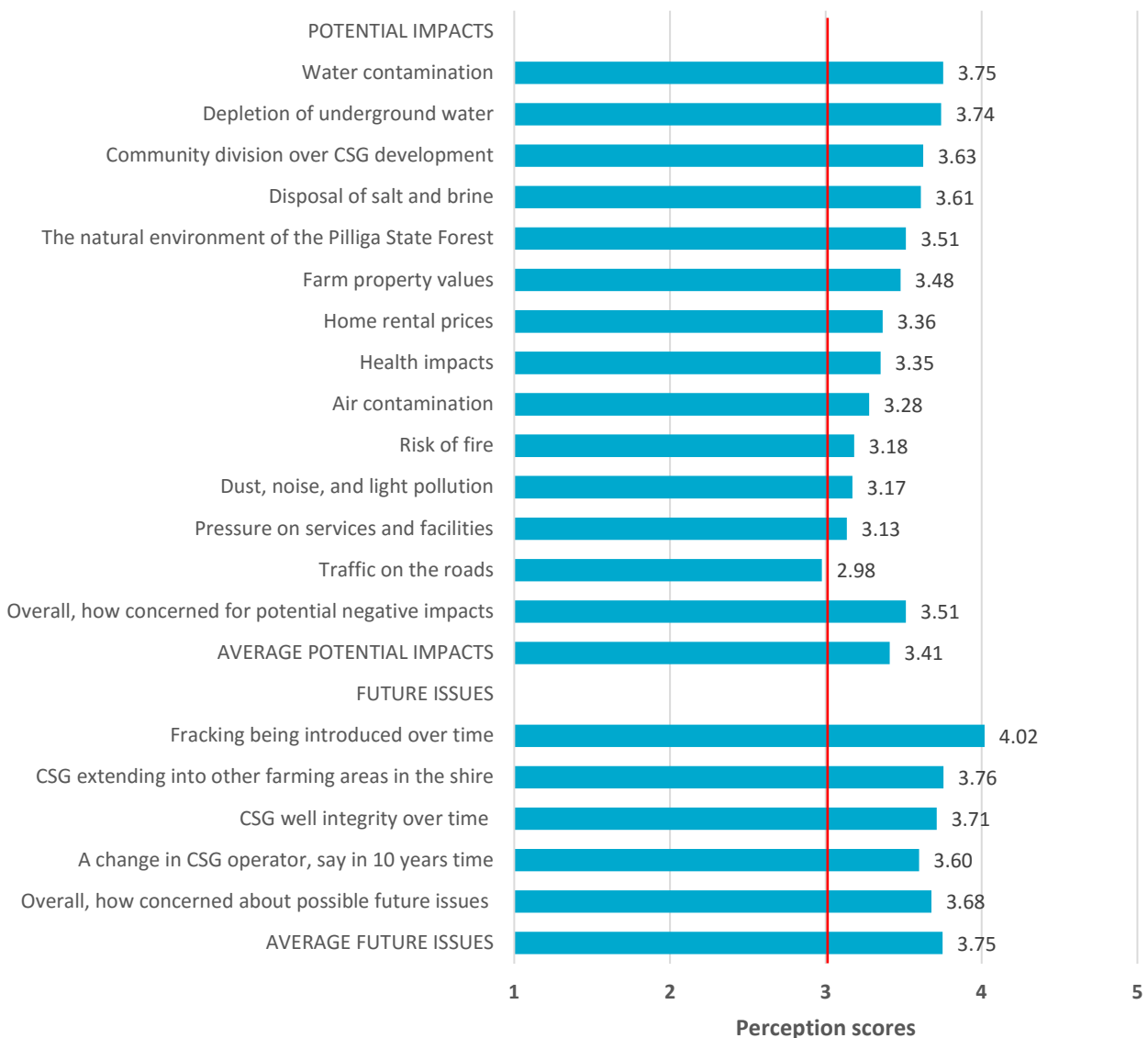
Perceptions about CSG development and the CSG sector

Based on the earlier research conducted in phase 2 of this project, the survey measured perceptions of eight different groups of issues (factors) that were identified as important to the Narrabri community if CSG development were to proceed. These factors contribute to people’s overall attitude towards CSG development, and include: perceptions of *impacts* and *benefits*, both *procedural* and *distributional fairness*, *governance*, *quality of relationships* with industry, *trust* in both state governing bodies and CSG companies, and confidence in *self-rated knowledge* about CSG development.

Perceived impacts and benefits

As shown in Figure 8, potential impacts on water were major concerns, although concerns about future issues in years to come were of higher concern on average than some of the more immediate concerns included under potential impacts. These future concerns included the potential introduction of hydraulic fracturing, the extension of development into more intensive agricultural areas, the integrity of the wells over time, and the potential for a change in ownership of the operating company.

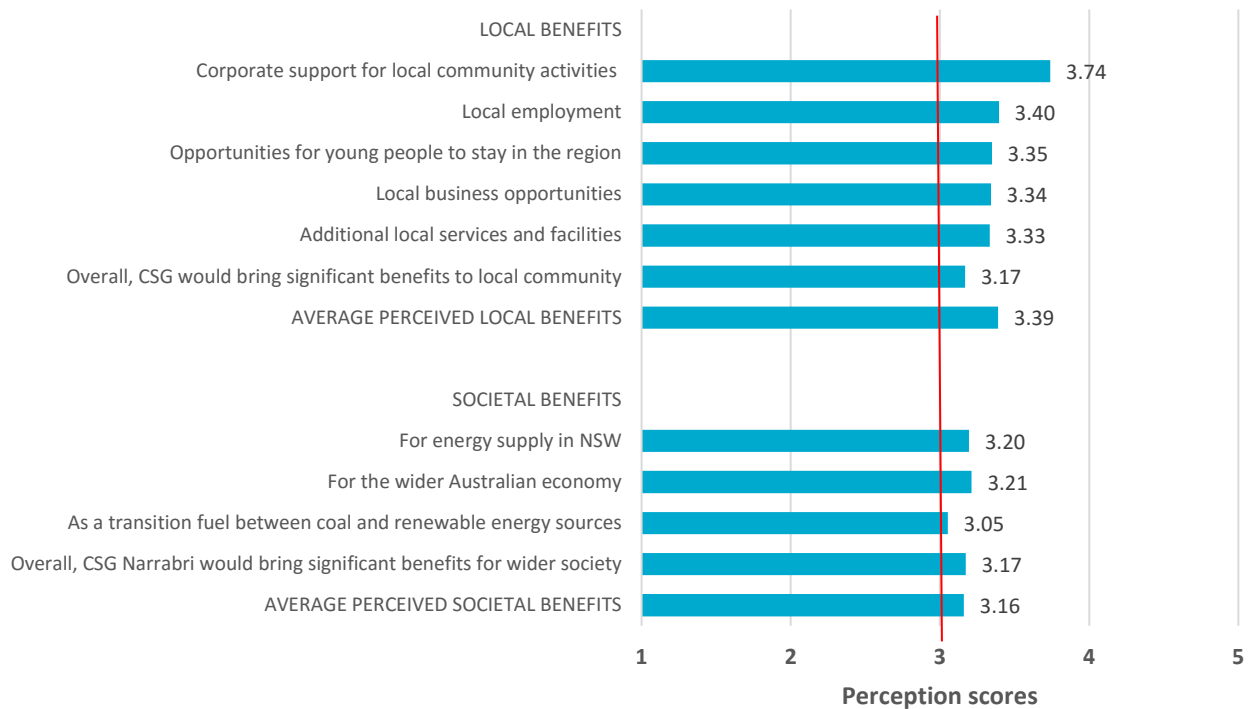
Figure 6 Perceptions of potential impacts and future issues: Narrabri shire



Note: Scores: 1 = not at all concerned and 5 = very concerned

Local benefits from gas were of higher importance to residents in the Narrabri shire than broader societal benefits, as depicted in Figure 7.

Figure 7 Perceptions of local and societal benefits: Narrabri shire

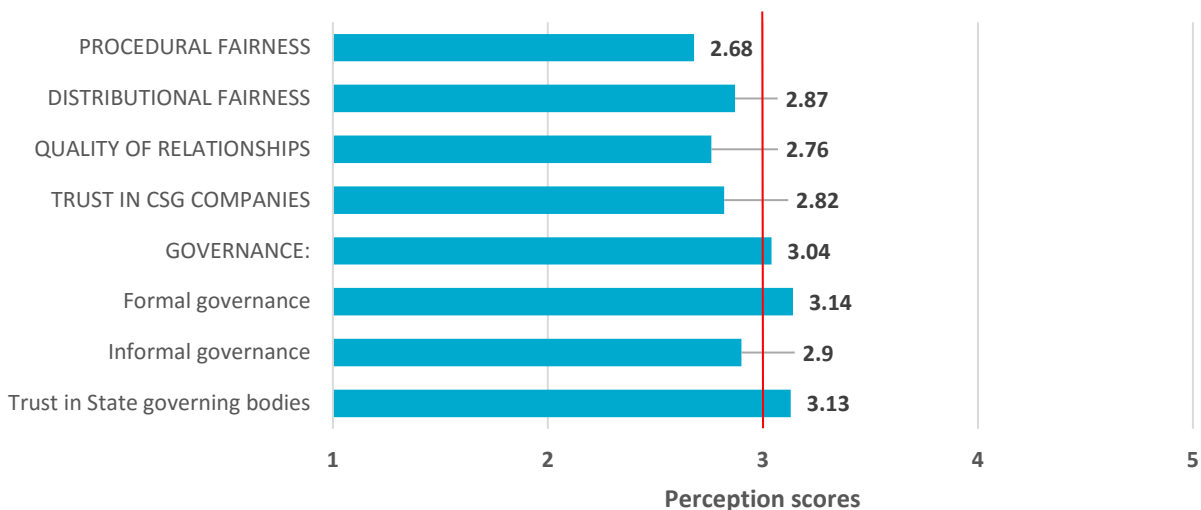


Note: Scores: 1 = strongly disagree and 5 = strongly agree

Perceptions of fairness, relationship quality, trust in industry and government, and governance

Perceptions of how a community would potentially be treated if CSG development were to proceed were less than favourable on average in terms of procedural and distributional fairness, the quality of the relationship with industry, and the trust that the community would have in industry. There was confidence that there would be adequate formal governance in terms of regulations and government oversight, but less confidence in the planning and processes around keeping communities informed about CSG development.

Figure 8 Perceptions of underlying drivers of attitudes towards CGS development: Narrabri shire



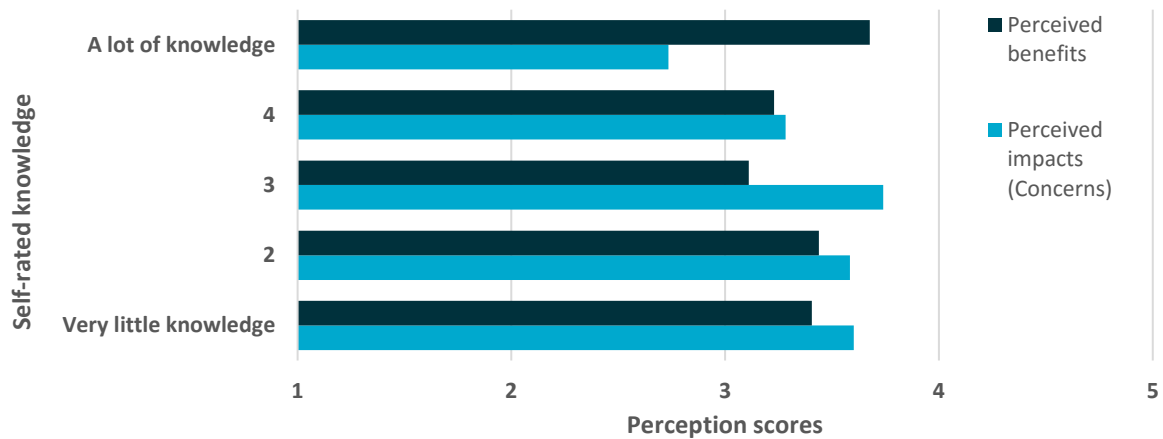
Note: The higher the perception score the more favourable the perception; a score of 3 represents the midline

Confidence in knowledge about CSG development

The survey measured participants’ self-rated knowledge about the local CSG industry and the information sources they used. On average results showed limited levels of knowledge across the shire ($M = 2.91$), with participants indicating they sourced information from two different sources on average.

Analysis of relationships between knowledge and perceived impacts and benefits showed that perceived impacts tended to be lower with higher self-rated knowledge; however, there was no association between knowledge and perceived benefits. As shown in Figure 9, ‘a lot of knowledge’ was linked to the lowest perceptions of concerns while lower levels of knowledge were linked to higher levels of concern.

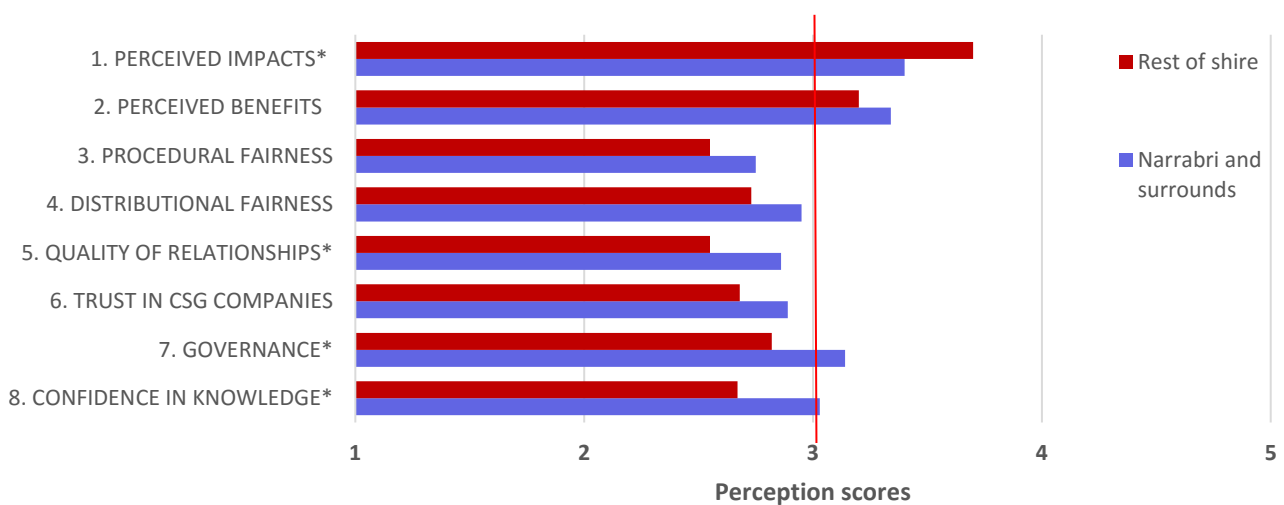
Figure 9 Levels of knowledge and perceptions of impacts and benefits scores: Narrabri shire



Differences between Narrabri and surrounds and the rest of the shire

People who live in Narrabri and surrounds showed significantly different perceptions about CSG development and the gas sector from residents in the rest of the shire. In this survey, the ‘rest of the shire’ represented residents from both Boggabri and surrounds and Wee Waa and surrounds. As shown in Figure 10, the rest of the shire reported higher levels of concern about possible impacts; and more negative perceptions of the quality of relationships with CSG companies and governance (formal, informal, and trust in governance) when compared to Narrabri and surrounds. In general, Narrabri and surrounds held more positive perceptions of the industry and the sector.

Figure 10 Differences in perceptions of underlying drivers: Narrabri and surrounds and Rest of shire

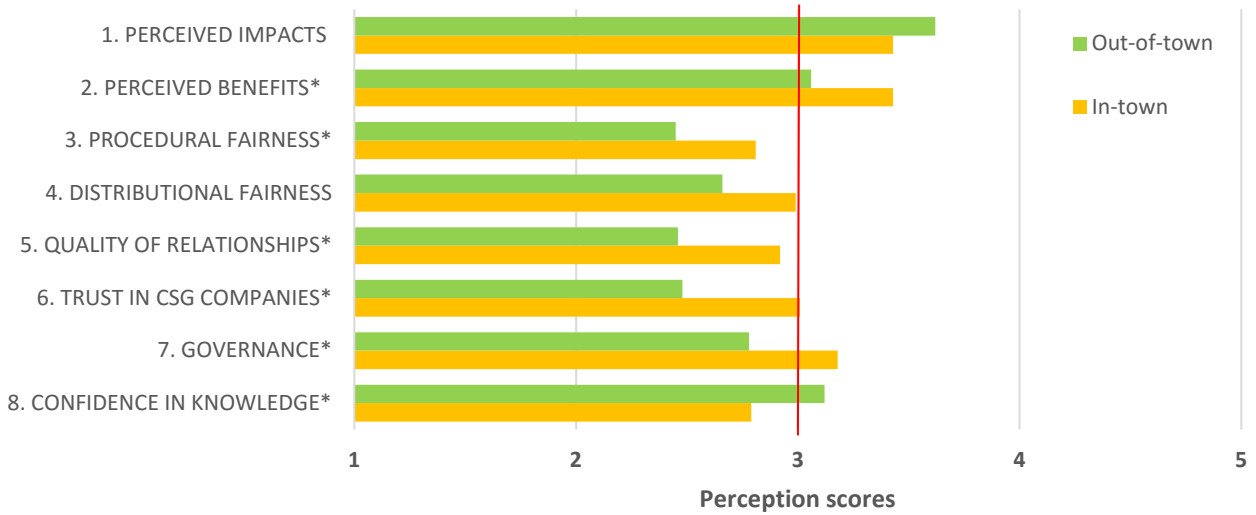


Note: The higher the perception score the more favourable the perception except for *perceived impacts* where the higher the score the greater the level of concern; a score of 3 represents the midline; * indicates a significant difference between Narrabri and surrounds and the rest of the shire

Differences based on living In-town and Out-of-town

Results also showed significant differences in perceptions based on whether someone lived in a town or out of a town. As shown in Figure 11, residents who live in town have generally more positive perceptions of CSG development and the sector than those residents who live out of town. In-town residents also have lower concerns (perceived impacts) with CSG development.

Figure 11 Differences in perceptions of underlying drivers: Living In-town and Out-of-town

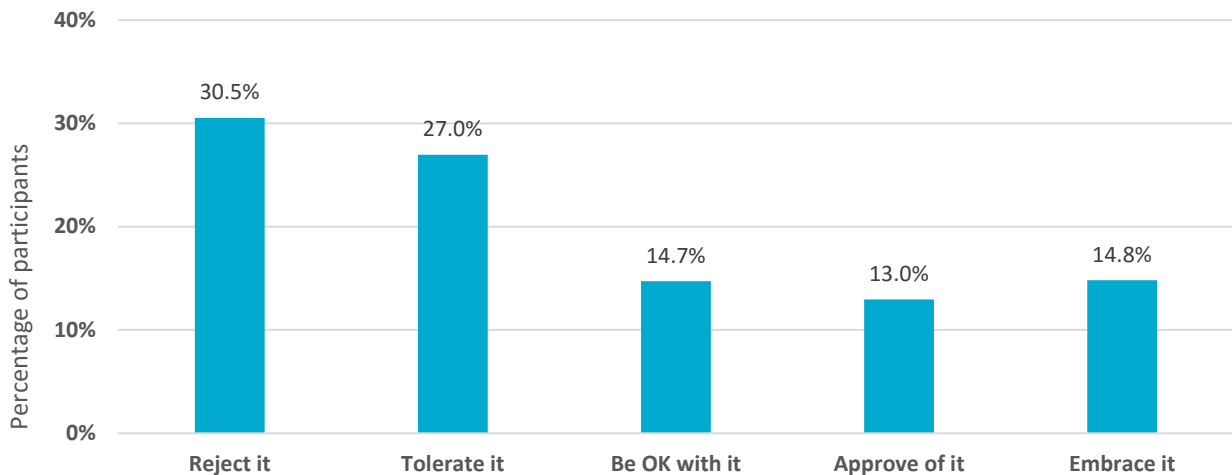


Note: The higher the perception score the more favourable the perception except for *perceived impacts* where the higher the score the greater the level of concern; a score of 3 represents the midline; * indicates a significant difference between In-town and Out-of-town residents

Attitudes towards CSG development

Attitudes towards CSG development varied between people, and there was a considerable proportion of the population who indicated they reject the notion of CSG development. As shown in Figure 12, at one end of the spectrum 30% of residents indicated they 'reject' CSG development in the Narrabri shire and at the other end of the spectrum 15% of residents indicated they 'embrace' it. However, the remaining respondents (55%) indicated they would either tolerate (27%), be ok with (15%), or approve of (13%) CSG development in the shire.

Figure 12 Attitudes towards CSG development in the Narrabri shire: 2017

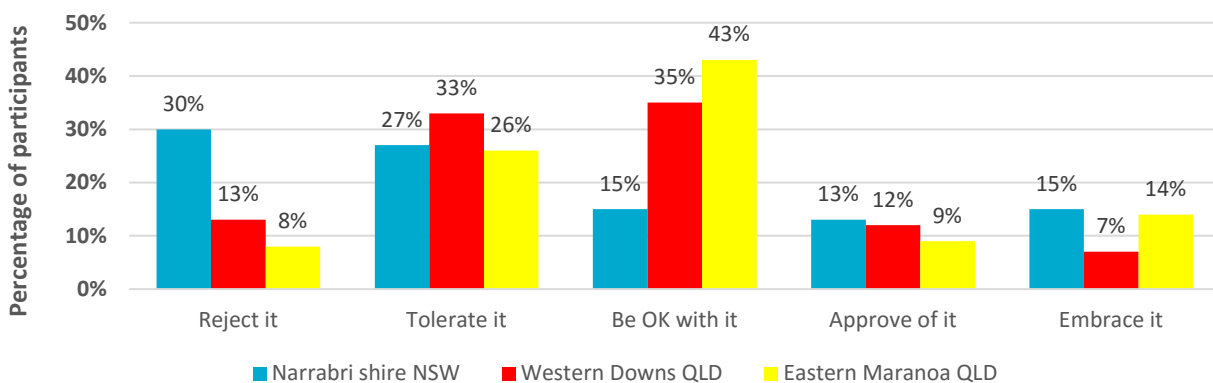


Attitudes towards CSG development also varied based on subregions and whether people lived in town or out of town. Those residents who live in Narrabri town and surrounds held significantly more positive views towards CSG development than those who live in the rest of the shire. Residents who lived out of town held significantly more negative views towards CSG development than those who lived in town.

Comparison with Queensland gasfields

When results from the Narrabri shire are compared with two gasfield regions in Queensland, the proportion of residents who are accepting of gas to some extent (tolerate through to embrace), as opposed to outright rejection, is much greater in Queensland. In 2016, residents of the Eastern Maranoa, which includes Roma and surrounds indicated the highest proportion of some acceptance of CSG (92%) followed by the Western Downs region (87%). Whereas, in 2017 in the Narrabri shire this drops to 70%. As shown in Figure 13, the biggest difference is the proportion of residents indicating they reject the notion of CSG development (30%) compared to Western Downs and Eastern Maranoa (13% and 8% respectively).

Figure 13 Attitudes towards CSG development: Narrabri 2017 and Queensland 2016



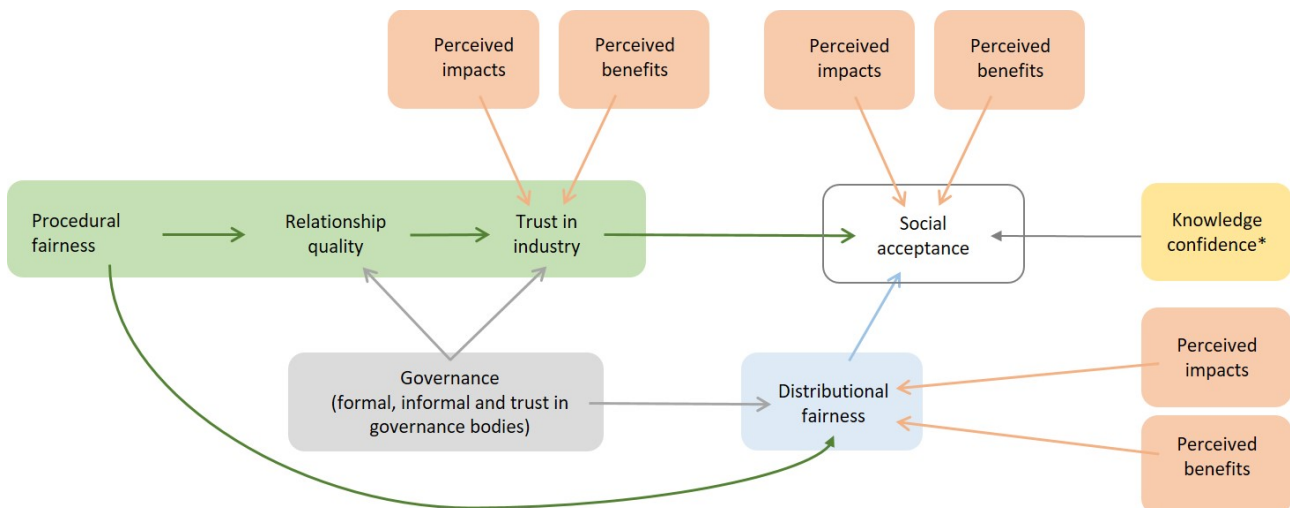
Note: Percentages have been rounded to one decimal point

Using a model to explain trust and acceptance in the CSG sector

Modelling identified the most important factors that act as drivers underlying trust in the CSG industry and acceptance of CSG development. The model also shows the main relationships among the different factors. We found five *direct* drivers that determine different levels of social acceptance: perceived impacts, perceived benefits, distributional fairness, trust in industry, and confidence in knowledge about CSG. These are shown in Figure 14. These drivers act as independent influences on social acceptance. This means, for example, that even if trust in industry is high, if people perceive impacts to be high then it will still reduce acceptance. Or conversely, even if perceptions of impacts are low, if trust in industry is low it will still reduce acceptance.

The modelling also identified *indirect* drivers of acceptance, often acting through trust and distributional fairness. For example procedural fairness, relationship quality, and governance influence trust, which in turn influences acceptance. Similarly, procedural fairness, and governance influence notions of distributional fairness, which in turn influences acceptance. Note that perceived impacts and benefits are also influencing trust and distributional fairness and thus are acting as both direct and indirect drivers of social acceptance. These relationships highlight the importance of underpinning factors, which indirectly contribute to and ultimately help determine the level of social acceptance.

Figure 14 Model of social acceptance and trust



Note: * this path was curvilinear

Key points

- Direct drivers of social acceptance are perceived impacts, perceived benefits, distributional fairness, trust in industry, and confidence in knowledge about CSG
- Indirect drivers of social acceptance via trust in the industry included procedural fairness, relationship quality, and governance. Perceived impacts and benefits also impacted trust.
- Governance underpinned trust in industry, perceptions of relationship quality with industry, and perceptions of distributional fairness

Differences between those rejecting and supporting CSG development

To further describe relationships between these underlying drivers and social acceptance, the means for each of the underlying drivers were compared across three broad attitudes towards CSG development (reject, lukewarm, and support). 'Reject' were those rejecting CSG development in the shire, 'lukewarm' included those residents who would 'tolerate it' or 'be OK with it', and 'support' included those who would 'accept it' or 'embrace it'. The reject and support groups were similar in size, while the lukewarm group was the largest (41.7%). See Figure 15.

Figure 15 Attitude towards CSG development: Three broad groups

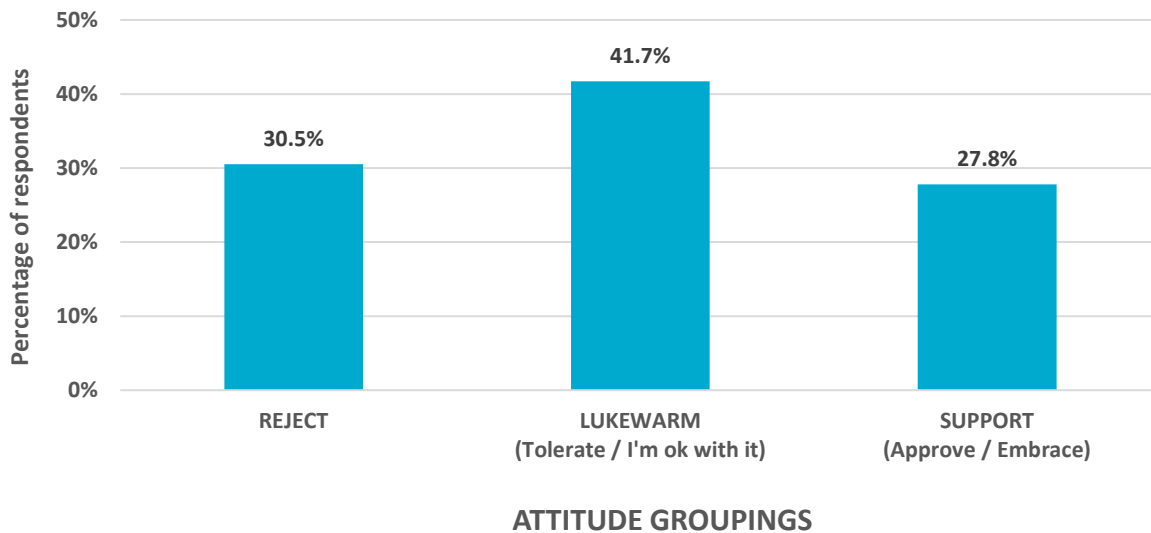
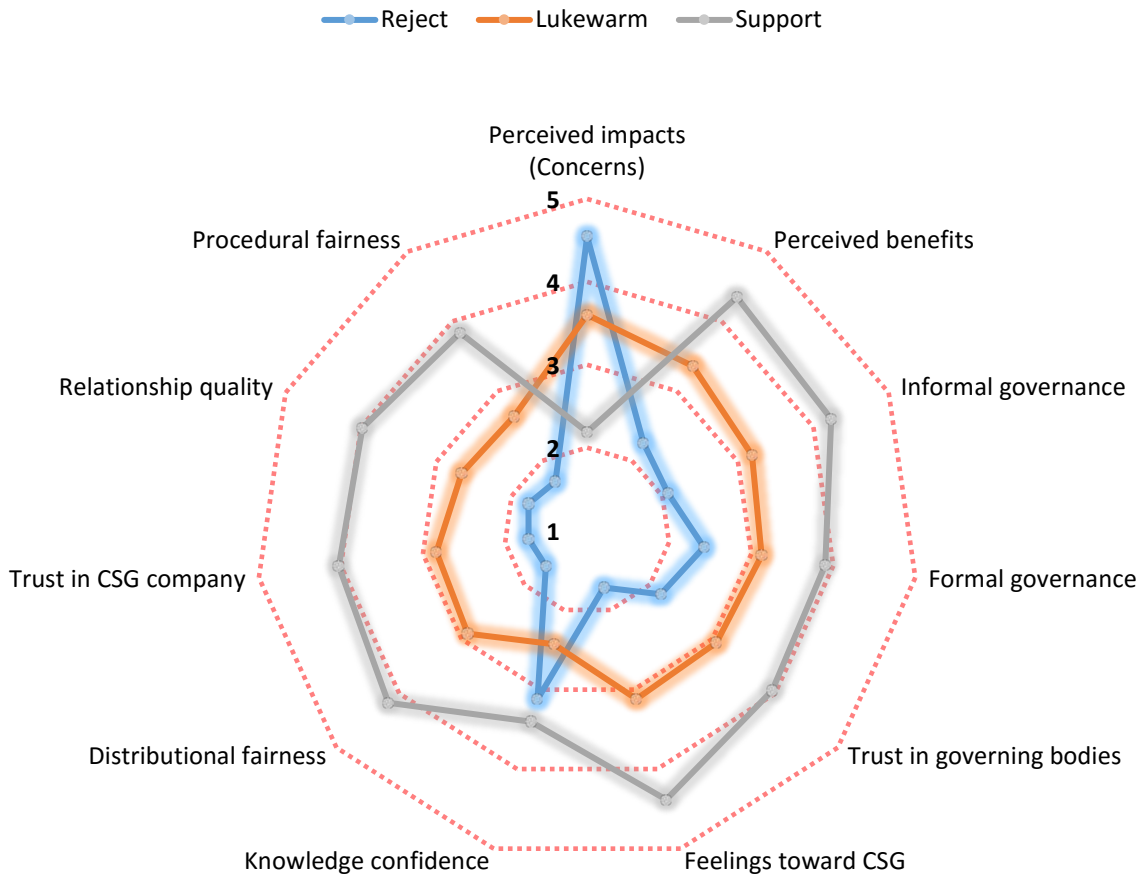


Figure 16 shows how the underlying drivers of trust and acceptance vary based on these three broad attitudes towards CSG development. Those rejecting CSG development had very high concerns with CSG, and rated most other drivers of trust in the industry and social acceptance of the CSG development very lowly. In contrast, those who supported CSG development had relatively low levels of concerns with CSG development on average, and the other drivers were all perceived positively, as shown by the grey line in Figure 16. Interestingly, both those rejecting and supporting CSG development were moderately confident in their level of knowledge about the local CSG industry. The lukewarm group, depicted by the orange line in Figure 16, indicated more neutral attitudes toward other drivers of trust and social acceptance, and were less confident in their level of knowledge. Nonetheless, the lukewarm group were still concerned about potential impacts and future issues associated with CSG development in the shire.

Figure 16 Drivers of trust and social acceptance by three groups of attitudes toward CSG development



Note: The higher the perception score the more favourable the perception except for *perceived impacts* where the higher the score the greater the level of concern; a score of 3 represents the midline

Key Points

- Those rejecting CSG development had very high concerns (perceived impacts), and low ratings for perceived benefits and the other drivers of trust and social acceptance.
- Those supporting CSG development showed the reverse pattern, though both rejecting and supporting were confident in their levels of knowledge about the CSG industry.
- Those with lukewarm attitudes had more neutral perceptions, though were still concerned about possible impacts from CSG development and had the lowest level of confidence in their knowledge about CSG.

1 Introduction

1.1 Background to the overall research project

To increase our understanding of the social impacts of unconventional gas, this research project investigates a range of aspects important for understanding trust and social acceptance in relation to the coal seam gas industry sector in NSW. The project overall investigates community expectations and perceptions of the industry and establishes baseline measures of community wellbeing and local attitudes in a region affected by the pre-development phase of the industry. The research context is the Narrabri shire of north-western NSW where an onshore CSG project, the Narrabri Gas project operated by Santos, is currently in a pilot and appraisal stage of development. Santos's Environmental Impact Statement (EIS) was lodged in February 2017 and is under review by the New South Wales and Commonwealth governments.

This report outlines the findings of survey research from Phase 3 of the project. The main aim of this phase was to establish baseline measures of community wellbeing within the Narrabri shire and to measure perceptions of community adaptation to a proposed CSG development. Using a telephone survey of 400 randomly selected residents of the Narrabri shire, the research also measured and modelled the factors underlying trust and attitudes towards CSG development that were identified in Phase 2 of this overall project. The findings from Phase 3 help to identify the factors important for community wellbeing and adapting to change, and help understand issues underlying social licence to operate if unconventional gas extraction were to proceed. Such findings are necessary if the onshore gas industry seeks to operate with trust and support from its host communities.

The final step of the project, Phase 4, is to feed back the research findings to stakeholders and to identify collaborative actions that could be undertaken by community, government, and industry that could improve trust and mitigate possible negative outcomes of CSG development if it were to proceed in the region.

FOUR PROJECT PHASES

Project Phase	Activity	Status
Phase 1	Preparation and Planning	Completed
Phase 2	Interviews and small group discussions	Completed Report: <i>Understanding community expectations and perceptions of CSG development, January 2017</i>
Phase 3	Shire-wide survey	Completed Report: <i>Community wellbeing and local attitudes to coal seam gas development, August 2017</i>
Phase 4	Opportunities for collaborative actions	Next phase to be completed

OVERALL PROJECT AIMS

1. To understand and document community values, perceptions, concerns, and expectations of the CSG sector in the context of the Narrabri Gas project [Phase 2]
2. To identify the driving factors affecting trust between community stakeholders and the CSG sector [Phase 2]
3. To establish baseline levels of community wellbeing, resilience, and attitudes to CSG development in the Narrabri region prior to further CSG development, if it were to proceed [Phase 3]
4. To identify opportunities for collaborative actions that could be undertaken by community, government, and industry stakeholders to improve trust and to mitigate possible negative outcomes of CSG development if it were to proceed [Phase 4]

1.2 Context for the Narrabri Gas Project

The Narrabri shire

The Narrabri shire is located in north-west New South Wales, around 100 km south of Moree and 100 km north of Gunnedah and is approximately half way between Brisbane and Sydney. The town of Narrabri itself is located on the Namoi River at the intersection of the Newell and Kamilaroi Highways. The shire has a population of approximately 13,000 with around 6,000 living in the town of Narrabri. Other smaller towns in the shire include Boggabri, Baan Baa, Gwabegar, Pilliga, Wee Waa, Edgeroi, and Bellata. Since white settlement, this area has been primarily a grazing and farming region. Irrigated cotton was planted near Wee Waa in the early 1960s, evolving to become the main high value crop in the region. More recently since 2012, a number of coal mines have been approved and are operating near Narrabri, Boggabri and Baan Baa, broadening activity in the shire. The Narrabri Gas Project, a proposed coal seam gas development, is currently in the appraisal phase.

The shire's Strategic Community Plan 2017 - 2027 (Narrabri Shire Council, 2017) reflects goals such as establishing attractive town centres with good regional infrastructure (e.g., roads, rail, airports, and industrial estates); improved health, educational and child care services; adequate and affordable housing; safe, inclusive and involved communities; thriving local businesses and new industries; and sustainable and environmentally friendly land-uses.

The Narrabri Gas Project

The Australian energy company Santos is the proponent that holds the petroleum and exploration leases inside which the Narrabri Gas Project is proposed (Petroleum Exploration Licence 238 and Petroleum Assessment Lease 2). The towns of Narrabri and Wee Waa are within PEL 238, and the town of Boggabri is outside this licence area. At the time of data collection, the project was in its exploration and appraisal phase with approximately 60 wells in place; a water storage area and water treatment plant constructed; and some gas being transmitted to the Wilga Park power station approximately 8 km south west of Narrabri. In February 2017, Santos lodged an Environmental Impact Statement (EIS) with the NSW Department of Planning and Environment proposing to develop natural gas in part of the geological area known as the Gunnedah Basin – the Narrabri Gas Project – approximately 20 km south-west of the town of Narrabri (NSW Government, 2017).

The EIS proposes that the Narrabri Gas Project would be developed over 20 years with up to 850 wells on up to 425 well pads in the project area in and around the Pilliga. Gas related infrastructure would also be constructed in the project area including gas processing and water treatment facilities and related water and gas gathering pipelines. The gas would be made available to the NSW market via a pipeline connection to the existing Moomba-Sydney gas pipeline, which is a separate project being developed by the APA Group. The EIS information sheet for the Narrabri Gas Project, prepared by Santos, described the project area as “mostly (around 60%) on state land in a section of the Pilliga set aside by the NSW Government for uses including logging and extractive industries”.

1.3 Theoretical concepts for Phase 3

1.3.1 COMMUNITY WELLBEING

A measure of community wellbeing is a snapshot in time of the perceived 'quality of life' within the community; an evaluation of the community as a 'good place to live' (McCrea, Walton, & Leonard, 2014). The notion of community wellbeing means different things to different people and thus a comprehensive measure of wellbeing that incorporates different '*dimensions*' of wellbeing is used to gain a deeper understanding of the various aspects of wellbeing that may influence the quality of life within the community. Drawing on international research and previous research in Queensland's Western Downs region, we investigated wellbeing across 15 dimensions, which in turn can be grouped into six domains: social, environmental, political, physical infrastructure, economic, and health (McCrea et al., 2014). Each of the 15 dimensions was measured by collecting people's judgements and perceptions. Figure 17 depicts the dimensions grouped into the six areas (domains).

Figure 17 Dimensions of community wellbeing grouped into six domains



The fifteen different dimensions are measured by a range of questions, with each dimension comprising 3-5 items or questions. Each dimension of wellbeing acts like an umbrella that covers a theme of perceptions and ideas around an aspect of community wellbeing. Table 1 provides a brief description of each dimension.

Table 1 Descriptions of the fifteen dimensions of community wellbeing

Dimension	Domain	Brief description
1. Personal safety	Social	Safety at home alone, walking outside, leaving the car by the roadside
2. Community spirit	Social	Friendliness, supporting each other, working together
3. Community cohesion	Social	Inclusion, welcoming of newcomers and people with differences
4. Local trust	Social	Trust within the community and with local leaders
5. Community participation	Social	Volunteering, supporting, and attending community based activities
6. Social interaction	Social	Visiting, talking, and going out with others in the community
7. Environmental quality	Environment	Quality of the environment in which people live - levels of dust and noise, overall quality of the general environment
8. Environmental management	Environment	Managing the environment for the long term - underground water, nature reserves; sustainability of local farming land
9. Local decision making and citizen voice	Political	Citizens having a say and being heard in local decision making and trust in government
10. Services and facilities	Physical infrastructure	Schools, child care, sports and leisure facilities, food, shopping, medical and health services, and community support services
11. Built environment	Physical infrastructure	General physical appearance of the town, cleanliness, parks, gardens
12. Roads	Physical infrastructure	Condition, safety, and amount of traffic on the roads
13. Income sufficiency	Economic	Household income sufficient for household expenses, and lifestyles
14. Employment and business opportunities	Economic	Job opportunities in the community, local business doing well
15. Health	Health	Diet and eating habits, exercise habits, physical and mental health

1.3.2 RESPONDING TO CHANGE: COMMUNITY ACTIONS AND ADAPTATION

Coal seam gas development in a region has the potential for creating both opportunities and challenges for its communities from social, economic, and environmental perspectives (Measham & Fleming, 2014). Previous research identified different types of **community actions** that are important in helping a community adapt to change in a CSG context. For example, strategic thinking such as planning, positioning and leadership; timely access to relevant information; and cross linkages within a community are all important actions for responding to the changes (Leonard, McCrea, & Walton, 2016; Walton, McCrea, Leonard, & Williams, 2013). In addition, research indicates that a collective belief that the community can work together to address problems and take advantage of opportunities (**community efficacy**) is also important for dealing with change (McCrea et al., 2014). Trust within the community and a sense of community participation in decision making, where communities feel they are being heard and have ‘citizen voice’, also play a vital part in communities working together to effectively deal with change (Walton et al., 2014; Williams & Walton, 2014).

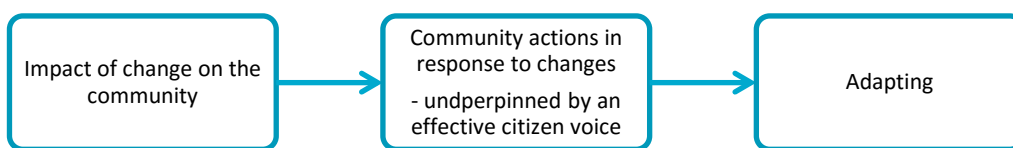
For this survey we have grouped these community actions into three groups: 1) strategic actions, 2) working together, and 3) community commitment; - all underpinned by citizen voice. Figure 18 depicts these actions.

Figure 18 Types of community actions important for responding to change



The literature also suggests that responding to change can be viewed on a spectrum of types of adaptive responses (Brown & Westaway, 2011). These responses can range from resisting change, to coping, to adapting, to transforming. We adopt a broad notion of resilient responses, which includes outcomes beyond returning to the original state. Resilient responses can include those responses where communities adapt and potentially transform into something different but better. Moreover, previous research suggests that the way in which the community responds to the changes is linked to wellbeing within the community and a sense of wellbeing for the future.

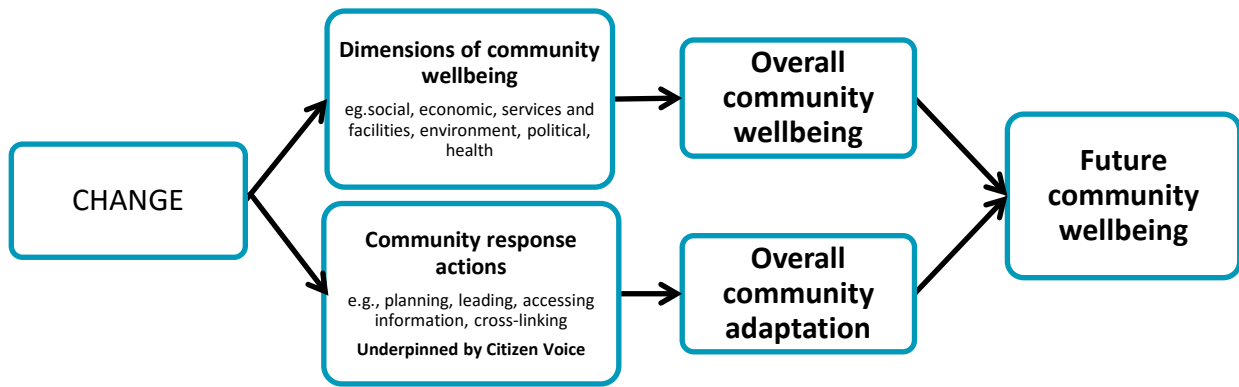
Figure 19 Responding to change



1.3.3 FUTURE COMMUNITY WELLBEING

In addition to measuring current perceptions of wellbeing, we also investigated expected future community wellbeing in three years' time, which we refer to as 'future wellbeing'. As shown in Figure 20, our conceptual model suggests that a sense of future wellbeing relates not only to current levels of wellbeing but also to community actions in response to change, including a sense of collective efficacy and citizen voice. Previous research suggests that if a community believes it is dealing effectively with change, despite its current levels of community wellbeing, then its level of expected wellbeing for the future will be higher (McCrea et al., 2015).

Figure 20 Explaining future community wellbeing



1.3.4 ATTITUDES AND PERCEPTIONS OF CSG DEVELOPMENT AND THE CSG SECTOR

Community acceptance of an industry's activities within a community is important for the establishment and ongoing operation of these activities. This acceptance is also referred to as a 'social licence to operate' (SLO), whereby the industry meets the ongoing expectations of the community with regards to its actions and thus gains **ongoing** acceptance (Gunningham, Kagan, & Thornton, 2004; Moffat & Zhang, 2014). Previous research conducted in a Queensland CSG region indicated that expectations revolve around aspects of community wellbeing such as affordable housing, good roads, job opportunities, sustainable businesses, ensuring water quality and quantity, maintenance of community spirit and trust, and engaging with the community from a position of mutual respect (Williams & Walton, 2014). These expectations reflect those outlined locally in the Narrabri Shire Community Strategic Plan (Narrabri Shire Council, 2017). The importance of some of these factors for community acceptance of the CSG industry has been tested (Moffat & Zhang, 2014) and models of social licence to operate in other extractive industries have been established.

Phase 2 research for this project built on this previous body of research by identifying a range of factors that contributed towards building trust and acceptance in the CSG industry as well as factors that undermined trust and acceptance (Walton et al., 2017). This phase 2 research was specific to the Narrabri shire and the context of an industry in its early appraisal stage of development. We found these factors to be underlying drivers of trust and acceptance. As depicted in Figure 21, these factors are grouped into issues around **fairness**, perceptions of possible **benefits** and perceptions of **risks or concerns (impacts)**, trust and confidence in **governance**, people's understanding and **knowledge** of CSG, and their **attitudes and beliefs** more generally. Issues of **trust** were also identified as fundamental to acceptance and underpinned many of the perceptions of the other factors.

Phase 2 research used a qualitative methodology and drew its findings from interviews and discussion groups with community and other stakeholders. The purpose of this approach was to provide a rich understanding of the issues and the range of views held by residents. It was an important step towards subsequent quantitative research of Phase 3 that would determine the extent of these perceptions within the local community, the relationships among the different factors, and the relative importance of each factor.

In this current study we conduct a survey of randomly selected residents to gain a representative sample, and then statistically analyse and model the data. Used in combination with the prior qualitative research, the quantitative survey approach and statistical modelling provides a robust and comprehensive understanding of community attitudes and perceptions in relation to CSG development.

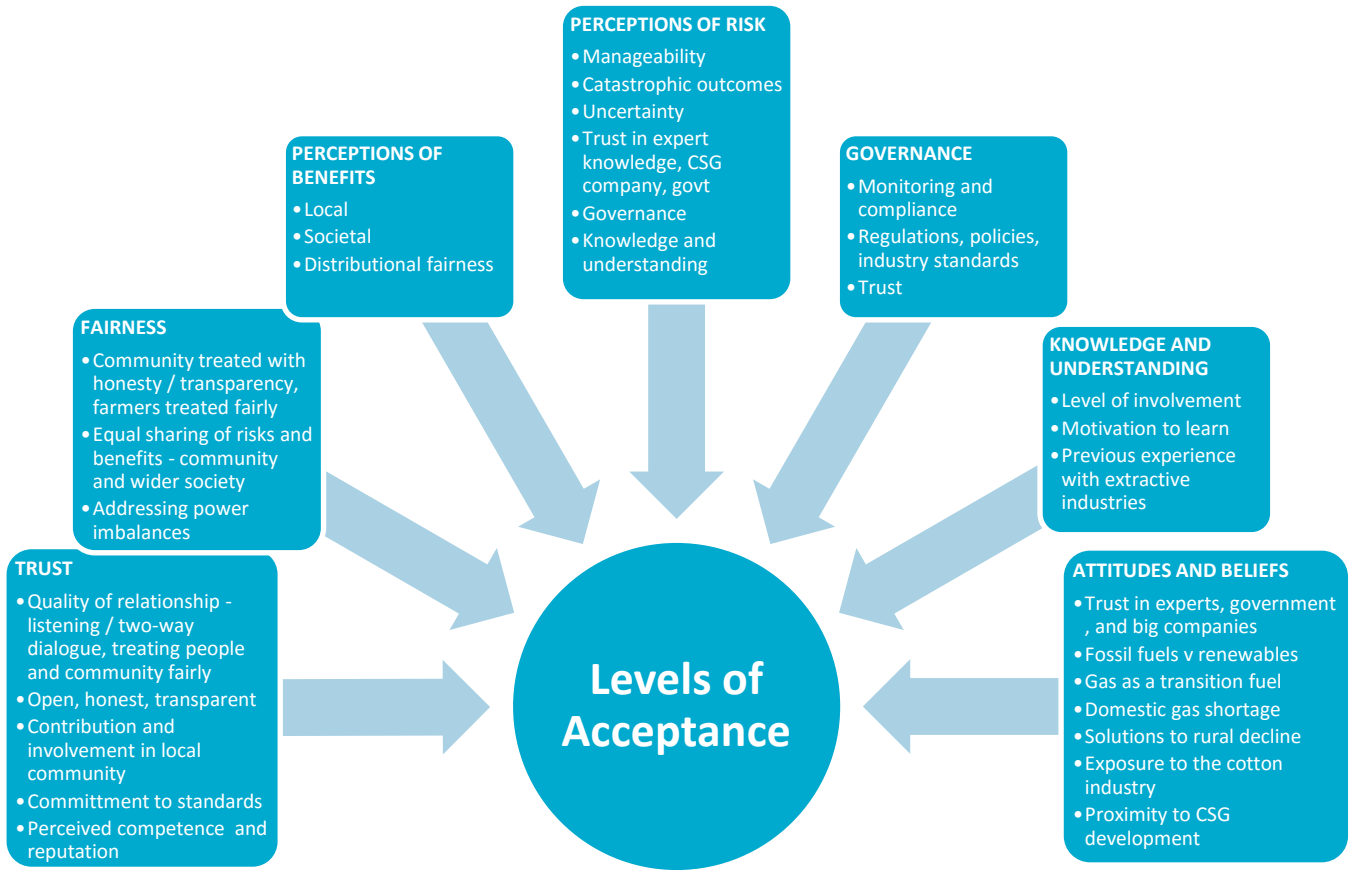


Figure 21 Seven key factors contributing to acceptance or lack of acceptance in CSG development and the CSG sector identified in Phase 2 research

2 Methods

2.1 Survey Procedure

The survey was conducted over a six week period during March - April 2017. It used computer assisted telephone interviewing (CATI) to survey 400 residents of the Narrabri Shire in north western New South Wales. A third party research company administered the survey and used a database of landline and mobile telephone numbers to randomly select shire residents based on pre-determined selection criteria and quotas.

Participants needed to be residents of the shire (not FIFO or DIDO shift workers) and aged 18 years or older. Quotas sampling was used to achieve a representative sample of the shire based on age, gender, employment status, indigenous, and location characteristics according to the Australian Bureau of Statistics (ABS). The survey took 32 minutes to complete on average and a response rate of 56% was achieved, which is considered very high for telephone surveys. Approximately one in every two residents called agreed to participate in the full survey.

The survey comprised 183 questions covering five main aspects. The initial aspect included screening and demographic questions, plus a question asking participants to identify one of three main towns they felt most part of (Narrabri, Boggabri, Wee Waa). This town became their 'subregion' and the subsequent reference for community related questions for that participant. For example, if a participant identified Wee Waa as their community then all subsequent questions were framed in relation to 'the town and surrounds of Wee Waa'.

The second aspect of the survey included questions about the 15 different dimensions of community wellbeing, overall community wellbeing, and expected future wellbeing. The third aspect measured perceived community responses to change associated with a proposed CSG development (i.e. perceptions of community resilience and adaptation) using a scenario. Appendix A details the CSG development scenario used in the survey. The fourth aspect of the survey measured attitudes and perceptions about CSG development along with other questions relevant to social acceptance and trust. The final aspect of the survey included additional demographic questions.

At the end of the survey participants were asked whether they would like to be in a prize draw for \$50 gift vouchers as a thank-you for completing the survey. Twenty participants were randomly selected to receive vouchers. These procedures adhered to the National Statement on Ethical Conduct in Human Research, as well as the ethical review processes of the CSIRO.

Figure 22 CSIRO Wellbeing and responding to change survey format



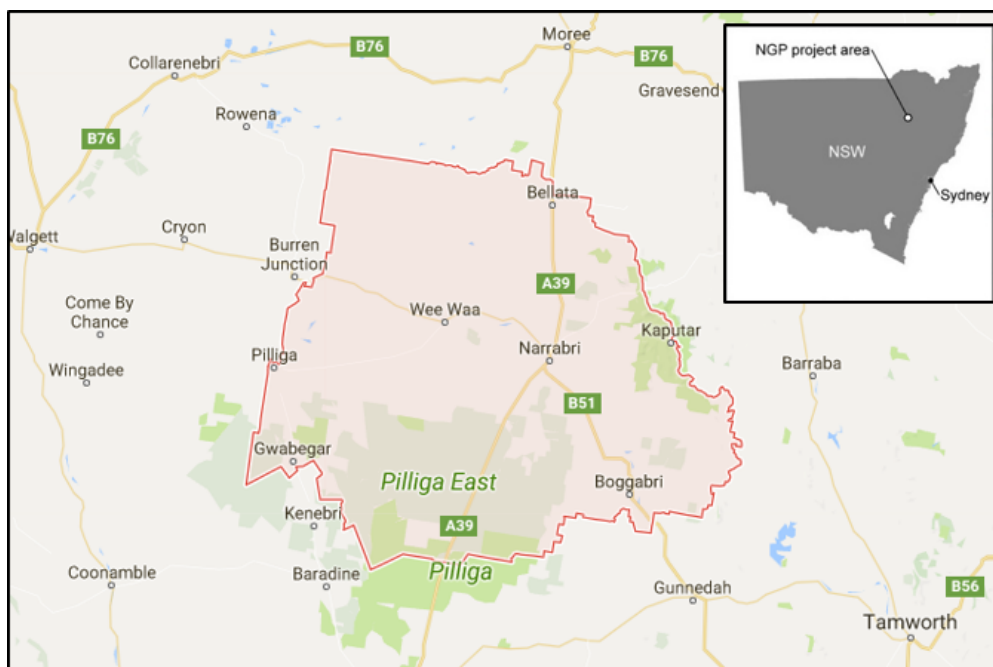
ETHICS REVIEW

All project procedures were reviewed by CSIRO's Ethics Committee and ethics approval was granted on August 04th, 2016.

2.2 Survey Sample

Residents from across the Narrabri shire were randomly selected to participate in the survey. A quota sampling technique was used to ensure that a representative sample was achieved. Figure 23 depicts a map of the Narrabri shire and the three main towns which were used to represent three subregions: Narrabri and surrounds, Boggabri and surrounds, and Wee Waa and surrounds.

Figure 23 Map of the Narrabri shire, NSW



Source: Google maps with insert map from Santos factsheet

Sample profile

As shown in Table 2, the sample comprised 400 residents across the Narrabri shire, including people who lived in-town and out-of-town and from three subregions within the shire – Narrabri, Boggabri, and Wee Waa.

Table 2 Profile of sample

	Number	Percent		Number	Percent
Narrabri and surrounds	262	65.50%	In-town residents	262	65.5%
Boggabri and surrounds	53	13.25%	Out-of-town residents	138	34.5%
Wee Waa and surrounds	85	21.25%			
TOTAL	400	100%	TOTAL	400	100%

Representativeness

According to ABS (2011; 2016) statistics, the sample was very representative on gender, indigenous, employed, and living in-town residents. However, the sample was over representative of older residents (sample average age 18+ = 59 yrs.; ABS census average age 18+ = 50 yrs. in 2011, 52 yrs. in 2016). Therefore, a weighted sample was used in the analyses to adjust for an over-representation of older participants. See section 2.4 for details of the sample weighting procedure.

Table 3 presents the representativeness of the sample compared to ABS statistics. A more detailed description of the sample is found in Appendix B and includes education, household income, home ownership, average years living in the region, and percentage owning a farm.

Table 3 Sample representativeness compared to ABS statistics

Sample characteristic	Actual Sample Survey 2016	ABS Census 2011	ABS Census 2016	Weighted sample Survey 2016 (Used in analyses)
Male	47.3%	50.5%	50.7%	48.6%
Age 18+ (median)	59.4 years	49.6 years	51.9 years	50.2 years
Indigenous (%)	8.8%	10.7%	12.2%	10.2%
Employed (%)	57.0%	63.0%	n.a.	68.1%
In-town residents (%)	65.5%	65.1%	n.a.	64.2%
Narrabri and surrounds	65.5%	63.8%	n.a.	67.4%

Note: Not all 2016 Census statistics were available at the time of writing; residents in-town in the census refer to residents living in urban centres and localities within the shire; employed residents (%) in the sample was for those aged 18+ and for the census 2011 it was for 20+ years. Residents living in 'Narrabri and surrounds' were those who identified Narrabri as their main town in the survey sample, and it was for residents in the postcode of Narrabri in the population census.

Additional sample checking

An additional question was also asked to check if people declining to participate in the survey had significantly different attitudes towards CSG activities from those participating in the survey. If residents declined to participate in the survey, they were asked if they would be willing to answer one short question about their attitude to CSG activities in the Narrabri shire on a 5-point scale from 'reject it' to 'embrace it'. However, there was no significant difference between participants and non-participants in their average attitudes toward CSG ($M = 2.60$ and $M = 2.42$ respectively, $p = .11$). We did not ask why people declined the survey and it was not possible to test the representativeness of those declining. However, the sample of respondents who participated were representative of the population in the Narrabri Shire across four ABS population census criteria and weighted for age.

In summary, the sample of participants was representative across a range of demographic variables and in their attitudes toward CSG development in the shire.

2.3 Measures

2.3.1 DEVELOPMENT OF THE MEASURES

The survey questions were developed from previous research conducted on community wellbeing and responding to change in communities experiencing CSG development (Walton et al., 2016; 2014) and informed by the research findings of the previous stage in this research project (Phase 2), which explored community expectations and perceptions of the CSG sector in Narrabri (Walton et al., 2017). Initially these items were developed and adapted from an extensive literature review, including qualitative research in the CSG field (Walton, McCrea, Leonard, & Williams, 2013; Williams & Walton, 2014), and community wellbeing and resilience research (Christakopoulou, Dawson, & Gari, 2001; Forjaz et al., 2011; Morton & Edwards, 2013; Onyx & Leonard, 2010; Sirgy, Widgery, Lee, & Yu, 2010; Walton et al., 2013).

In addition, the survey questions relating to social acceptance and trust were developed from previous research conducted by CSIRO on social licence to operate in mining and the waste and resource recovery industries (McCrea et al., 2016; Moffat & Zhang, 2014; Moffat, Zhang, & Boughen, 2014) and further informed by Phase 2 of this present research project.

2.3.2 RESPONSE SCALES

In most instances, questions used a response scale from 1 to 5 where 1 was the least and 5 was the most. Participants were either asked to indicate how much they agreed with a statement, or how satisfied they were with the issue in question. The agreement scales ranged from 1 = strongly disagree to 5 = strongly agree, and the satisfaction scales ranged from 1 = very dissatisfied to 5 = very satisfied. In addition, there was one open ended question on expected future community wellbeing that required a short response, and the demographic questions required participants to choose the most accurate category.

2.3.3 ITEMS USED TO MEASURE

The survey comprised 183 questions (items) covering six main topics. A brief outline of the items used to measure each topic area is summarised below. Descriptions of individual measures and scales are detailed in Appendix C along with reliability of each scale. The survey questions with exact wording of associated items are detailed in Appendix D.

Community wellbeing measures (69 items)

- *Fifteen dimensions* of wellbeing each with their own set of multiple items (63 items)
- *Overall wellbeing*, six items rating the community as a suitable place to live for different segments of the population (children / teenagers / seniors), and assessing the community overall as a place to live (that offers a good quality of life / they are happy to be living in / a great place to live)

Community resilience and adaptation measures (14 items)

- *Community resilience actions* in response to proposed CSG development (planning, leadership, accessing information, sharing, perseverance, supporting volunteers, getting involved, working together)
- *Community coping and adapting*, perceptions of the community's coping and adapting to a proposed CSG development

Expected future community wellbeing measures (4 items)

- *Expected future community wellbeing* in 3 years hence (as a place that offered a good quality of life / where they would be happy to be living). They were also asked to choose how wellbeing in

their community might change in the future (decline / stay about the same / improve), and to offer a reason to support their view in an open text question.

Attitudes and perceptions of CSG and the sector (82 items)

- Perceived impacts and risks
- Perceived benefits – local and societal
- Perceived fairness – procedural and distributional
- Trust – in government and CSG companies
- Quality of relationships and responsiveness of CSG companies
- Governance – formal (compliance, regulations) and informal (planning, collaboration)
- Knowledge, information sources, and previous experience with the sector
- Feelings towards coal seam gas, measuring positive emotions (pleased, optimistic) and negative emotions (angry, worried)
- Attitudes towards CSG development – acceptance of CSG development in the shire

Demographic questions (14 items)

The purpose of demographic questions was to describe the sample of participants and their representativeness, as well as to explore demographic and geographic differences in results.

- age, gender, employment status, household income, home ownership, education, indigenous identification, farm ownership
- location type (live in or out-of-town), subregion (Narrabri, Boggabri, Wee Waa)

2.4 Analyses

2.4.1 STATISTICAL TESTS

A range of bivariate and multivariate analyses were undertaken including t-tests, chi-square tests, analysis of variance, multiple regression, and path analyses. To enhance readability of this report, these analyses are not explained in detail in the body of this report. However, more detailed results relating to some analyses are shown in the Appendices and referred to in the body of the report when relevant.

2.4.2 ADJUSTING RESULTS FOR AGE OF RESIDENTS

As the sample was over representative of older residents, the analyses were weighted by age. Weighting by age is a method to adjust the results so that the findings are not biased by the age distribution of the sample respondents. For this survey, weighting by age means giving less weight to the responses of older residents because they were over-represented in the sample and more weight to the responses of younger and middle aged residents who were under-represented in the sample. This approach gives a more accurate estimate of the views across the whole shire. See Appendix E for details.

2.4.3 REPORTING RESULTS

Findings reported as 'significant' means that they were 'statistically significant' at the .05 level. This means there was less than a five percent chance that the findings were due to chance. This is a convention in scientific report writing and denoted as $p < .05$. In addition, most scores have been rounded to one decimal place when depicted in the graphical figures. Results of the survey are typically described as average scores out of 5, using a scale from 1 to 5 where 1 is the least and 5 is the most. A score below the midpoint of 3 is considered negative or unfavourable on average.

Findings

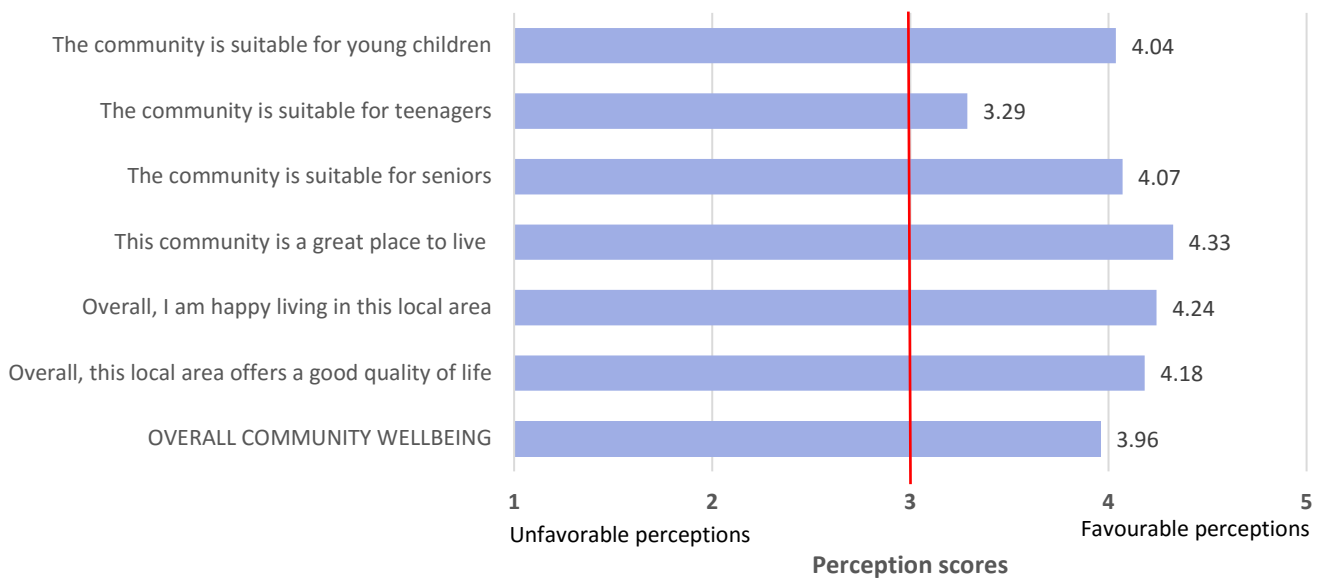
3 Community Wellbeing

3.1 Overall community wellbeing

Overall community wellbeing for the Narrabri Shire was very robust with a score of 3.96 out of 5. This score is comparable to other CSG regions in the Surat Basin of southern Queensland (Western Downs region $M = 3.84$ and Eastern Maranoa (Roma) $M = 4.12$).

As shown in Figure 24, analysis of the individual items of overall community wellbeing indicate that residents have a much lower perception of the community as a place suitable for teenagers compared to suitability for young children and for seniors.

Figure 24 Mean scores of individual items for overall community wellbeing



Differences among subregions

Perceptions of community wellbeing were similar across the region. There were no significant differences among Narrabri, Boggabri, and Wee Waa in residents' perceptions of perceived wellbeing in their community ($M = 3.97$, $M = 3.97$, $M = 3.95$ respectively).

Differences between Out-of-town and In-town

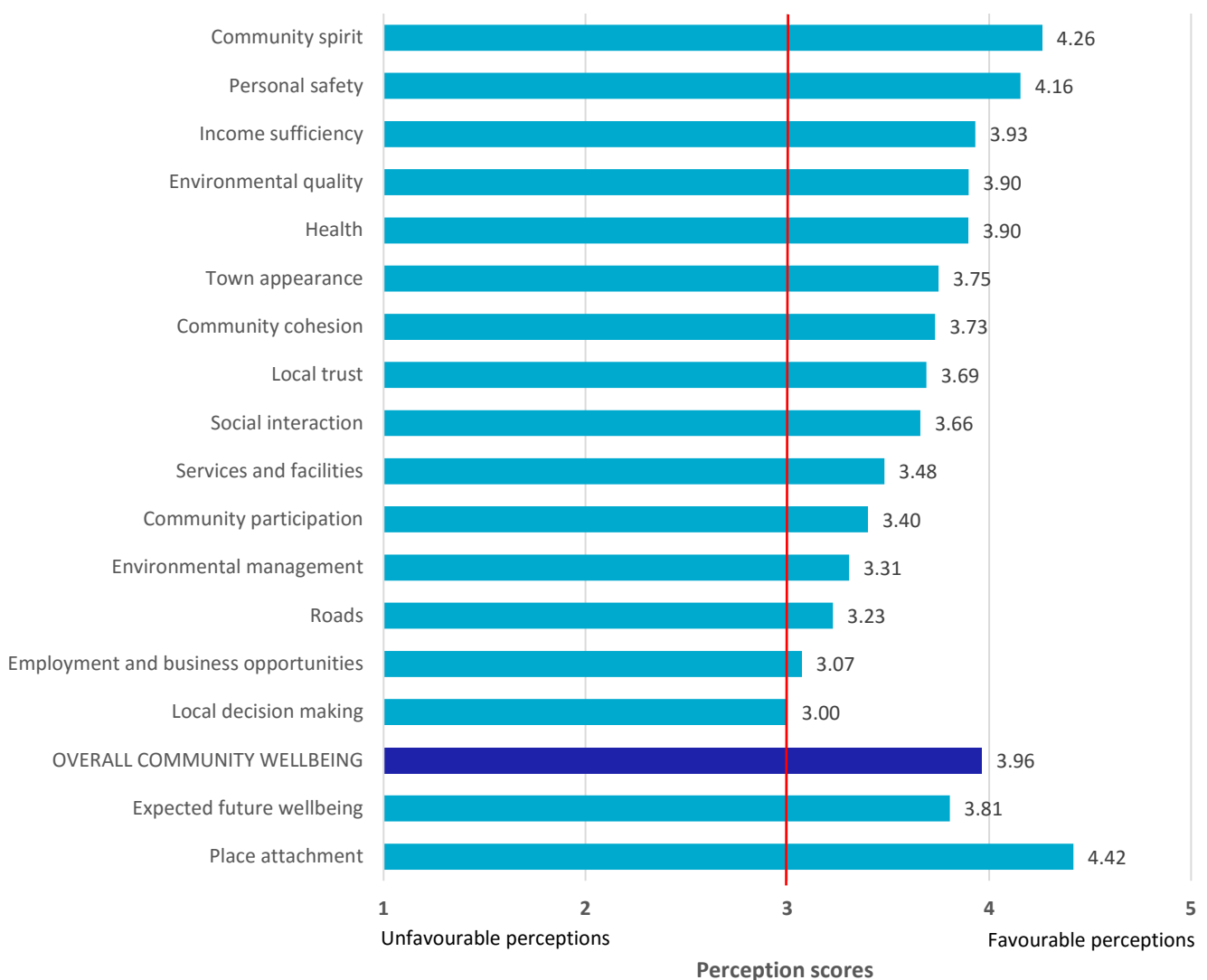
Similarly, there were no significant differences in perceptions of community wellbeing for those people who lived out-of-town and those who lived in-town ($M = 3.97$ and $M = 3.96$ respectively).

3.2 Dimensions of community wellbeing

The survey measured 15 different dimensions of wellbeing encompassing social, economic, environmental, health, physical infrastructure, and political aspects, all of which contribute to a sense of wellbeing within the community and a view that the community provides a good quality of life for residents. Of the 15 dimensions, thirteen were rated positively and two as borderline. As depicted in Figure 25, perceptions of *community spirit* and *personal safety* were viewed the most favourably with scores greater than 4 out of 5 ($M = 4.26$ and $M = 4.16$ respectively). *Local decision making* and *employment and business opportunities* were perceived to be borderline ($M = 3.00$ and $M = 3.07$).

In addition, the survey measured place attachment as very high ($M = 4.42$) indicating residents felt a high sense of belonging to their community and that they were very happy to be living there. Expected future wellbeing was less than current perceptions of wellbeing, although expectations of wellbeing in three years' time was still very robust ($M = 3.81$).

Figure 25 Mean scores for community wellbeing dimensions



Note: Scores: 1 = lowest and 5 = highest; scores below 3 indicate dissatisfaction and scores above three indicate satisfaction

Differences among subregions

Community wellbeing dimensions were analysed according to subregions. Table 4 presents satisfaction levels for the fifteen different dimensions of community wellbeing across three different subregions – Narrabri, Boggabri, and Wee Waa. Dimensions with scores greater than three are viewed as favourable on average and dimensions with scores less than three are viewed as unfavourable on average.

Two dimensions of community wellbeing differed significantly across the region based on subregions. Residents of Narrabri rated their town appearance significantly lower than residents of Boggabri and Wee Waa. They were significantly less satisfied with the cleanliness of the town and the greenspace of the town than residents of Boggabri and Wee Waa were of their towns. The second dimension of significant difference was environmental quality. Residents of Boggabri and surrounds rated the quality of their environment, in terms of levels of dust and noise, to be significantly less favourable than the other subregions. Economic opportunities for Boggabri residents and local decision making around Narrabri were unfavourable on average, though not significantly different from the other subregions.

Table 4 Community wellbeing dimensions across subregions

	Narrabri	Boggabri	Wee Waa	Whole of Shire
Community spirit	4.21	4.28	4.42	4.26
Personal safety	4.15	4.21	4.14	4.16
Income sufficiency	3.98	3.79	3.86	3.93
Health	3.87	3.99	3.93	3.90
Environmental quality	3.94 ^H	3.48^L	4.02 ^H	3.90
Town appearance	3.59^L	4.15 ^H	4.02 ^H	3.75
Community cohesion	3.66	3.93	3.86	3.73
Local trust	3.68	3.79	3.66	3.69
Social interaction	3.70	3.64	3.55	3.66
Services and facilities	3.50	3.46	3.42	3.48
Roads	3.26	3.25	3.10	3.23
Community participation	3.42	3.64	3.16	3.40
Environmental management	3.27	3.23	3.46	3.31
Economic opportunities	3.08	2.99	3.09	3.07
Local decision making	2.95	3.12	3.11	3.00
Overall Community wellbeing	3.97	3.97	3.95	3.96
Expected future wellbeing	3.78	3.76	3.93	3.81
Place attachment	4.35	4.50	4.59	4.42

Note: Scores: 1 = lowest and 5 = highest; shading indicates areas of dissatisfaction; bold font indicates significant differences in mean scores; L denotes a significantly lower score than H; H denotes a significantly higher score than L

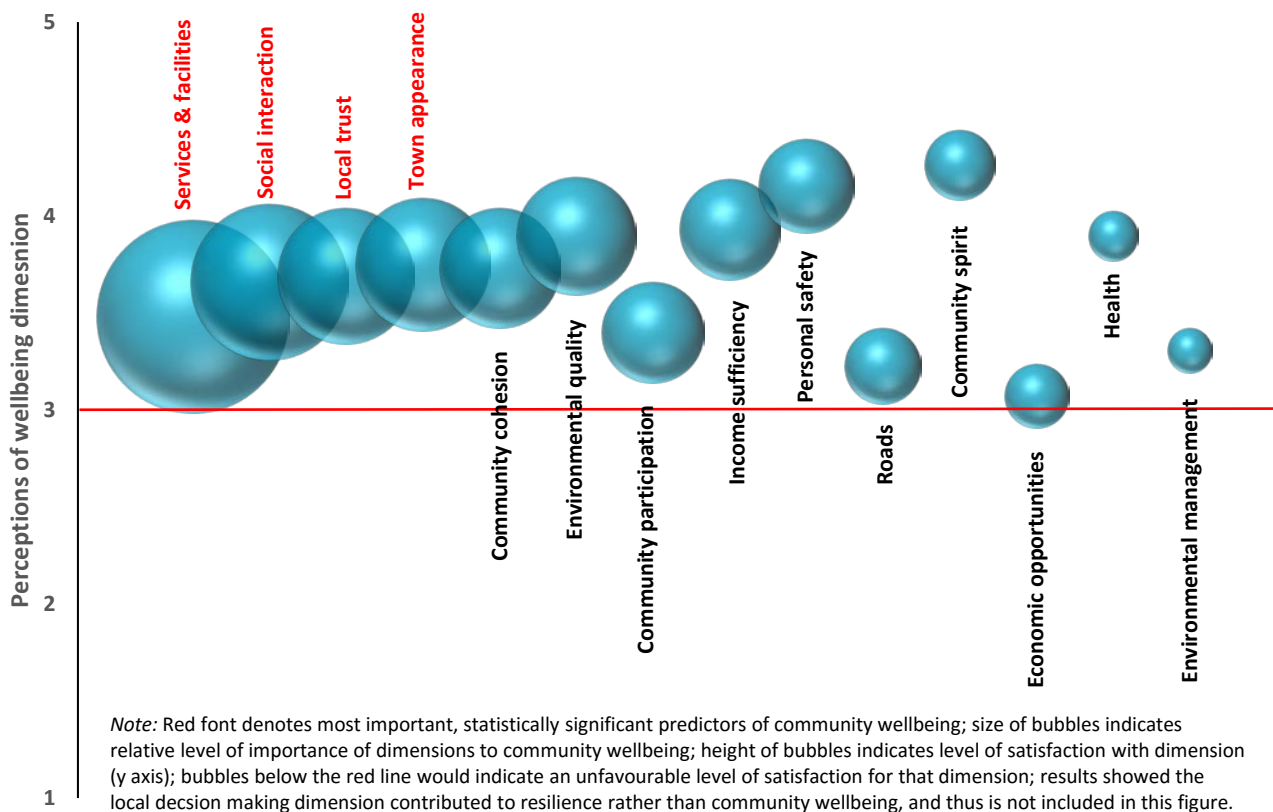
3.3 Most important dimensions of community wellbeing

A multiple regression analysis identified the underlying drivers of community wellbeing. These drivers can be considered as those dimensions that contributed most to a sense of wellbeing in the community and a view that the community offers a good quality of life. When these drivers are perceived to be high then residents perceive their community wellbeing as also high. Similarly, when these drivers are perceived to be low then residents perceive their wellbeing or quality of life in the community as also low. The importance of understanding the drivers of wellbeing is that they may not necessarily be the dimensions that score the lowest or highest perception scores. For example, even though roads might be assessed as being of a relatively low score, roads may not contribute significantly to whether or not the community is seen as a good place to live.

The statistical modelling indicated four main underlying drivers of community wellbeing: *services and facilities*, *social interaction*, *local trust*, and *appearance of towns*. This implies when people view services and facilities as very good, when they feel the social aspects of their community life are strong (social interaction and local trust), and when they feel their towns are clean with good parks and greenspace then they also perceive their community as a great place to live - offering a good quality of life.

Figure 26 combines the level of importance of each dimension (the size of the bubbles) with the level of participant's satisfaction with each dimension (the height of the bubbles). The size of the bubbles represent the size of the beta coefficients determined in the regression analysis, and these are detailed in Appendix F. The smaller the size of the bubble the less important the dimension is to a sense of community wellbeing. The height of the bubble reflects the mean score for that dimension. The higher the bubble is positioned the more positively the dimension was assessed. Notably, the dimensions that reflect personal situations such as health and income sufficiency are not significant drivers of community wellbeing or seeing their community as a good place to live. Other research shows that these types of dimensions are important predictors of individual or personal wellbeing rather than community wellbeing (Cummins, 1996). Local decision making is more related to community resilience (McCrea et al., 2016) and is included in Section 5.

Figure 26 Community wellbeing dimensions ordered according to importance



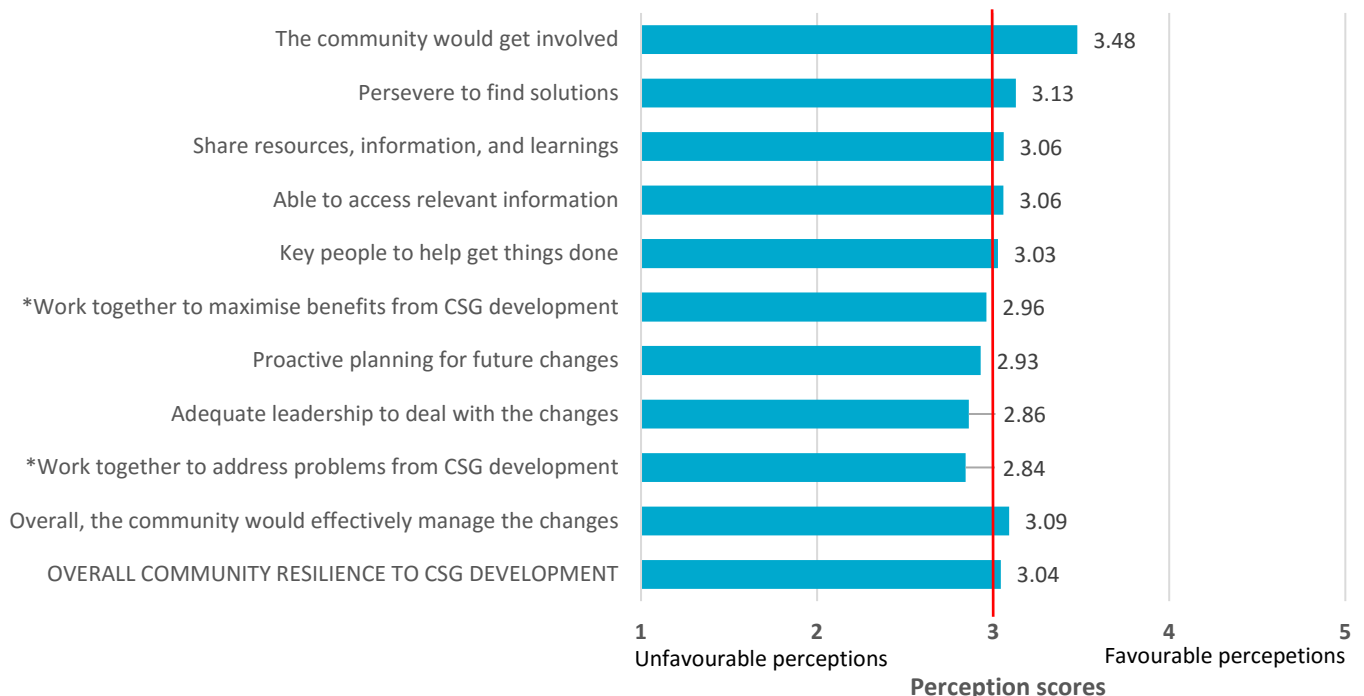
4 Community resilience and responding to change from a proposed CSG development

4.1 Community resilience actions

Participants were asked about a range of community actions in response to changes from a proposed CSG development, which was outlined in a scenario. They were asked about planning, leadership, and accessing information, which are considered necessary components for responding strategically and proactively to change. In addition, participants were asked about the community’s ability to work together as a collective with other stakeholders such as local and state government and industry to address changes related to a possible CSG development. These are called collective efficacy beliefs. Finally, participants were asked about the community’s commitment to its future and its preparedness to persist in finding solutions. The scenario is detailed in Appendix A.

As shown in Figure 27, results indicated that expectations that the community would get involved and persevere to find solutions in response to a proposed CSG development were viewed positively on average ($M = 3.48$ and $M = 3.13$ respectively). In contrast, expectations of local communities to be able to work together with local and state government and a CSG company to address any problems or to maximise any benefits associated with CSG development were, on average, viewed negatively. Similarly, responding strategically in terms of proactive planning and adequate leadership for dealing with changes was also viewed unfavourably on average.

Figure 27 Community perceptions of resilience responses to a proposed CSG development



Note: *Working together refers to local communities, a CSG company, local and state governments being able to work together; Scores: 1 = lowest and 5 = highest; scores below 3 indicate dissatisfaction and scores above three indicate satisfaction

Differences among subregions

There were no significant differences among the three subregions in perceptions of overall community resilience actions. However, analysis of specific resilient actions indicated that participants from Boggabri and surrounds viewed the level of ‘leadership to effectively deal with changes’ within their community as higher than participants from Narrabri and Wee Waa ($M = 3.26$, $M = 2.79$, and $M = 2.84$ respectively).

Differences between Out-of-town and In-town

There was a pattern for people who live out-of-town to view resilient actions significantly lower and unfavourably compared to people who live in-town. As shown in Table 5, people who live in-town view most actions and overall resilience favourably, whereas people who live out-of-town view most actions unfavourably on average.

Table 5 Community resilience actions: Out-of-town and In-town

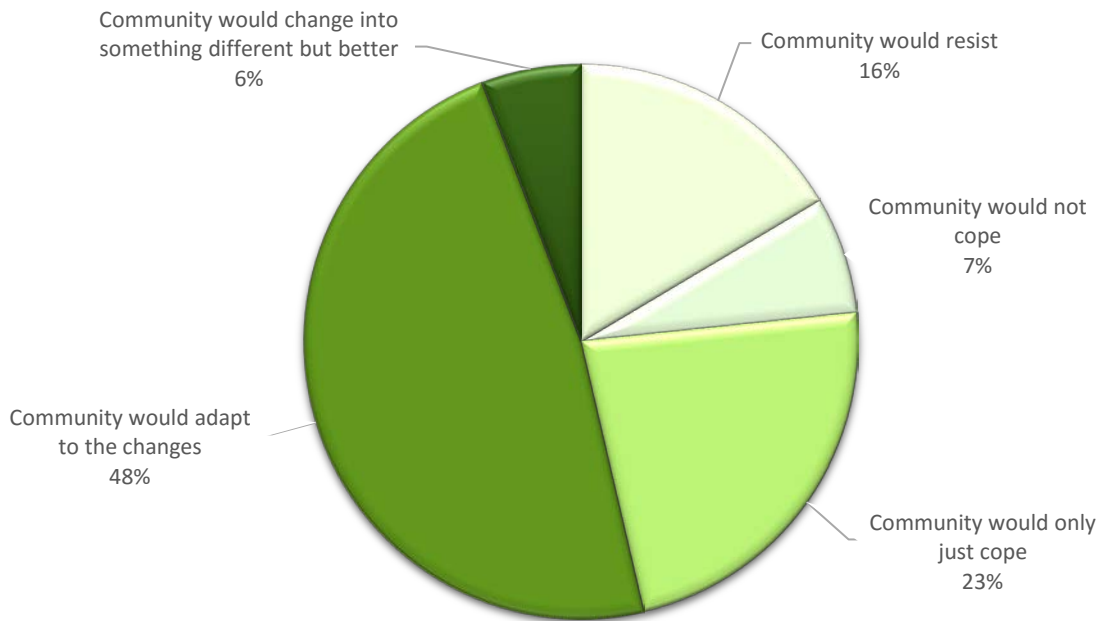
Resilient Actions	In-town	Out-of-town	Whole of Shire
Proactive planning for future changes	3.01	2.79	2.93
Adequate leadership to deal with the changes	2.95	2.70	2.86
Able to access relevant information	3.15	2.90	3.06
Share resources, information, and learnings	3.18^H	2.85^L	3.06
Key people to help get things done	3.14^H	2.83^L	3.03
Work together to address any problems with CSG development	2.96^H	2.63^L	2.84
Work together to maximise any benefits associated with CSG development	3.09^H	2.74^L	2.96
Persevere to find solutions	3.27^H	2.87^L	3.13
The community would get involved	3.51	3.43	3.48
Overall, the community would be able to manage the changes effectively	3.16	2.97	3.09
OVERALL COMMUNITY RESILIENCE	3.14^H	2.87^L	3.04

Note: Scores: 1 = lowest and 5 = highest; shading indicates areas of dissatisfaction; bold font indicates significant differences in mean scores; L denotes a significantly lower score than H; H denotes a significantly higher score than L; shading indicates an unfavourable perception on average

4.2 Adapting to CSG development

Across the Narrabri shire there was a diversity of views regarding how participants felt their community would cope and adapt to CSG development. These views ranged from people feeling their community would resist changes through to feeling their community would change into something different but better. Figure 28 depicts these differences in views towards coping and adapting to changes. Almost half of the participants indicated that the community would adapt to changes (48%), with nearly a quarter indicating that they felt the community would only just cope (23%). The remainder felt that the community would either resist (16%), not cope (7%), or alternately change into something different but better (6%).

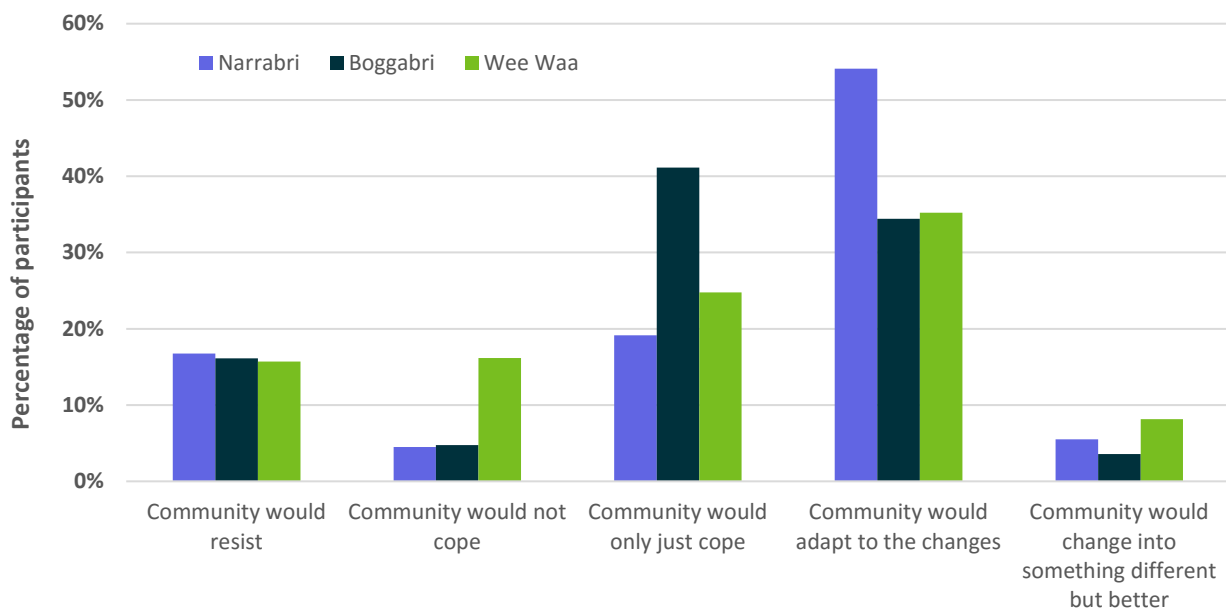
Figure 28 Community perceptions of adapting to CSG development: Narrabri shire



Differences among subregions

Perceptions of coping and adapting to CSG development varied among the subregions. As depicted in Figure 29, Narrabri is significantly more likely to see its community as adapting to changes than Boggabri, Boggabri is more likely to see its community as only just coping compared to Narrabri, and Wee Waa is significantly more likely to see its community as not coping than Narrabri.

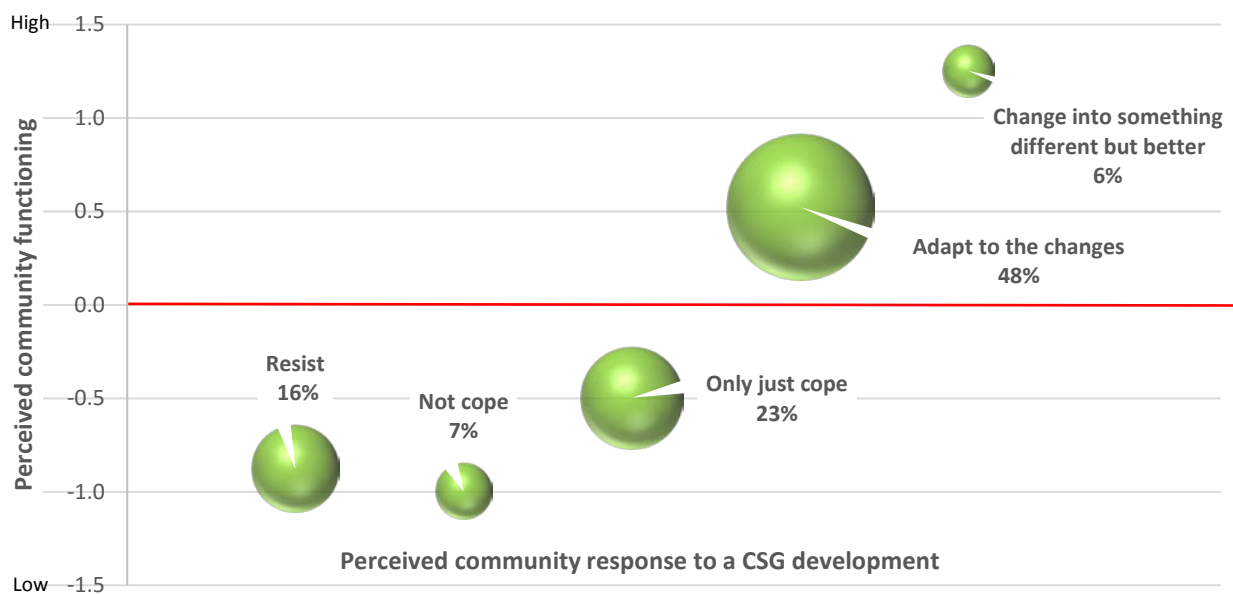
Figure 29 Community perceptions of adapting to CSG development: differences among subregions



Indicators that would show the community adapting to a future CSG development

A discriminant analysis showed that differences in perceived community functioning could explain different perceptions of how their community would adapt to a possible CSG development. Community functioning can be thought of as a 'bundle' of community wellbeing attributes and resilience actions combined to indicate high or low community functioning. As shown in Figure 30, when people perceived community functioning would be high they indicated they would view their community as adapting well to CSG activities. Conversely, if they perceived community functioning would be low then they thought their community would only just cope, not cope, or resist the changes. Details of the discriminant analysis used to identify indicators of community functioning are presented in Appendix F.

Figure 30 Perceptions of community adaptation mapped to perceived community functioning



Indicators of high community functioning

- ✓ Working together (good sharing of information and ability to work together on problems and opportunities)
- ✓ Working strategically (good planning, leadership and access to information)
- ✓ Working committedly (community involvement and perseverance)
- ✓ Environmental management (underground water, nature reserves, and farming land being managed well for the future)
- ✓ Environmental pollution (low levels of dust and noise, and good air quality)
- ✓ Roads (satisfied with condition, safety and amount of traffic)
- ✓ Local decisions and citizen voice (trust in local leaders and council, people feel listened to and heard, and that they are being kept informed)
- ✓ Community participation (participation in community events, groups and local activities)

5 Expected future community wellbeing

Residents of the Narrabri shire expected their future community wellbeing to decline slightly in three years' time ($M = 3.81$) compared to current levels ($M = 3.96$). This tendency to be slightly pessimistic about the future has been demonstrated in other community wellbeing research in Queensland (Walton et al., 2016). However, in the Queensland research, when tested two years later people's perceptions that wellbeing would decline were not borne out in actual measures of wellbeing.

As shown in Figure 31, almost one quarter of residents in the Narrabri shire felt wellbeing in their community would improve (23%), almost one quarter felt that it would decline (24%), and just over half felt that it would stay about the same (53%).

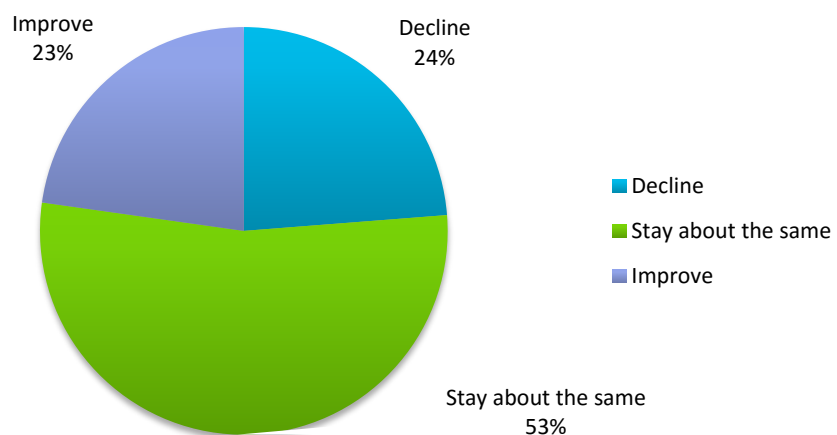


Figure 31 Expected future community wellbeing

Differences among subregions and between Out-of-town and In-town

As with current community wellbeing, there were no significant differences across the subregions in expectations of future community wellbeing in three years times.

Differences between Out-of-town and In-town

There were also no significant differences based on whether a person lived in-town or out-of-town in expected future community wellbeing, as with current community wellbeing.

5.1.1 UNDERLYING DRIVERS OF EXPECTED FUTURE COMMUNITY WELLBEING

A multiple regression analysis showed that expectations of future community wellbeing were largely explained by three factors:

- perceptions of *current levels of community wellbeing*,
- perceptions of *resilience actions* - how well the community might respond to coal seam gas development
- the strength of a persons' *attachment to place*.

When community wellbeing and community resilience were perceived to be strong, then people held more positive views about the future wellbeing of their community. In addition, the stronger a sense of belonging and attachment to place the more positive a person is likely to feel about its future. Results showed that attitudes and feelings about CSG development were not significant predictors of expected future community wellbeing. Statistical details of the regression analysis are found in Appendix F.

6 Attitudes and perceptions of CSG and the sector

6.1 Perceived impacts and risks

To measure perceived impacts from CSG development we used three banks of questions: concerns about potential impacts, concerns about future issues, and perceptions of ground water risk manageability. Results showed that residents were concerned on average about all perceived impacts (i.e. both potential impacts and futures issues) associated with CSG activities ($M = 3.50$). However, as shown in Figure 32, they were significantly more concerned about future issues ($M = 3.75$) than more immediate potential impacts ($M = 3.41$).

In addition, residents from Narrabri and surrounds were significantly less concerned about CSG ($M = 3.40$) than residents from the rest of the shire ($M = 3.70$) who lived in Boggabri and surrounds and Wee Waa and surrounds, see Figure 33.

Figure 32 Perceived impacts

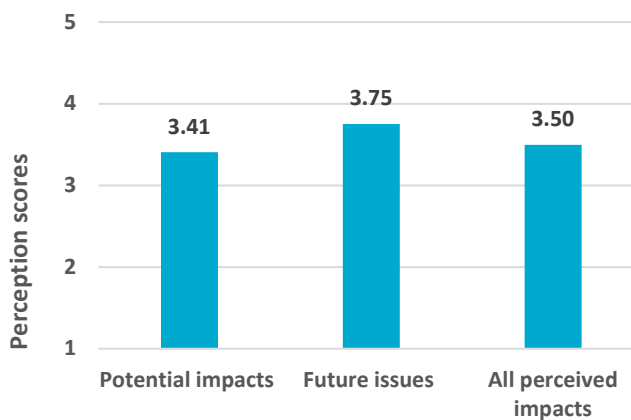
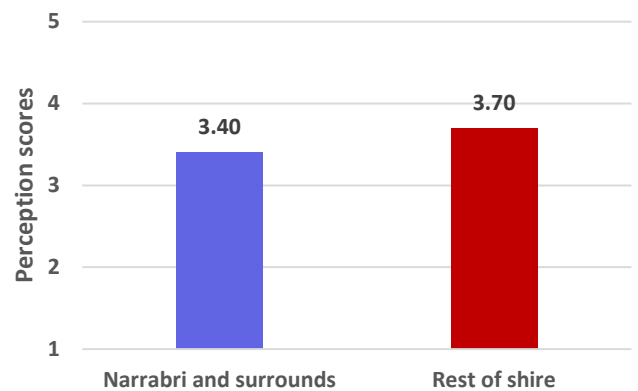


Figure 33 Perceived impacts: By location

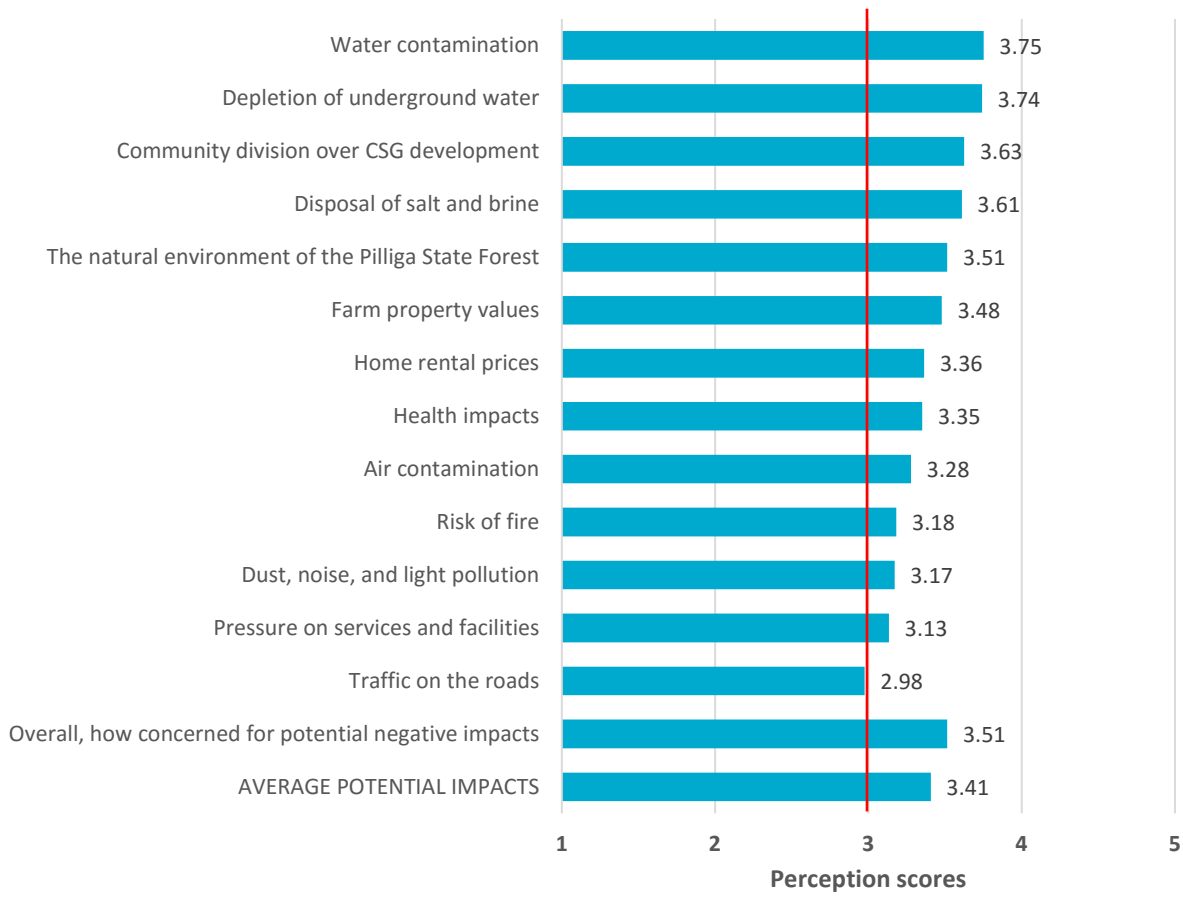


6.1.1 CONCERNS ABOUT POTENTIAL IMPACTS

The average level of concerns across thirteen potential impacts ranged from a borderline concern with traffic ($M = 2.98$) to a moderately high concern ($M = 3.75$) about possible water contamination. Of the thirteen potential concerns, four of the top five concerns related to environmental issues with the top two reflecting concerns about *water contamination* and *groundwater depletion*. As shown in Figure 34, *disposal of salt and brine* and the impact on the *Pilliga forest* were the other two main environmental concerns. The potential for *community division* over CSG was the third ranked concern. The three areas of least concern were potential for pressure on services and facilities, the risk of fire, and the concern about traffic on roads.

It is relevant to note that these are average scores, which reflect a range of views. Though some residents indicated they were very concerned others indicated no real concerns. For example, the average level of concern for health impacts is 3.35 out of 5, 33% are very concerned about this issue and 17% are not at all concerned. The frequency of responses for each item of potential impact are presented in Appendix G.

Figure 34 Concerns about potential impacts of CSG development

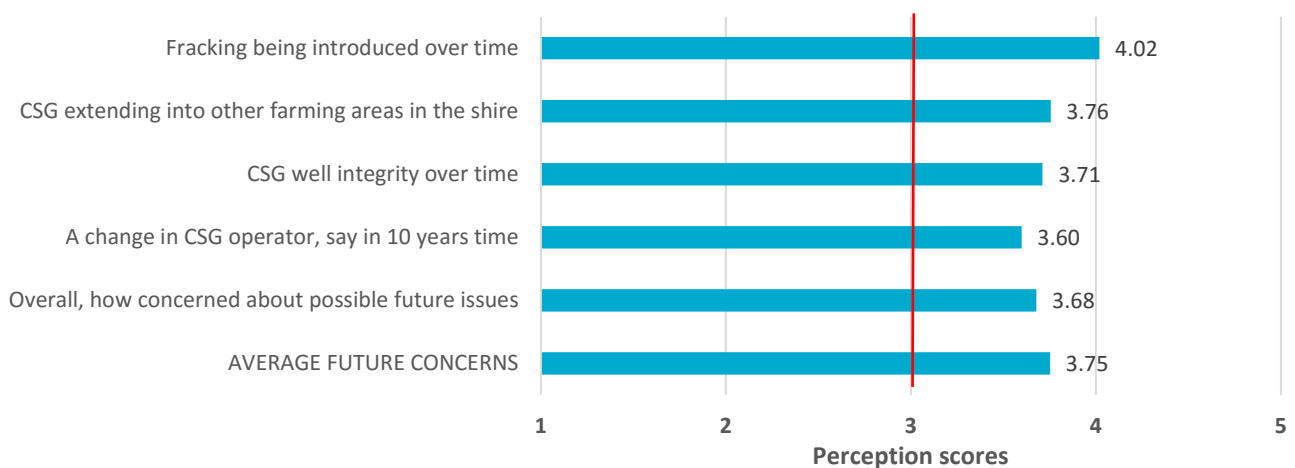


Note: Scores: 1 = not at all concerned and 5 = very concerned

6.1.2 CONCERNS ABOUT FUTURE ISSUES

Results showed that concerns for future issues were moderately high. As shown in Figure 35, concerns that fracking would be introduced over time was the most concerning issue ($M = 4.02$), followed by concerns that CSG development would extend into other farming areas in the shire beyond the mixed grazing and cropping farms that were described in the scenario of the survey. Concerns about well integrity in the future as well as a change in future ownership of the CSG company were also rated moderately high.

Figure 35 Perceptions of future concerns

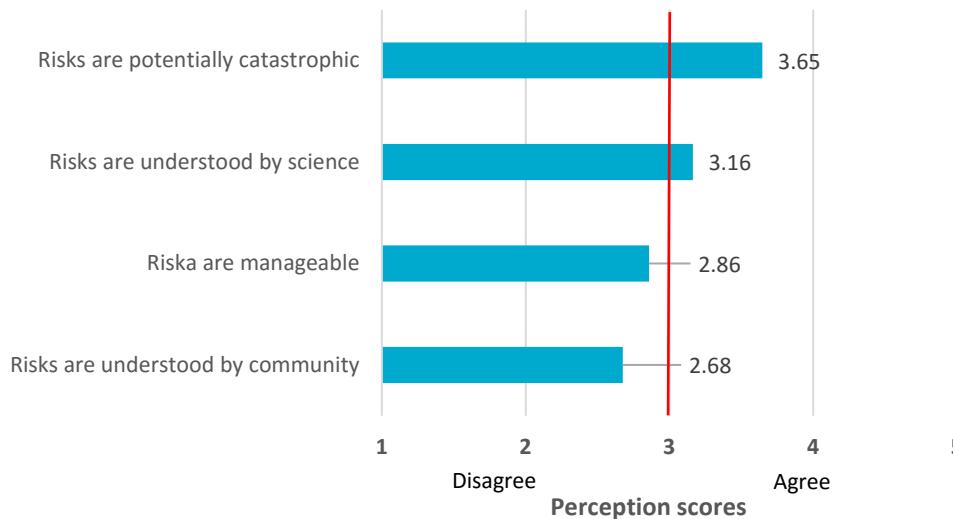


Note: Scores: 1 = not at all concerned and 5 = very concerned

6.1.3 PERCEPTIONS OF GROUNDWATER RISK MANAGEABILITY

Perceptions of risks to underground water as potentially catastrophic rated most highly ($M = 3.68$). Results showed residents believed that the risk to groundwater was not well understood by science ($M = 3.16$). However, as shown in Figure 36 residents on average did not believe that risk to groundwater was manageable ($M = 2.86$), nor that it was understood by community ($M = 2.68$).

Figure 36 Perceptions of risk to underground water



Note: Scores: 1 = strongly disagree and 5 = strongly agree

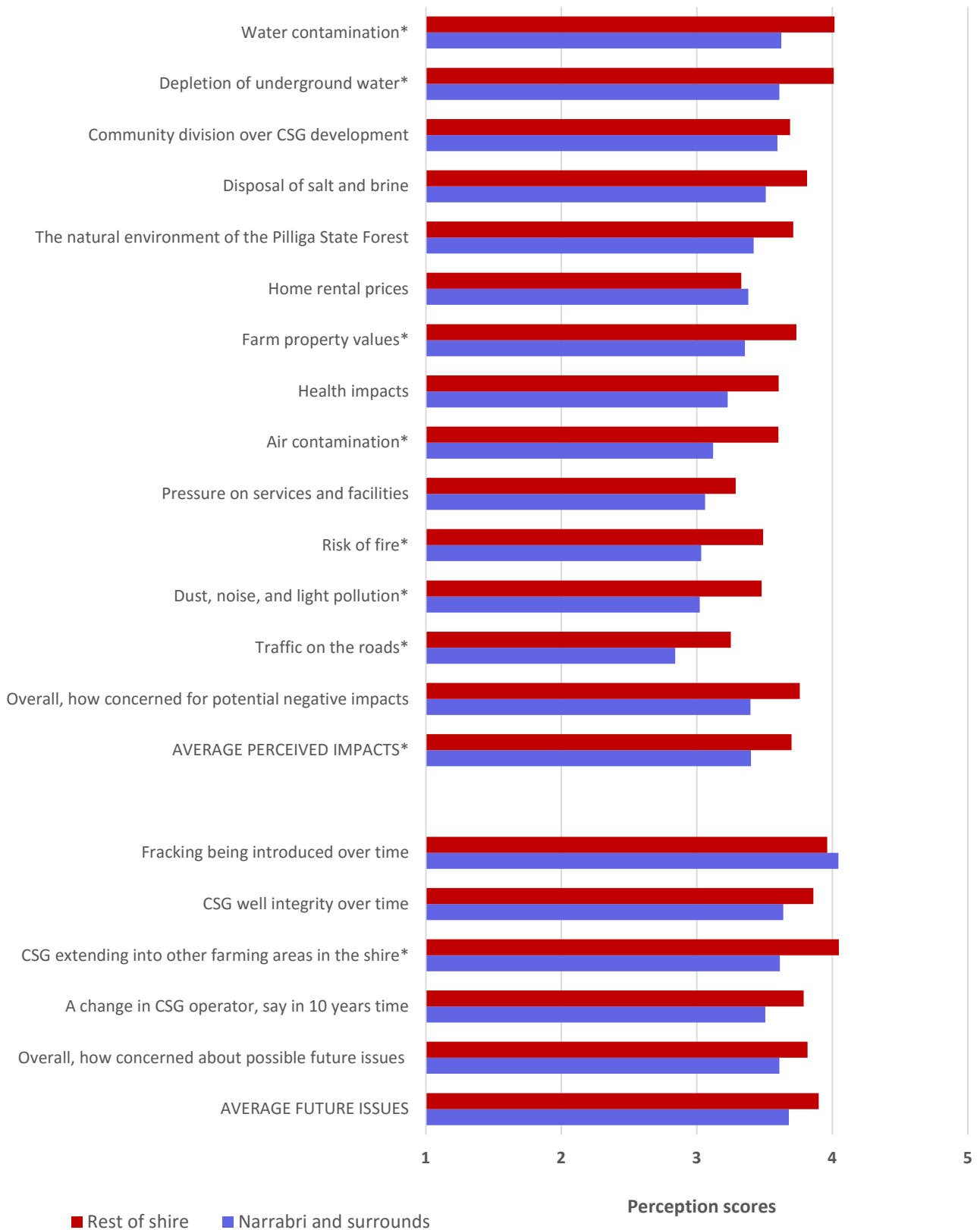
Differences among subregions: Perceived impacts

In general, perceived impacts were significantly lower for residents who lived in Narrabri and surrounds ($M = 3.40$) than for residents in the rest of the shire ($M = 3.70$), which includes Boggabri and surrounds and Wee Waa and surrounds. Differences for each item are shown in Figure 37.

Differences between Out-of-town and In-town: Perceived impacts

Results showed no statistically significant difference in perceived impacts between those residents who lived in town ($M = 3.43$) and those who lived out-of-town ($M = 3.62$). However, there were significant differences in concerns about future issues between those in-town and those out-of-town residents ($M = 3.64$ and $M = 3.95$ respectively). There were also significant differences for selected items of concern like farm property values, depletion of underground water, and potential for changes in CSG operators over time, with out of town residents showing significantly higher levels of concern than in town residents. Results for each item are shown in Appendix D.

Figure 37 Concerns about potential impacts and future issues: Differences among subregions



Note: *denotes a significant difference at $p < .05$; Scores: 1 = not at all concerned and 5 = very concerned

6.2 Perceived benefits

To measure perceptions of benefits associated with CSG development we used two sets of questions: perceptions of *local benefits* and *societal benefits*. As shown in Figure 38, on average, perceptions of all benefits were modest ($M = 3.30$) though perceptions of local benefits from CSG development ($M = 3.39$) was significantly higher than perceptions of wider society benefits ($M = 3.16$). Results also showed that perceived benefits of CSG development were viewed significantly higher by those who lived in-town ($M = 3.43$) than those who lived out-of-town ($M = 3.06$), see Figure 39. There were no real differences in perceptions of benefits based on subregions.

Figure 38 Perceived benefits: By type

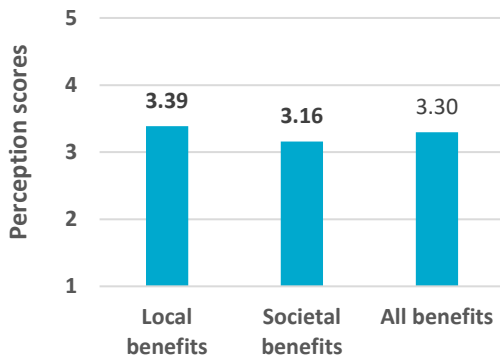
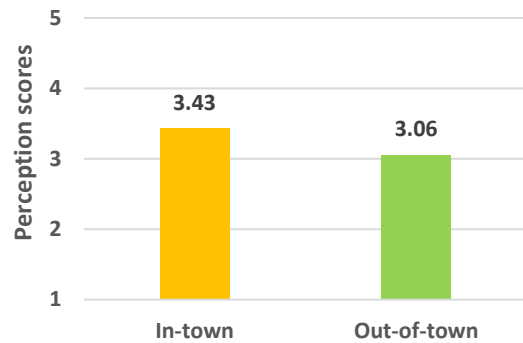


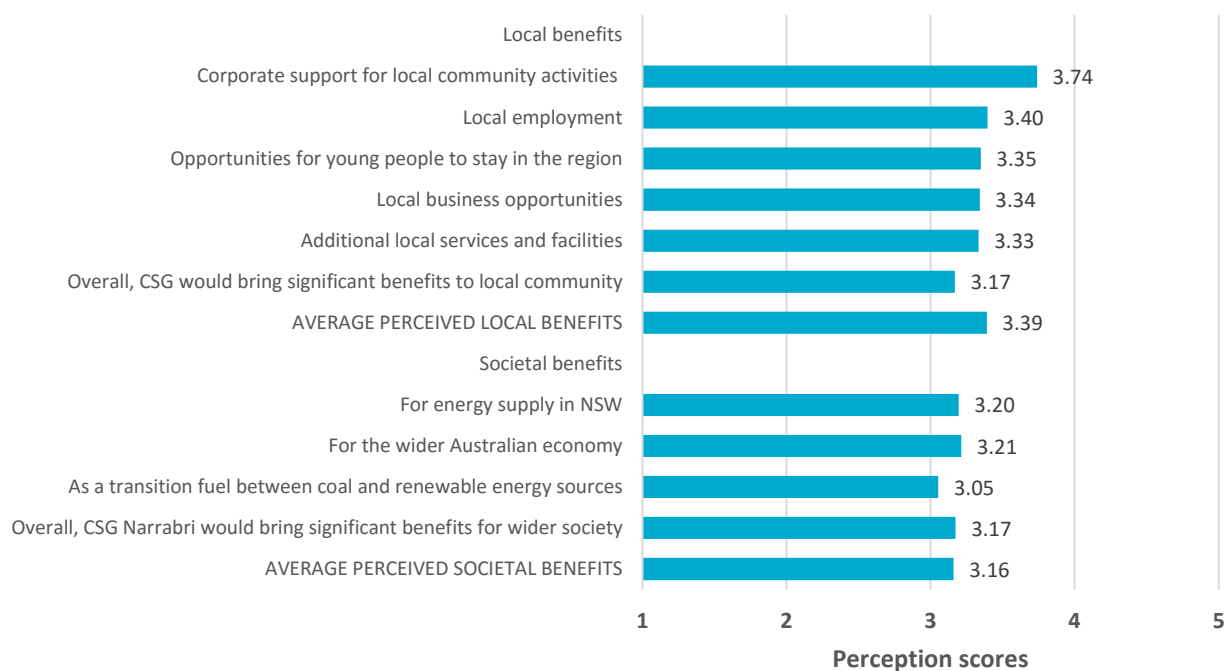
Figure 39 Perceived benefits: In and out of town



6.2.1 LOCAL AND SOCIETAL BENEFITS

Results showed that residents believed corporate support of local community activities, and opportunities for local employment, for local businesses, for young people to stay in the region, and for additional local services and facilities were all local benefits from CSG development. In terms of societal benefits, CSG was only marginally viewed as beneficial in terms of providing an energy source to NSW, acting as a transition fuel, and providing benefit to the wider Australian economy. Figure 40 shows these results.

Figure 40 Perceived benefits: Local and societal benefits



Note: Scores: 1 = strongly disagree and 5 = strongly agree

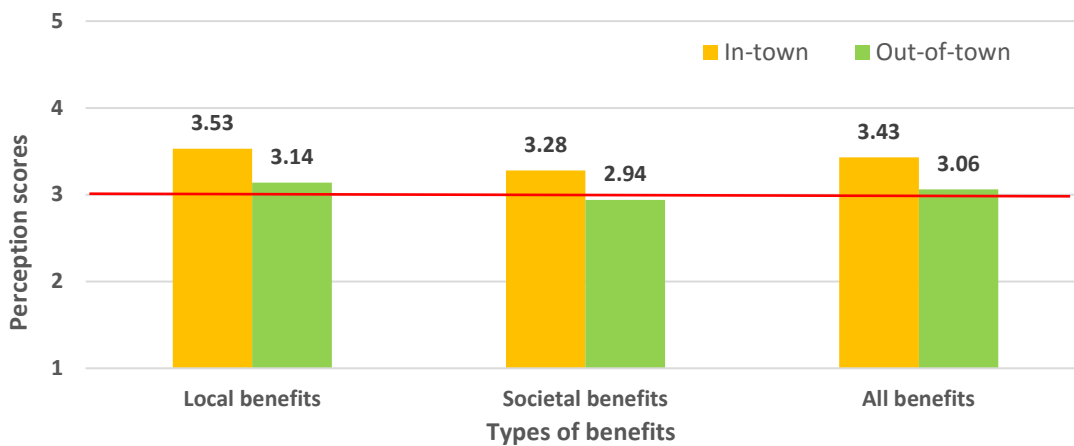
Differences among subregions

Results showed no statistically significant difference in average perceptions of benefits (local benefits and societal benefits) between those residents who live in Narrabri and surrounds ($M = 3.34$) and those who live in the rest of the shire ($M = 3.20$), except for the item related to corporate support for local community activities, which was significantly higher in Narrabri and surrounds. See Appendix D.

Differences between In-town and Out-of-town

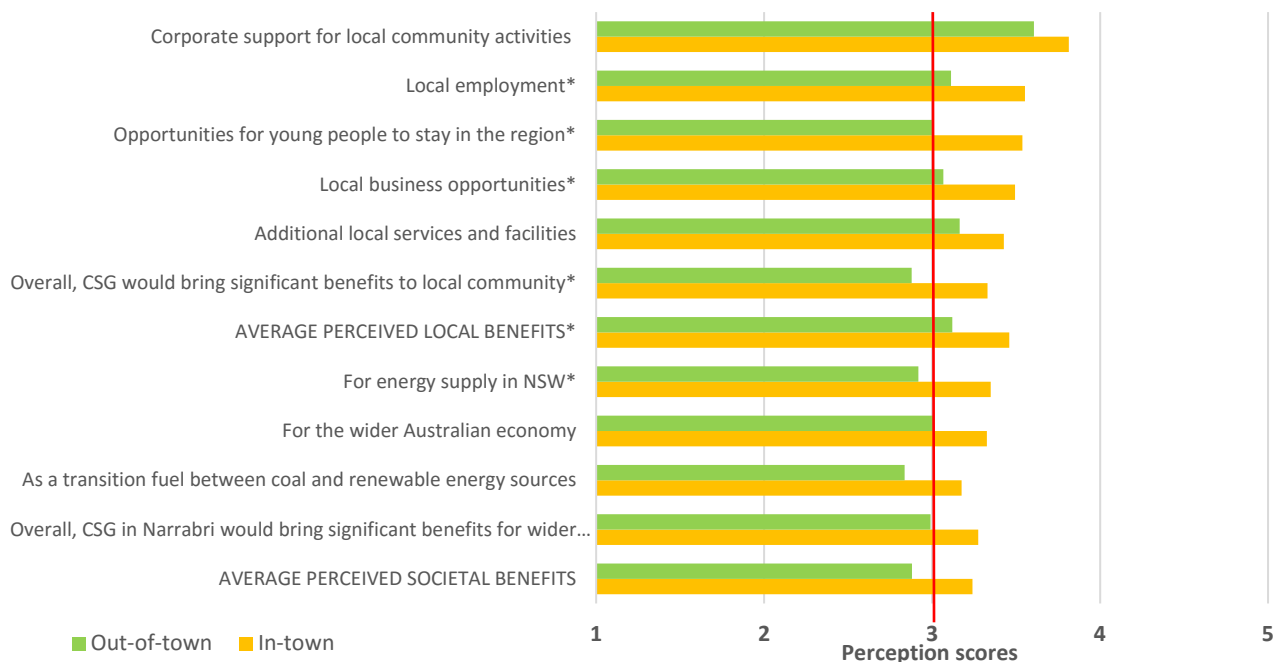
As depicted in Figure 41, there were significant differences based on living in-town or out-of-town. Those living in-town perceived benefits to be significantly higher than those who live out-of-town for all types of benefits.

Figure 41 Perceptions of benefits: In-town and Out-of-town



Specifically, the results show that people who live in town perceive significantly greater benefits in CSG development in terms of local employment, opportunities for young people, and local business opportunities than those who live out-of-town. As shown in Figure 42, they also perceive that CSG development would be beneficial for the state's energy supply though people who live out of town do not see this as beneficial, on average.

Figure 42 Perceived benefits: Differences between In-town and Out-of-town



Note: Scores: 1 = strongly disagree and 5 = strongly agree

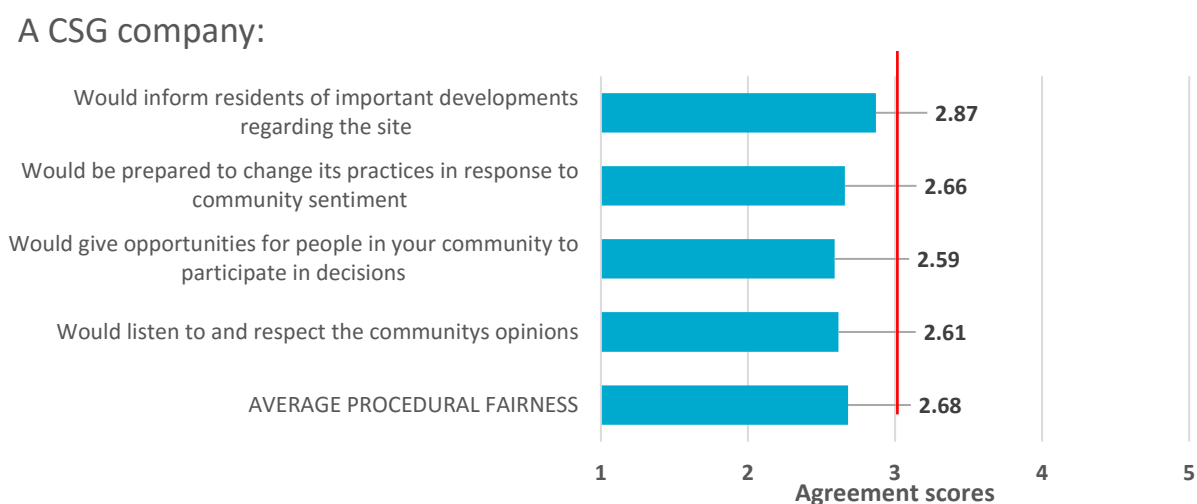
6.3 Perceived fairness

To measure perceptions of fairness in relation to CSG development we used two sets of questions: *procedural fairness* and *distributional fairness*. Procedural fairness refers to perceptions of fairness in relation to the way a CSG company would involve community in decision making about CSG development. Distributional fairness refers to perceptions of fairness in that those who are being impacted are compensated accordingly, and that there is fair sharing of the costs as well as the benefits.

6.3.1 PROCEDURAL FAIRNESS

Results showed that on average community perceptions of procedural fairness were unfavourable ($M = 2.68$). Low scores indicated that residents did not believe on average that a CSG company would inform residents of important developments, would be prepared to change its practices in response to community sentiment, would give opportunities for participation in decision making, nor would listen and respect community opinions. These results are depicted in Figure 43.

Figure 43 Community perceptions of procedural fairness



Note: Scores: 1 = strongly disagree and 5 = strongly agree

Differences among subregions

Results showed no statistically significant difference in average perceptions of procedural fairness between those residents who live in Narrabri and surrounds ($M = 2.75$) and those who live in the rest of the shire ($M = 2.55$).

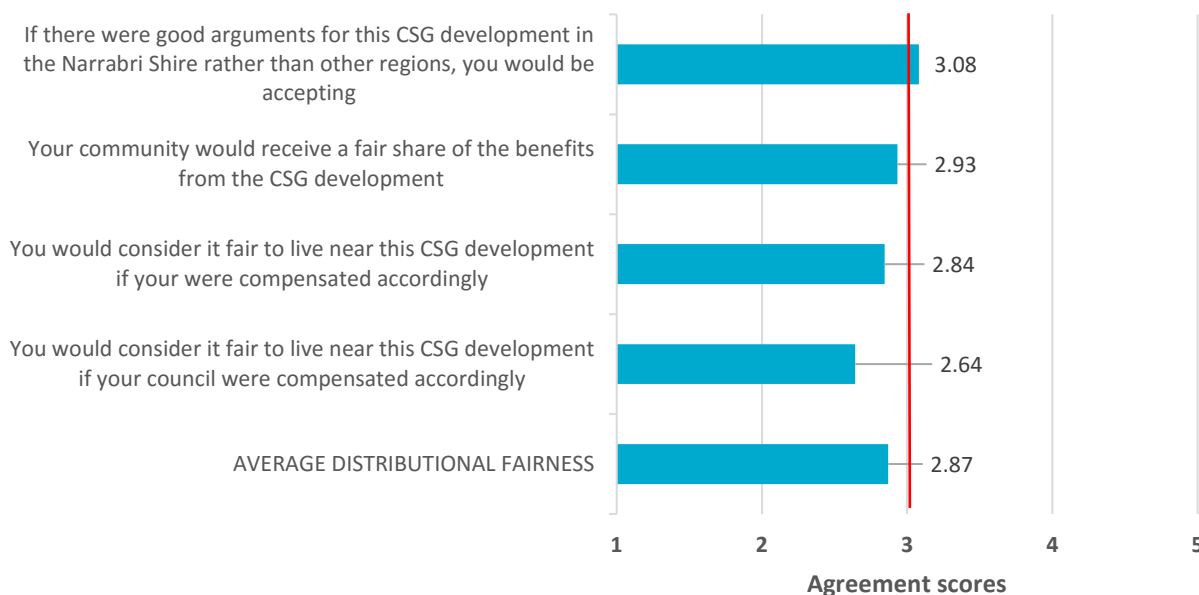
Differences between Out-of-town and In-town

Residents who live in town reported significantly higher perceptions of procedural fairness ($M = 2.81$) than those residents who live out of town ($M = 2.45$).

6.3.2 DISTRIBUTIONAL FAIRNESS

Results found that average perceptions of distributional fairness was less than positive ($M = 2.87$). As shown in Figure 44, participants indicated that on average they would not view it as fair to have CSG development in their shire even if they or the council were compensated accordingly. Nor did they indicate that they believed the shire would receive its fair share of benefits. However, there was borderline levels of support for the notion that the community would be accepting if there were good reasons as to why CSG development should be in the Narrabri shire over other regions.

Figure 44 Community perceptions of distributional fairness



Note: Scores: 1 = strongly disagree and 5 = strongly agree

Differences among subregions

Results showed no statistically significant difference in average perceptions of distributional fairness between those residents who live in Narrabri and surrounds ($M = 2.95$) and those who live in the rest of the shire ($M = 2.73$).

Differences between In town and Out of towns

There were no statistical differences in average perceptions of distributional fairness between residents who live in town ($M = 2.99$) and those who live out of town ($M = 2.66$); although this could be described as a tendency to be different with the result being significant at the $p < .10$ level.

Comparisons with the Australian Attitudes toward Mining survey 2016 -17

Three items were compared with very similar items from the Australian Attitudes to Mining survey (CSIRO, 2017), which incorporated CSG extraction in its definition of mining. Table 6 shows that views relating to procedural fairness were slightly more unfavourable for the Narrabri shire than for communities in other mining regions within Australia and that there was no meaningful difference in the way distributional fairness was viewed.

Table 6 Comparison with Australian Attitudes towards Mining survey: Procedural, distributional fairness

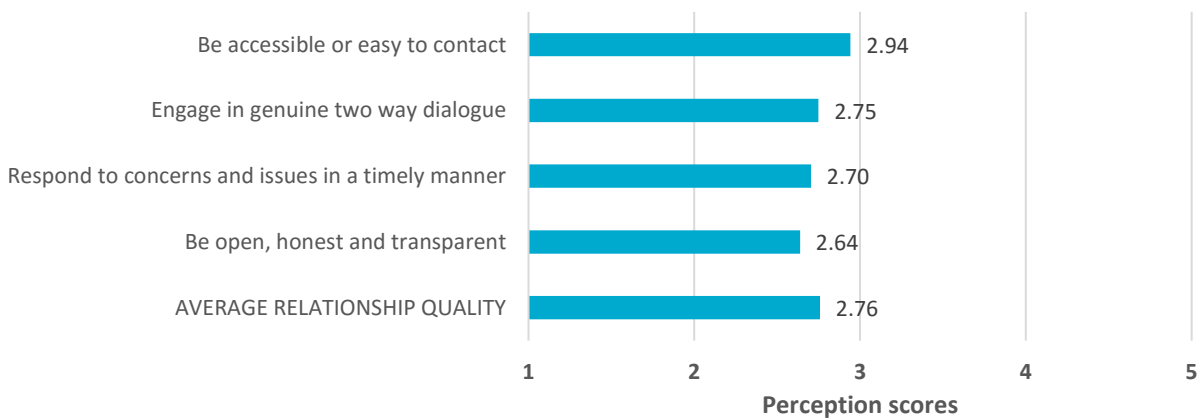
Item		CSIRO Narrabri Shire survey 2017	Australian Attitudes ¹ Survey 2016 -17
The mining industry listens to and respects community opinions	Procedural	2.61	2.78 ²
The mining industry is prepared to change its practices in response to community concerns	Procedural	2.66	2.87 ²
Mining communities receive a fair share of the benefits from mining	Distributional	2.93	2.99 ²

Note: ¹ Attitudes are from 'mining' communities in Australia and refer to mining where mining includes all extractive industries including unconventional gas; ² this result has been statistically adjusted from its original reporting on a 7-pt scale to reporting here on a 5-pt equivalent scale using methods according to Colman et al. (1997).

6.4 Perceived quality of relationships

To measure perceptions of the potential quality of the relationship between the community and a CSG operator we used questions about perceived quality of interactions and the responsiveness of a CSG company operating a possible CSG development. Figure 45 shows that on average perceptions of the potential relationship quality were unfavourable ($M = 2.76$). Participants indicated low levels of belief that CSG companies would be open, honest and transparent in their dealings; that they would engage in genuine two way dialogue; and be responsive to their concerns in a timely manner. Views that a CSG company would be accessible and easy to contact were borderline on average.

Figure 45 Community perceptions of potential relationship quality with CSG companies



Note: Scores: 1 = not at all confident and 5 = very confident

Differences among subregions

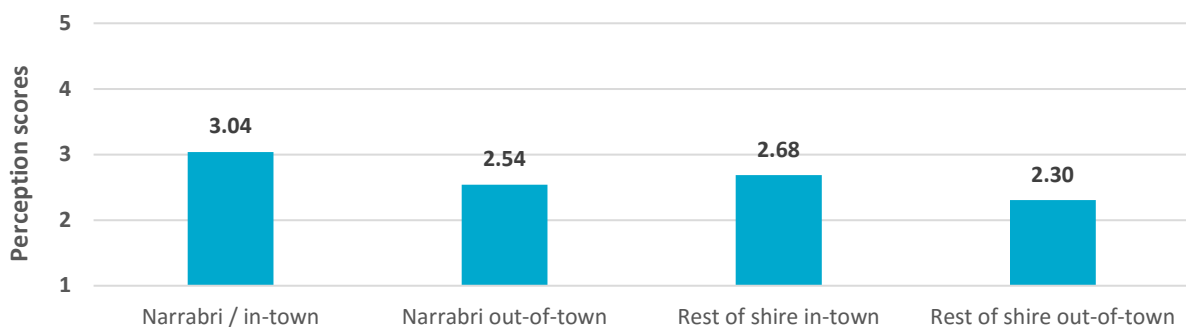
Results showed statistically significant differences in average perceptions of relationship quality between those residents who live in Narrabri and surrounds ($M = 2.86$) and those who live in the rest of the shire ($M = 2.55$).

Differences between Out-of-town and In-town

There were also statistically significant differences in perceptions between residents who live in town ($M = 2.92$) and those who live out of town ($M = 2.46$).

As shown in Figure 46, residents who live in town in Narrabri have significantly more positive views of their relationship quality with CSG companies than those who live out of town in Narrabri or in the other parts of the shire.

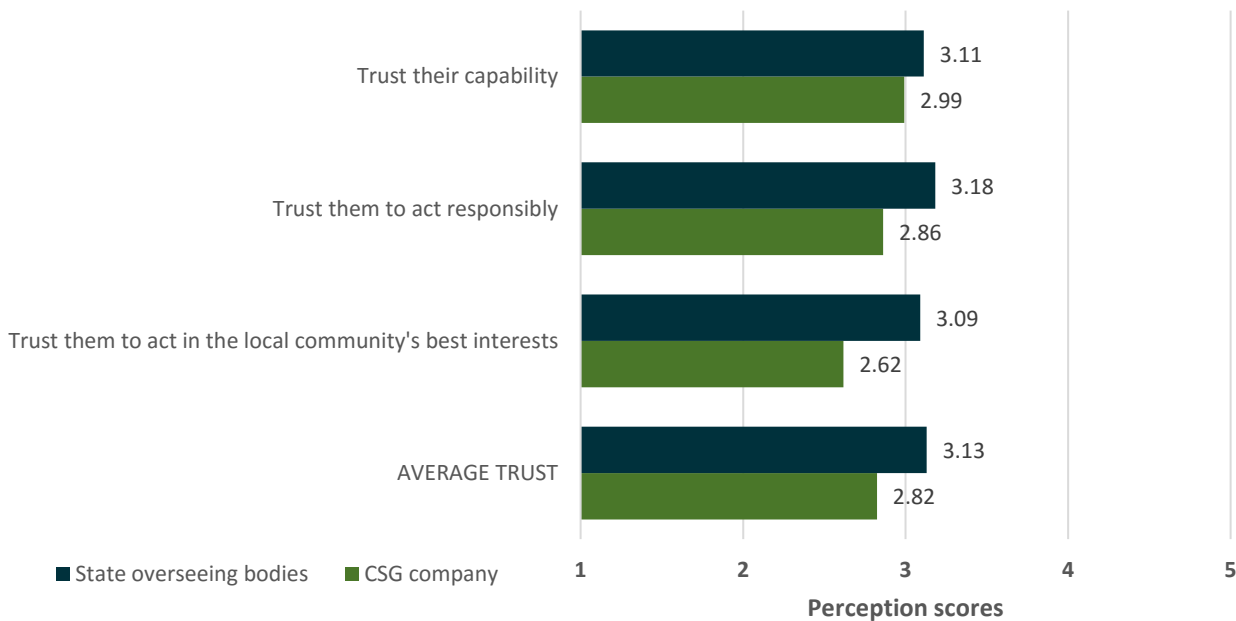
Figure 46 Community perception scores of relationship quality with CSG companies



6.5 Trust in the CSG sector

To measure trust in the CSG sector we used measures of trust in both CSG companies and state governing bodies who oversee the CSG industry. On average, perceptions of trust in state governing bodies were significantly higher ($M = 3.13$) than trust in CSG companies ($M = 2.82$). As shown in Figure 47, perceptions of state governing bodies to be capable, act responsibly, and in the interest of local communities were on average favourable. In comparison, results indicated perceptions of trust in these aspects were unfavourable for CSG companies on average, though there was more trust in CSG company capabilities

Figure 47 Community perceptions of trust in CSG companies and State overseeing bodies



Note: Scores: 1 = not at all and 5 = a great deal

Differences among subregions

Results showed no statistical differences in perceptions of trust in CSG companies based on sub-regions. However, there were statistically significant differences in average perceptions of trust in state overseeing bodies between those residents who live in Narrabri and surrounds ($M = 3.24$) and those who live in the rest of the shire ($M = 2.90$). See Figure 48 and Figure 49.

Differences between Out-of-town and In-town

There were also statistically significant differences in perceptions of trust for both CSG companies and state governing bodies based on residents living in town and out of town, as shown in figures below.

Figure 48 Trust in CSG companies

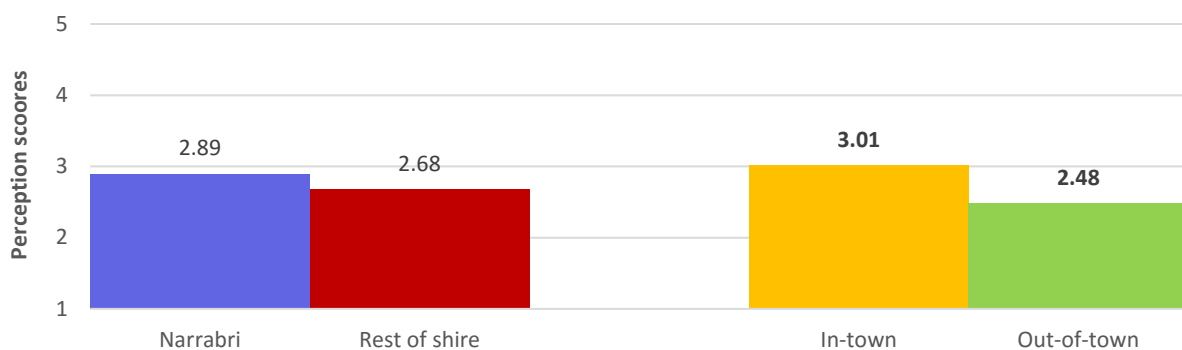
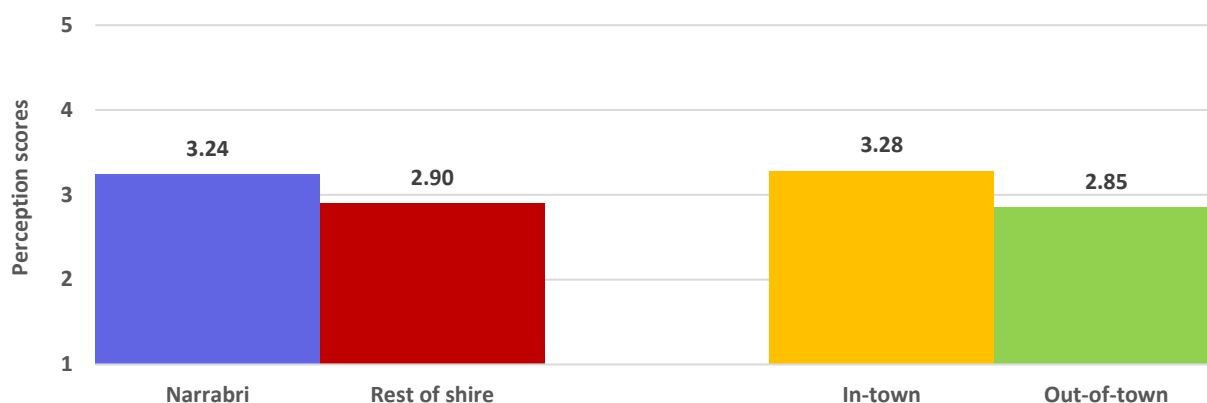


Figure 49 Trust in state governing bodies



Comparisons with the Australian Attitudes toward Mining survey 2016 -17

Items related to trust in CSG companies and trust in state government were compared with very similar items from the Australian Attitudes towards Mining survey, which incorporates CSG extraction into its definition of mining. As shown in Table 7, results of the national survey indicated low levels of trust in both companies and state government in relation to mining. These levels are similar to the results of trust in CSG companies demonstrated in the Narrabri shire. However, trust in state government bodies were higher in the Narrabri survey than the national survey. Note that attitudes reported here from the national survey are only for those communities in mining regions within Australia.

Table 7 Comparison with Australian Attitudes towards Mining survey 2016 - 17: Trust in companies and state government

Item		CSIRO Narrabri Shire survey 2017	Australian Attitudes ¹ Survey 2016-17
Trust the (CSG / Mining) company to act responsibly	Trust in companies	2.86	2.78
Trust the (CSG / Mining) company to act in the (community's / society's) best interests	Trust in companies	2.62	2.58
Trust the (State government bodies / State government) to act responsibly	Trust in state government	3.18	2.60
Trust the (State government bodies / State government) to act in the (community's / society's) best interests	Trust in state government	3.09	2.59

Note: ¹ Attitudes are from 'mining' communities in Australia towards mining where mining includes all extractive industries including unconventional gas

6.6 Governance

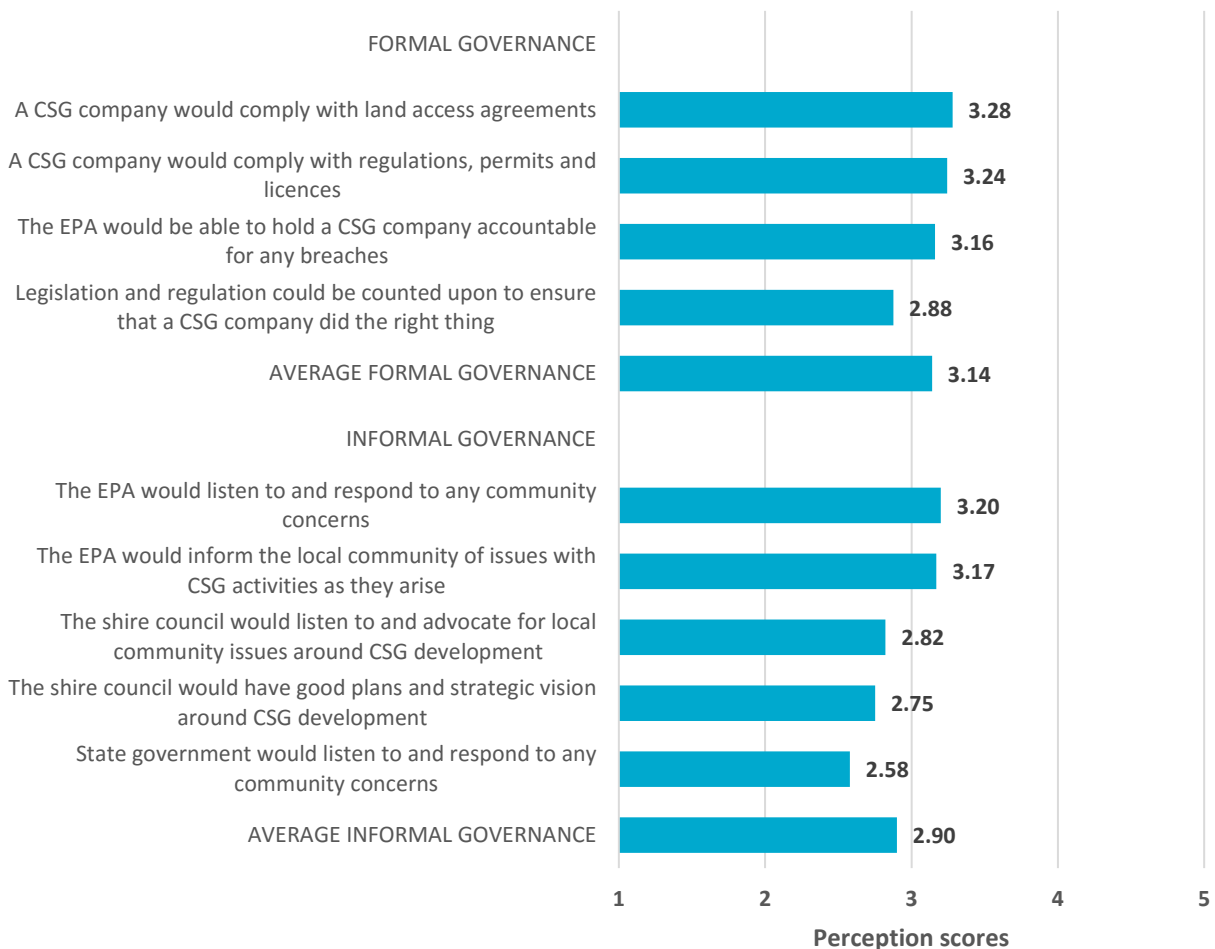
The survey measured two aspects of governance: formal governance and informal governance. Formal governance related to compliance with regulations, permits, licences, and land access agreements. Informal governance referred to local council, state government, and the EPA listening and responding to community concerns. Trust in state governing bodies is also associated with governance.

6.6.1 FORMAL AND INFORMAL GOVERNANCE

Results showed that on average, perceptions of formal governance was favourable ($M = 3.14$), with Figure 50 showing that on average people believed that CSG companies would comply with land access agreements, regulations, permits and licences, and that the EPA would be able to hold CSG companies accountable. However, residents were less positive that legislation and regulation could be counted on to ensure that CSG companies did the right thing.

There were less favourable views of informal governance on average ($M = 2.90$). Figure 50 shows that residents on average believed that the EPA would listen to and respond to community concerns and that they would inform local communities on CSG related issues as they arise. Though, there were less favourable views that the shire council would listen and advocate for local community issues and that they would have good plans and strategic vision around CSG development. In addition, there were low levels of support for the view that the state government would listen to and respond to community concerns.

Figure 50 Community perceptions of formal and informal governance



Note: Scores: 1 = strongly disagree and 5 = strongly agree

Differences among subregions

Results showed statistically significant differences in average perceptions of both formal and informal governance based on sub-regions. As shown in Figure 51 and Figure 52, those residents who live in Narrabri and surrounds held significantly more positive views about formal and informal governance than those who lived in the rest of the shire.

Differences between Out-of-town and In-town

Similarly, there were statistically significant differences in perceptions between those residents who live in town and those who live out of town. As shown in the figures below residents who lived in town held positive views on average towards informal and formal governance; however, those residents who lived out of town held significantly more unfavourable views on average.

Figure 51 Perceptions of formal governance

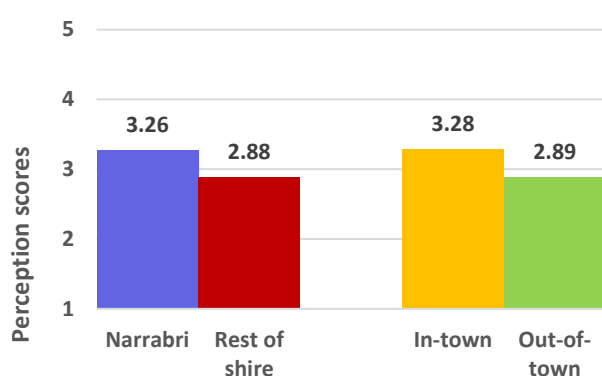
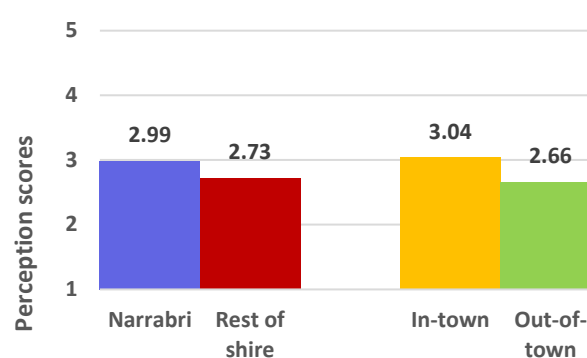


Figure 52 Perceptions of informal governance



Comparisons with the Australian Attitudes toward Mining survey 2016 - 17

Where possible items related to informal and formal governance were compared with very similar items from the Australian Attitudes toward Mining survey, which had incorporated CSG extraction into its definition of mining. As shown in Table 8, three similar items were compared indicating more favourable perceptions of informal and formal governance in the Narrabri shire than for other mining communities within Australia, particularly that the state government (e.g., EPA) could hold industry accountable, which was favourable on average in Narrabri but unfavourable on average for communities in other mining areas. In addition, the comparisons revealed no real difference in beliefs that legislation and regulation could be accounted on to ensure companies did the right thing, with people in both the Narrabri shire and at a national level showing on average low levels of support for this notion.

Table 8 Comparison with Australian Attitudes towards Mining survey 2016: Informal, formal governance

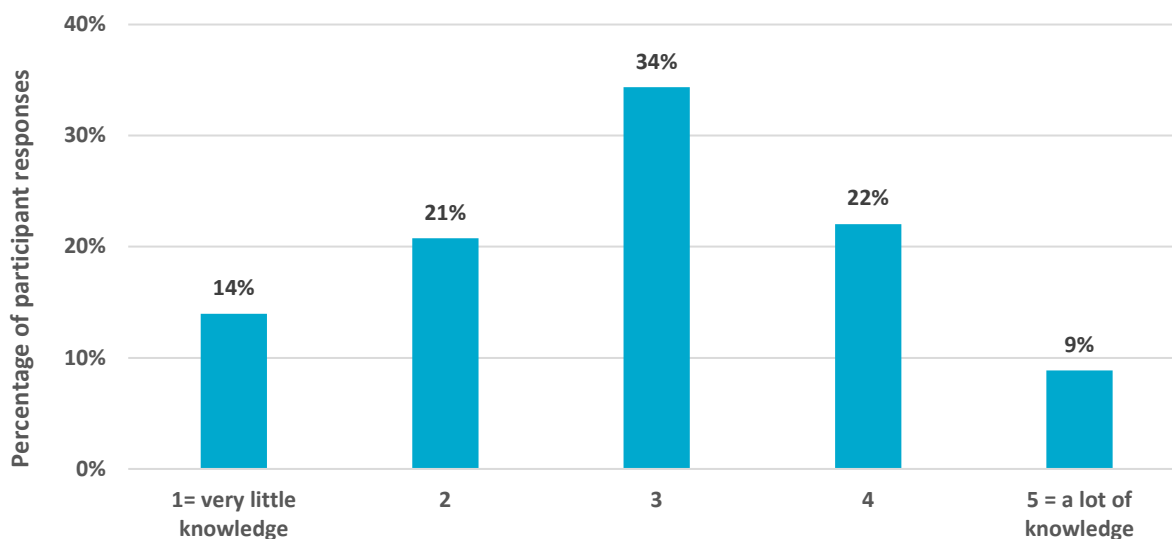
Item		CSIRO Narrabri Shire survey 2017	Australian Attitudes ¹ Survey 2016
State government listens to and (respects / responds to) community concerns	Informal governance	2.58	2.14 ²
Legislation and regulation can be counted on to ensure mining companies do the right thing	Formal governance	2.88	2.84
The state government (EPA) is able to hold the mining industry accountable	Formal governance	3.16	2.74

Note: ¹ Attitudes are from 'mining' communities in Australia and refer to mining where mining includes all extractive industries including unconventional gas; ² this result has been statistically adjusted from its original reporting in a 7-pt scale to reporting here in a 5-pt scale using methods according to Colman et al. (1997).

6.7 Knowledge and information sources

The survey measured participants' self-rated knowledge about the local CSG industry and the information sources they used. As depicted in Figure 53, on average results showed borderline levels of knowledge ($M = 2.91$), with participants indicating they sourced information from two different sources on average.

Figure 53 Self-rated knowledge: Frequency of responses



As shown in Table 9, seeking industry sources of information was most common, though other sources of information were commonly sought. Notable, over a third of residents have not sought any information from these sources about the proposed local CSG development.

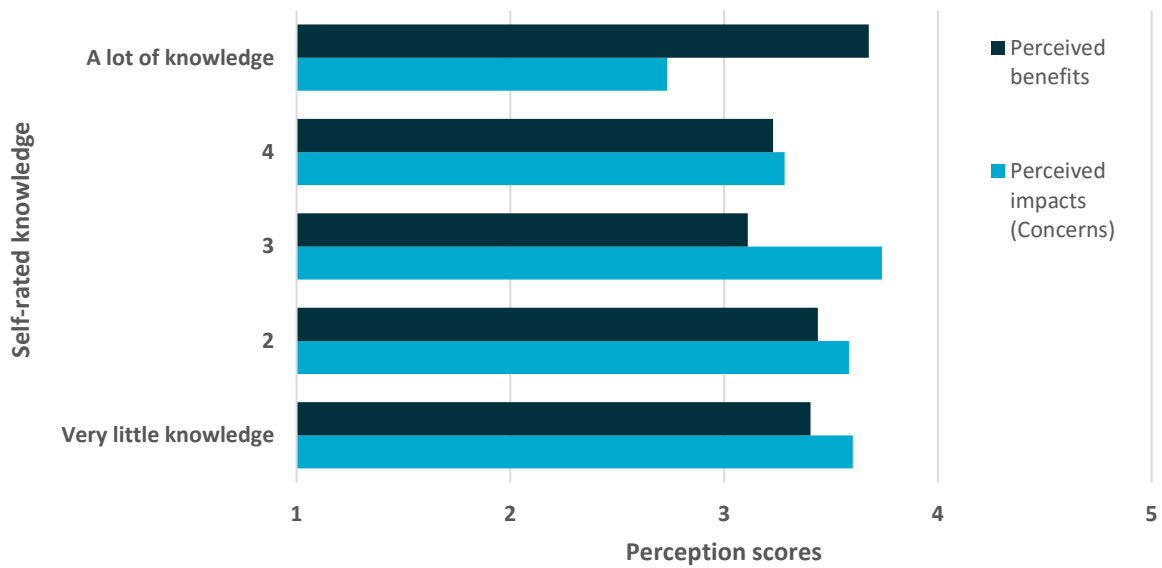
Table 9 Percentage of respondents sourcing different types of information sources

Source of information	Percentage of respondents
Industry sources	42.1%
Pro-CSG groups	34.4%
Anti-CSG groups	34.2%
Research organisations	32.3%
Government sources	31.6%
By going on a site visit of Santos's wells and facilities	26.8%
None of the above	35.8%

Levels of self-rated knowledge and perceptions of impacts and benefits

Analysis of the correlation statistics indicated lower levels of perceived impacts for those with more self-rated knowledge ($p < .05$). As shown in Figure 54, 'a lot of knowledge' was linked to the lowest perceptions of impacts (concerns), while lower levels of knowledge were associated with higher levels of concern. Those with medium levels of knowledge (a score of 3) held significantly higher perceived impacts than benefits ($p < .05$). However, perceptions of overall benefits was not significantly associated with self-rated knowledge.

Figure 54 Associations between levels of knowledge and perceptions of impacts and benefits



Differences among subregions

Results showed significantly higher self-rated knowledge between those residents who live in Narrabri and surrounds ($M = 3.03$) compared to those who live in the rest of the shire ($M = 2.67$). Similarly, people in Narrabri and surrounds sought significantly more sources of information about CSG development ($M = 2.13$) compared to those who live in the rest of the shire ($M = 1.78$). See Figure 55 and Figure 56.

Differences between Out-of-town and In-town

There were also significant differences in perceptions of self-rated knowledge and number of sources of information between residents who live in town ($M = 2.79$ and $M = 1.82$ respectively) and those who live out of town ($M = 3.12$ and $M = 2.37$ respectively). As shown in Figure 55 and Figure 56, people who live in town had lower perceptions of knowledge and had sought fewer information sources than those who live out of town.

Figure 55 Differences in self-rated knowledge

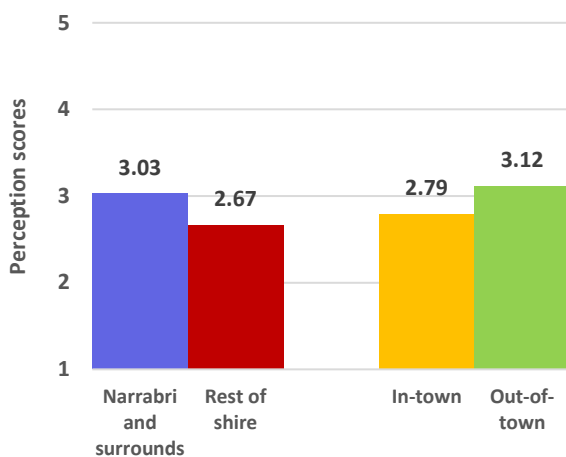
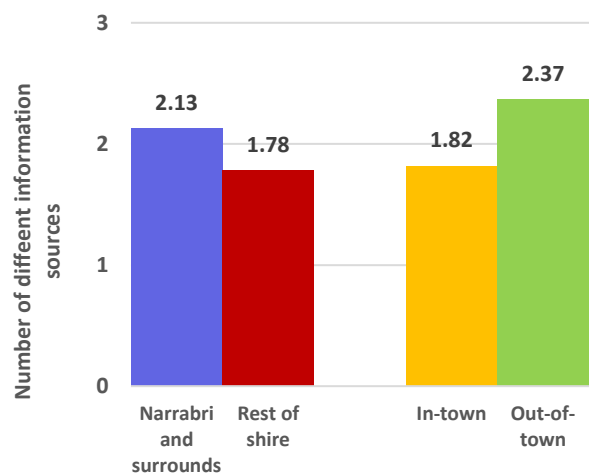


Figure 56 Differences in information sources



6.8 Feelings towards CSG development

Feelings towards CSG development were measured using measures of both positive and negative feelings. Two items measured positive feelings (feeling optimistic and feeling pleased) and two items measured negative feelings (feeling angry and feeling worried). Results showed that on average residents did not have strong feelings towards CSG development. The strongest feeling was a sense of worry, which was borderline ($M = 3.08$). As shown in Figure 57, residents did not indicate they were angry ($M = 2.31$), optimistic ($M = 2.83$), or pleased ($M = 2.72$) on average. However, there was considerable variation and spread in these feelings as reflected in the standard deviations for these items (See Appendix D) and the frequency distribution of responses depicted in Figure 58.

Figure 57 Feelings towards CSG development: Narrabri shire

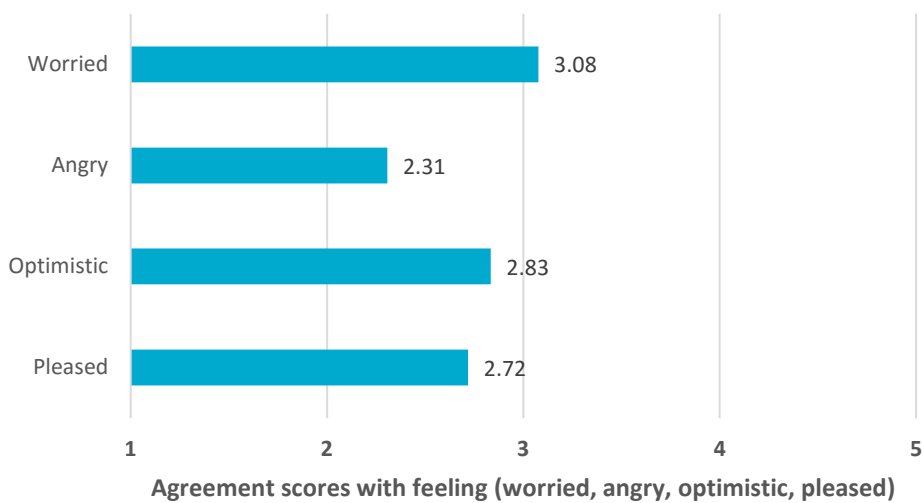
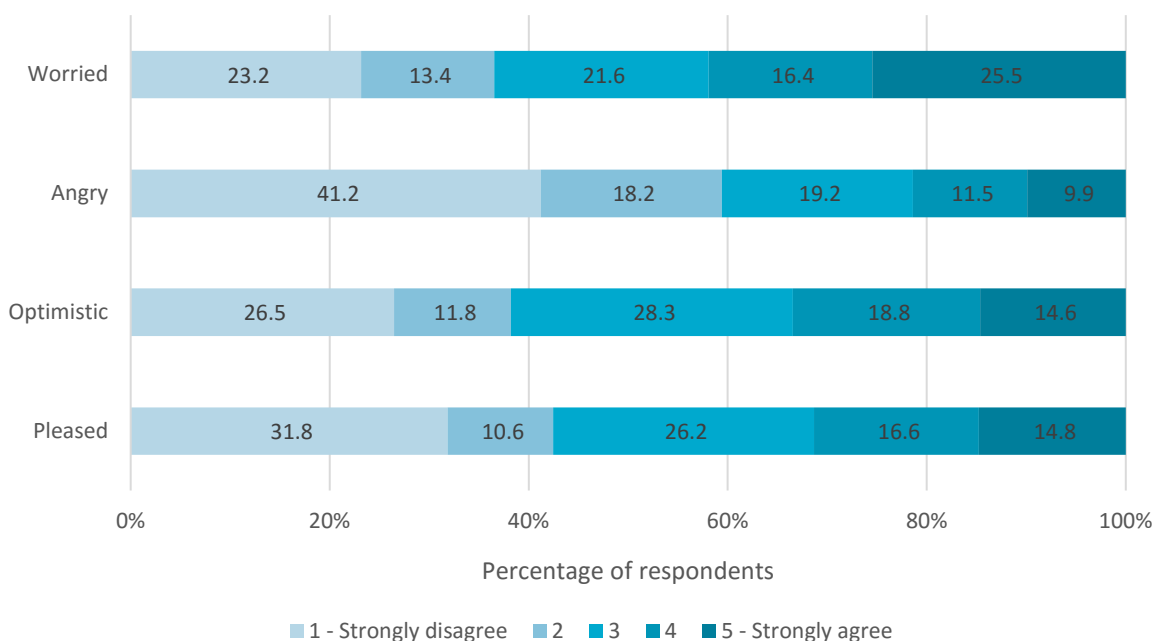


Figure 58 Frequency distribution of responses: Feelings



Differences among subregions

Compared to residents in Narrabri and surrounds, residents in the rest of the shire felt significantly less positive toward CSG development. Those in and around Narrabri felt significantly more pleased and less angry and worried than residents in the rest of the shire. See Table 10.

Differences between Out-of-town and In-town

Table 10 also shows that those living out-of-town were significantly less pleased or optimistic than those living in town. However, they were not significantly more angry or worried than those in-town.

Table 10 Feelings toward CSG development: Differences between subregions and difference between out-of-town and in-town

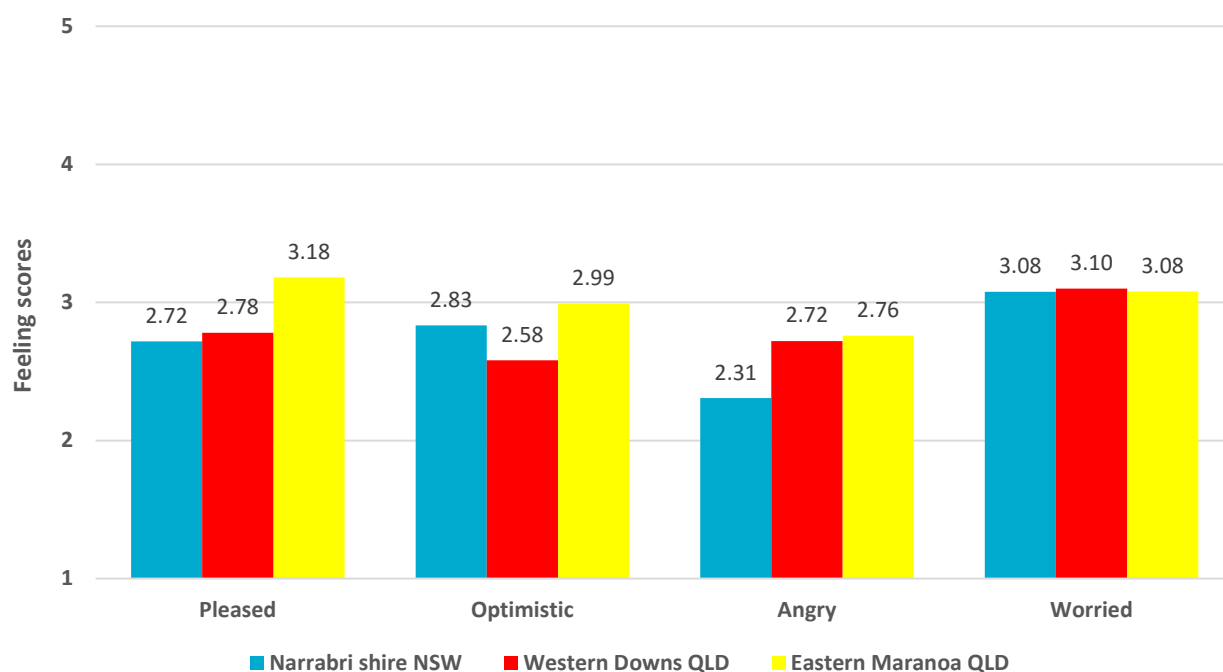
Feelings	Subregion		Out-of-town and In-town	
	Narrabri	Rest of shire	Out-of-town	In-town
Worried	2.96	3.33	3.29	2.96
Angry	2.18	2.57	2.43	2.24
Optimistic	2.93	2.64	2.58	2.98
Pleased	2.87	2.40	2.46	2.87

Note: bold font indicates significant differences in scores.

Comparison with Queensland gas fields

When compared to previous 2016 results for gas fields in Queensland, the feelings in the Narrabri shire are similar to Queensland. As shown in Figure 59, feelings of worry was highest but still on average midline across the three locations, reflecting that there were as many people not worried as worried in each location. Narrabri showed similar results for feeling pleased and optimistic as Queensland regions, but lower levels for feeling angry.

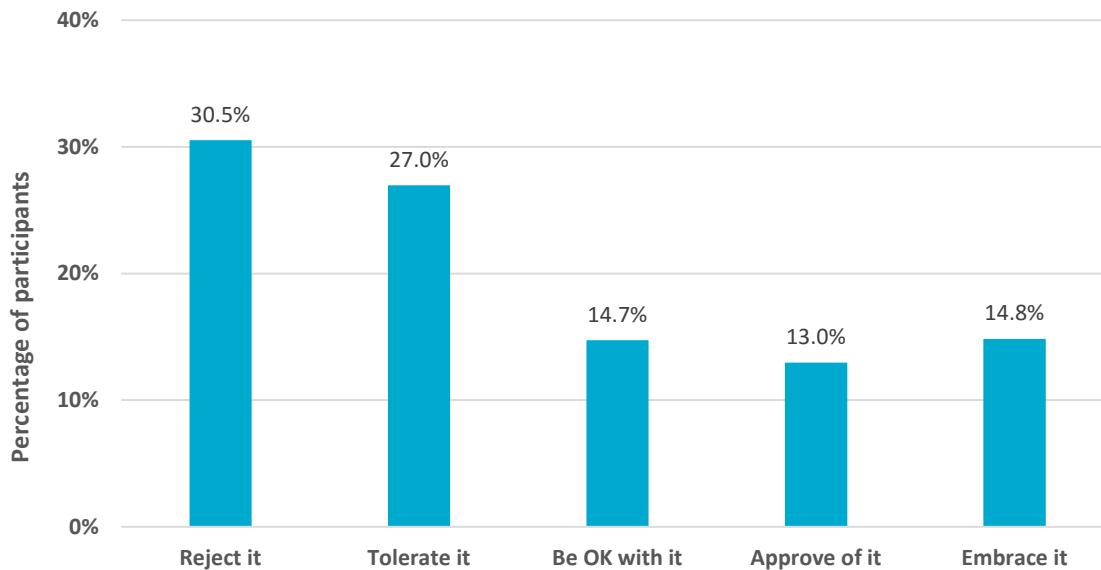
Figure 59 Feelings towards CSG development: Comparisons with Queensland



6.9 Attitudes towards CSG development

Results showed that across the shire, there were a range of views towards CSG development ranging from reject through to embrace. At one end of the spectrum 30% of residents indicated they reject CSG development in the Narrabri shire and at the other end of the spectrum 15% of residents indicated they 'embrace' it. However, the remaining respondents (55%) indicated they would either tolerate (27%), are ok with it (15%), or approve (13%) CSG development in the shire. See Figure 60.

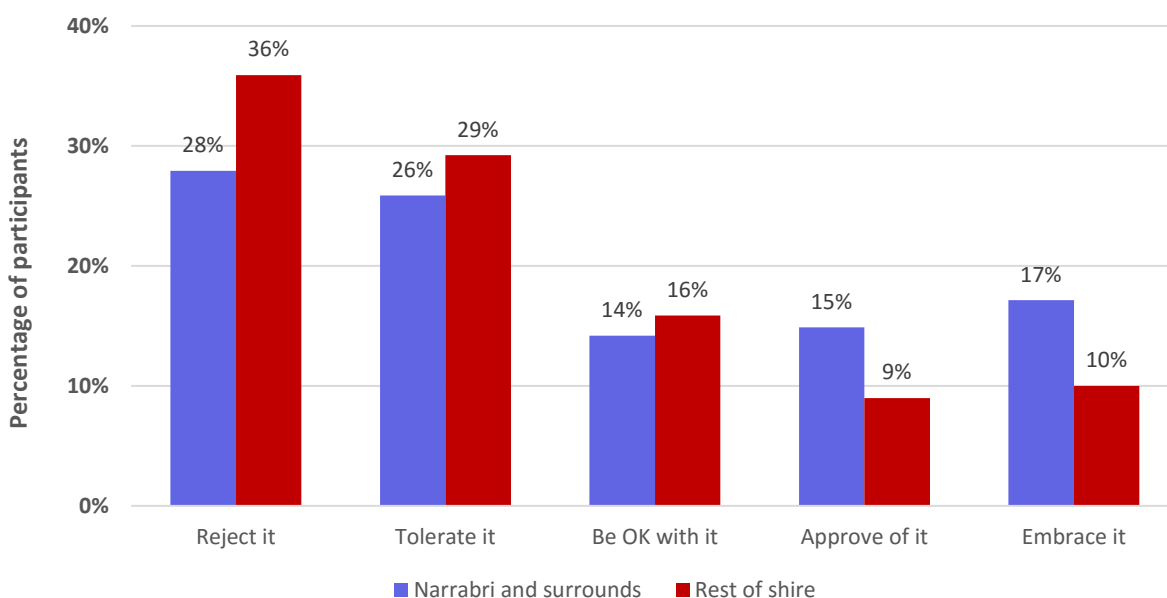
Figure 60 Attitudes towards CSG development in the Narrabri shire: 2017



Differences among subregions

Results showed differences in attitudes towards CSG development based on subregions. As depicted in Figure 61, a greater proportion of those residents who live in Narrabri town and surrounds held significantly more positive views towards CSG development than those who live in the rest of the shire.

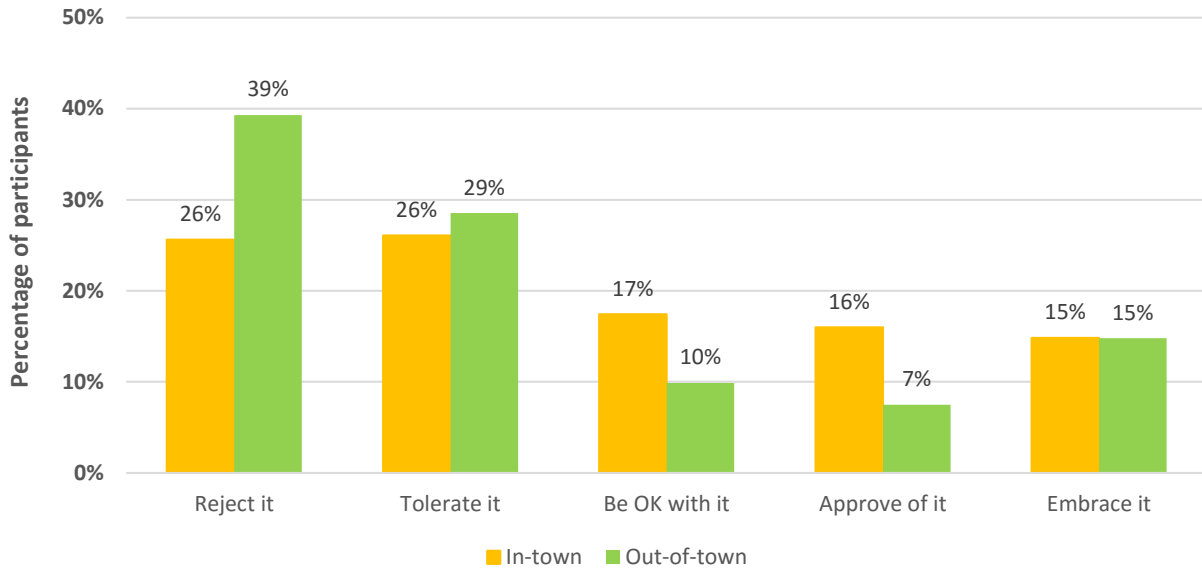
Figure 61 Attitudes towards CSG development: Subregions



Differences between In-town and Out-of-town

There were also differences in attitudes towards CSG development based on living in or out of town, as shown in Figure 62. Residents who lived out of town held significantly more negative views towards CSG development than those who lived in town.

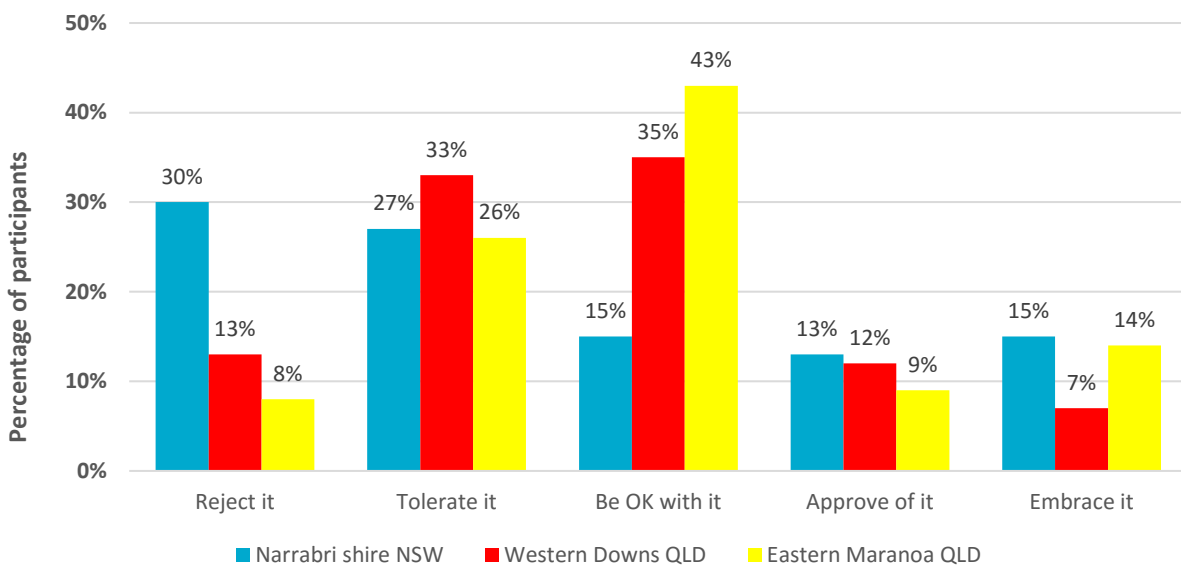
Figure 62 Attitudes towards CSG development: In-town and Out-of-town



Comparison with Queensland gasfields

When results from the Narrabri shire are compared with two gasfield regions in Queensland, it demonstrates that the proportion of residents who are accepting of gas to some extent (tolerate through to embrace), as opposed to outright rejection, is much greater in Queensland. In 2016, residents of the Eastern Maranoa, which includes Roma and surrounds indicated the highest proportion of some acceptance for CSG (92%) followed by the Western Downs region (87%). Whereas, in 2017 in the Narrabri shire this drops to (70%). Figure 63 shows the biggest difference is the proportion of residents indicating they reject the notion of CSG development (30%) compared to Western Downs and Eastern Maranoa (13% and 8% respectively).

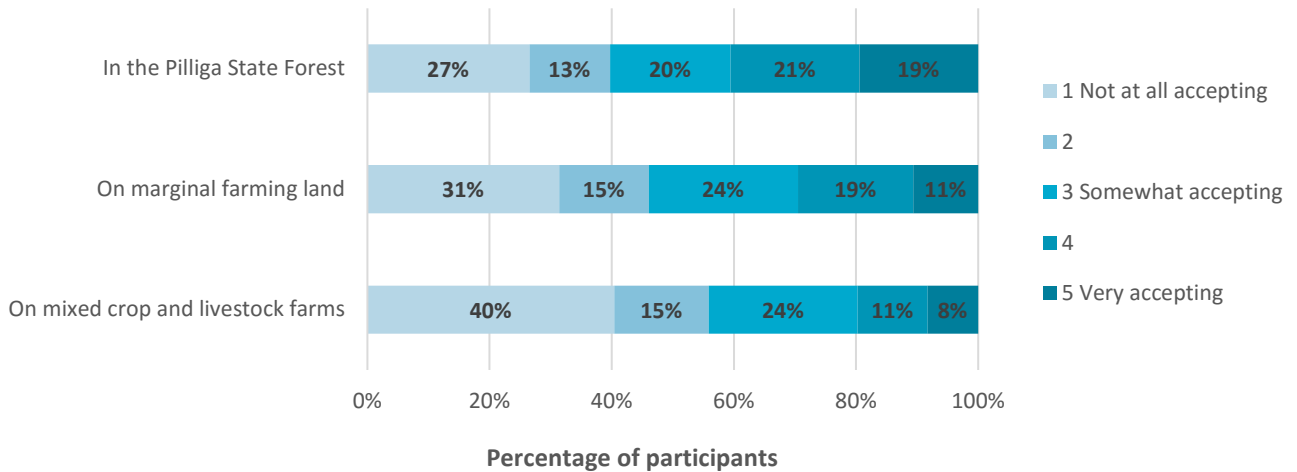
Figure 63 Attitudes towards CSG development: Narrabri and Queensland



Attitudes towards CSG development and different land uses

The survey also measured attitudes towards CSG development based on different types of land use within the Narrabri shire. As shown Figure 64, results indicated greater proportions of support, including somewhat accepting, for CSG development in the Pilliga state forest (60%) than on marginal cropping land (54%) and on mixed crop and livestock land (43%). Residents were not accepting of CSG development on the latter.

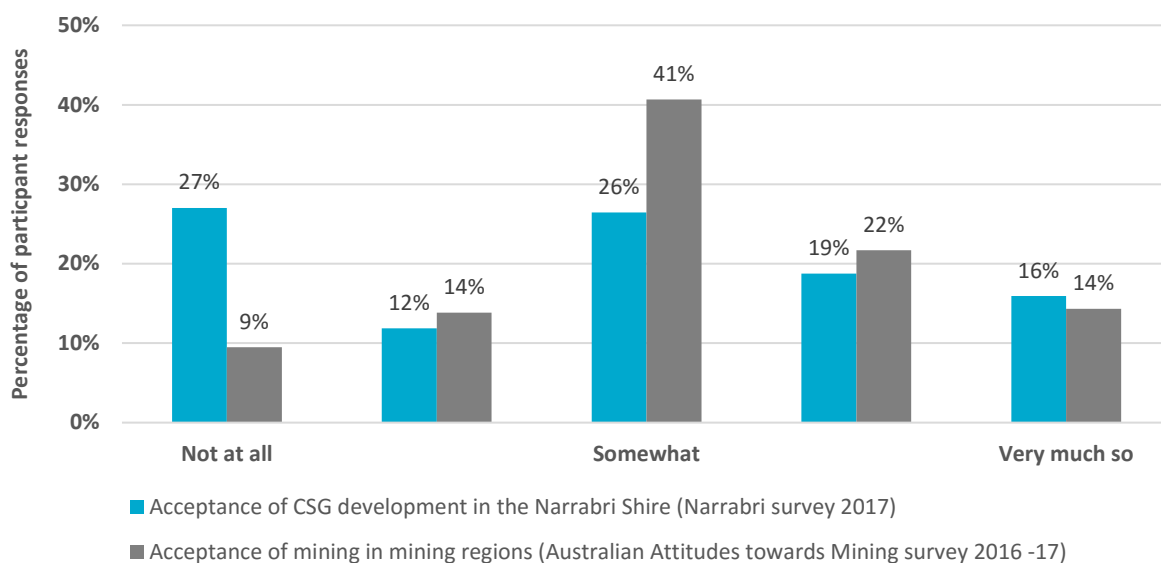
Figure 64 Attitudes towards CSG development based on different types of land use



Comparisons with the Australian Attitudes towards Mining survey 2016 -17

One item similarly related to acceptance was able to be compared from the Narrabri survey with the Australian Attitudes towards Mining survey. As shown in Figure 65, a much higher percentage of participants from the Narrabri survey indicated 'not at all' in their support for CSG development in the Narrabri shire compared to those who indicated 'not at all' in their support for mining in mining regions within Australia.

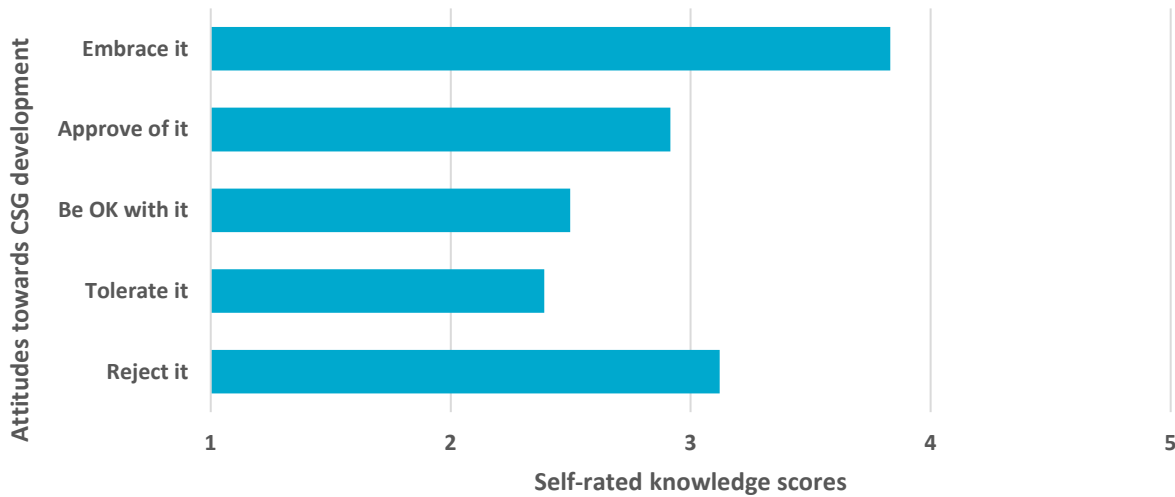
Figure 65 Comparison with Australian Attitudes towards Mining survey 2016-17: Acceptance



Attitudes and knowledge

Analysis of attitudes towards CSG development and self-rated knowledge scores showed that residents with 'reject' and 'embrace' attitudes demonstrated the highest levels of self-rated knowledge about the local CSG industry. Whereas residents who indicated more lukewarm attitudes towards CSG development demonstrated lower scores on self-rated knowledge about the local CSG development. See Figure 66.

Figure 66 Association between attitudes towards CSG development and self-rated knowledge levels

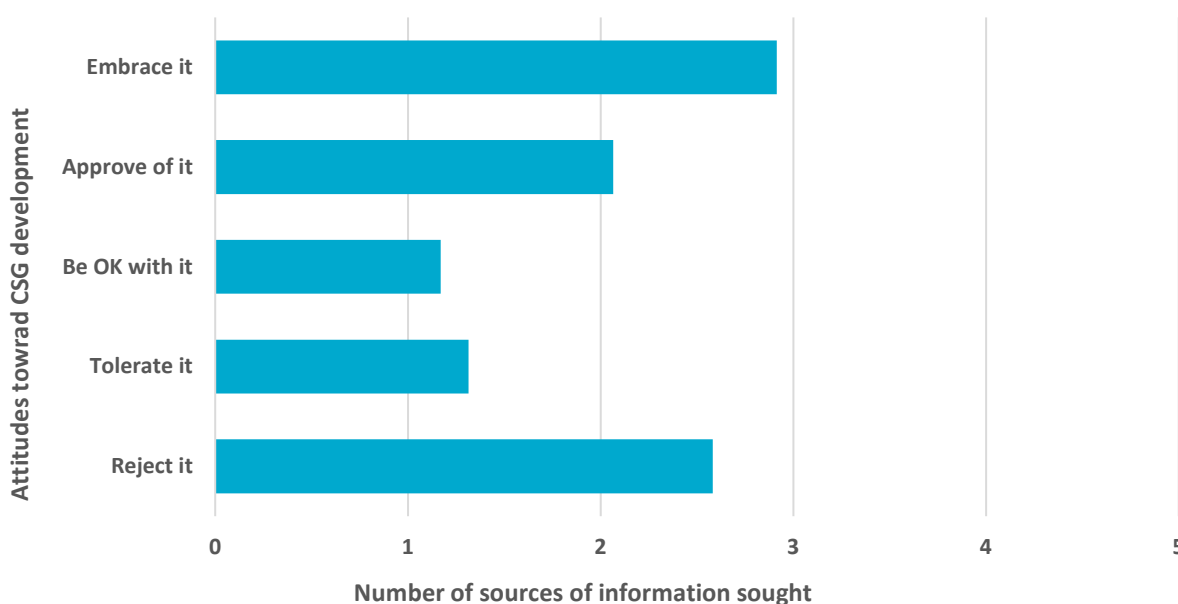


Note: Scores: 1 = very little knowledge and 5 = a lot of knowledge

Attitudes and sources of information

Similarly, analysis of attitudes towards CSG development and seeking different sources of information showed a similar trend. As shown in Figure 67, residents who indicated 'embrace' and 'reject' attitudes showed they sought information from more sources; however, residents who indicated they 'tolerate' or are 'ok with it' sought information from fewer sources.

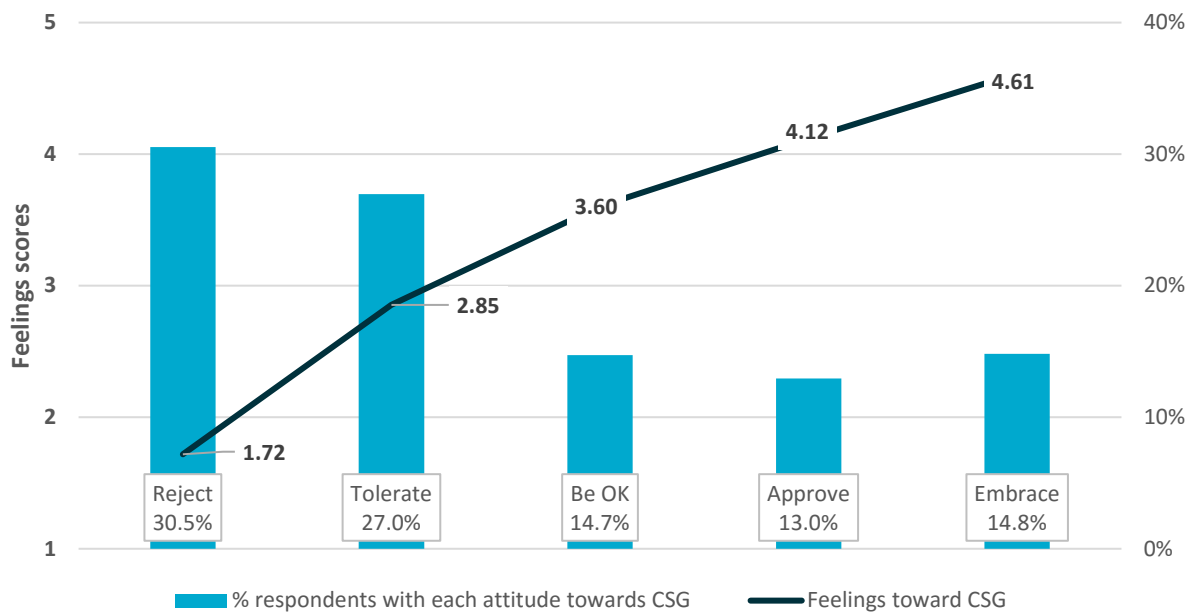
Figure 67 Association between attitudes towards CSG development and number of information sources



Attitudes and Feelings

Analysis of attitudes with feelings scores showed that feelings scores increased or decreased correspondingly with changes in attitude. As shown in Figure 68, more positive feelings about gas were associated with increasing levels of acceptance towards CSG development, and more negative feelings associated with lower levels of acceptance. At either ends of the range of attitudes there are very negative feelings towards gas on average (Reject: $M = 1.72$) and very positive feelings towards gas on average (Embrace: $M = 4.61$) with the middle range of attitudes also reflecting a range of feelings in between (Tolerate: $M = 2.85$; OK with it: $M = 3.60$; Approve: $M = 4.12$). The largest group (reject) have very negative feelings, though approve and embrace are both very positive and nearly as big combined.

Figure 68 Attitudes towards CSG development and average feelings scores



7 Explaining trust and social acceptance of the CSG sector

7.1 Underlying drivers of social acceptance

Measures of eight key attitudes and perceptions were used to statistically model the important drivers of trust and social acceptance in the CSG sector. As summarised in Table 11, these underlying drivers included: *perceived impacts*, *perceived benefits*, *procedural fairness*, *distributional fairness*, *quality of relationships* with CSG companies, *governance*, *trust* in CSG companies, and confidence in *knowledge* about CSG.

Table 11 Seven key drivers of social acceptance

Drivers	Description	Narrabri shire	Subregions		Location	
			Narrabri and surrounds	Rest of shire	In town	Out of town
1. Perceived impacts:	Level of concerns about 13 different potential impacts and four possible future issues	3.50	3.40	3.70	3.43	3.62
Potential impacts	E.g. impacts on water, property values, health, community	3.41	3.40	3.70	3.36	3.50
Future issues	E.g. change in CSG operator, fracking introduced, CSG well integrity	3.75	3.68	3.90	3.64	3.95
2. Perceived benefits	Perceptions of possible local benefits and benefits to wider society	3.30	3.34	3.20	3.43	3.06
Local benefits	E.g., employment, business opportunities, retaining youth	3.39	3.43	3.27	3.53	3.14
Societal benefits	E.g., energy supply for NSW, transition fuel, Australian economy	3.16	3.19	3.10	3.28	2.94
3. Procedural fairness	Perceptions of the way CSG companies would involve communities in decisions	2.68	2.75	2.55	2.81	2.45
4. Distributional fairness	Perceptions of fairness in the bearing of costs and sharing of benefits for communities	2.87	2.95	2.73	2.99	2.66
5. Quality of relationships	Responsiveness of CSG companies and preparedness to engage in open, honest, genuine two-way dialogue	2.76	2.86	2.55	2.92	2.46
6. Trust in CSG companies	E.g., trusting CSG companies' competence, to act responsibly, and in community's best interests	2.82	2.89	2.68	3.01	2.48
7. Governance	Perceptions of both formal and informal governance and trust in state governing bodies	3.04	3.14	2.82	3.18	2.78
Formal governance	E.g., perceptions of CSG company compliance, EPA ability to hold CSG companies accountable,	3.14	3.26	2.88	3.28	2.89
Informal governance	E.g., Shire council, state gov't, EPA listening and responding to concerns; planning and visioning; keeping communities informed	2.90	2.99	2.73	3.04	2.66
Trust in State governing bodies	E.g., trusting EPA and State competence, to act responsibly and in community's best interests	3.13	3.24	2.90	3.28	2.85
8. Knowledge confidence	Self-rated level of knowledge about the local coal seam gas industry	2.91	3.03	2.67	2.79	3.12

Note: Bold font indicates significant differences between subregions or locations; scores range from 1-5 where 1 is the least and 5 is the most

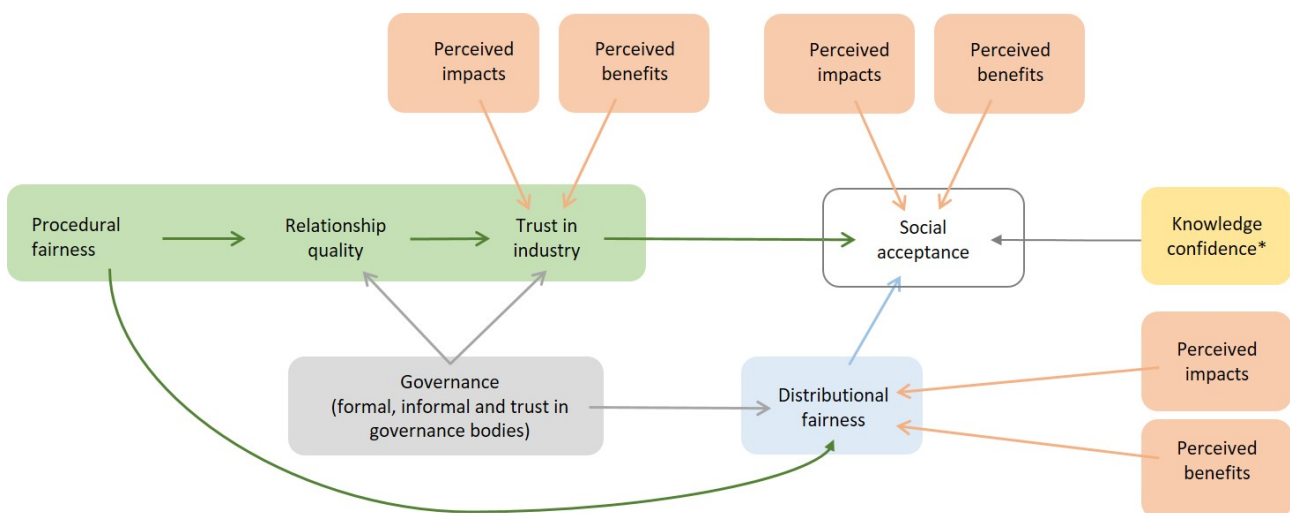
7.2 A model of trust and social acceptance in the CSG sector

A path analysis modelled the eight key drivers of acceptance to explain different levels of social acceptance and trust of the CSG sector. As depicted in Figure 69, results showed that social acceptance was determined by five main factors, which acted directly on acceptance. These *direct* drivers were *perceived impacts* and *perceived benefits*, *trust in industry*, perceptions of *distributional fairness* and *confidence in knowledge about CSG*.

Trust in industry was determined by the *quality of the relationship* with industry and perceptions of *procedural fairness* in how communities were treated by CSG companies. Importantly *governance* underpinned trust in industry, relationship quality, and perception of distributional fairness. In addition, perceived impacts and benefits also influenced trust perceptions.

The relationships between all these factors were positive except for perceived impacts, which demonstrated negative relationships. A positive relationship means that when a person perceives one variable to be high they are more likely to perceive the corresponding variable to also be high. For example, when a person has higher perceptions of trust in industry then they also demonstrate higher levels of acceptance. The exception to this positive relationship was perceived impacts, which has a negative relationship with other factors. This means, when a person perceives impacts from CSG to be higher they are more likely to demonstrate lower levels of acceptance, lower perceptions of distributional fairness, and lower levels of trust in industry. In contrast to these linear relationships, knowledge confidence acts on acceptance in a different way. When a person feels very confident in their level of knowledge about CSG, then they are more likely to have stronger views, which could be either for or against CSG development. In contrast when people have low confidence in their knowledge then they are less likely to have strong view or more likely to have lukewarm views about CSG development. Figure 69 shows the main pathways for drivers of trust and social acceptance. This model was highly predictive, although other relationships are also possible, and a separate scientific paper is being written by the authors detailing this model.

Figure 69 Model of social acceptance and trust



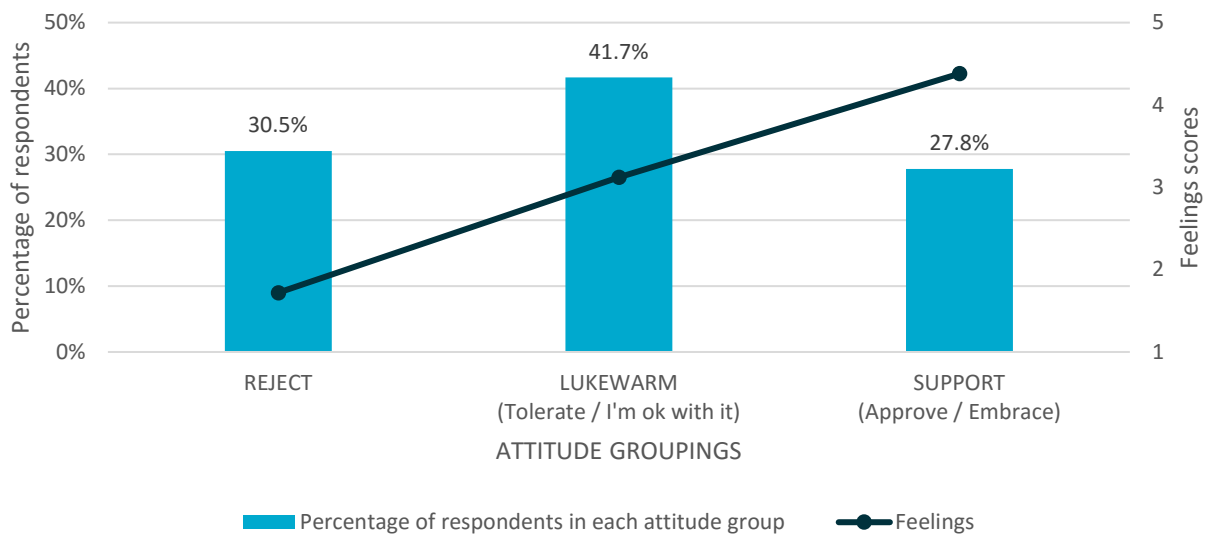
Note: * this path was curvilinear.

Other variables act indirectly on social acceptance. These indirect drivers were procedural fairness, relationship quality and governance, which underpinned distributional fairness and trust in the CSG industry. Perceptions of distributional fairness also depended on perceptions of impacts and benefits and procedural fairness. Perceived impact and benefits had both direct and indirect effects on social acceptance and were the most important predictors in the model.

7.3 Depicting acceptance of gas by the underlying drivers

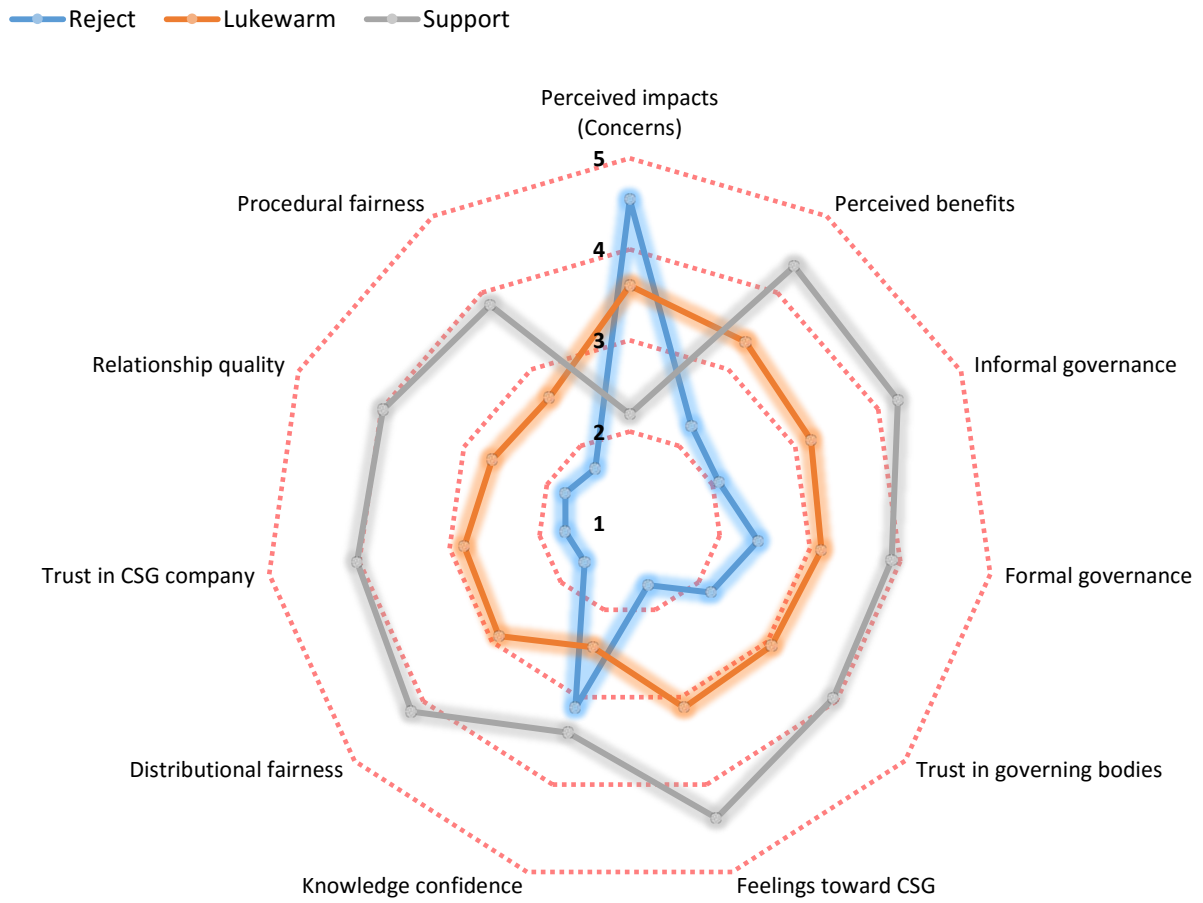
By grouping the different attitudes towards gas into three groups (reject, lukewarm, and support) we were able to demonstrate how the underlying drivers differ among residents who felt negative, positive and more neutral toward CSG development on average. 'Reject' were those rejecting CSG development in the shire, 'lukewarm' included those residents who would 'tolerate it' or 'be OK with it', and 'support' included those who would 'accept it' or 'embrace it'. We chose these groupings based on their average feelings toward CSG development. As shown in Figure 70, the average feelings and percentage of residents in each group were: reject ($M = 1.72$ out of 5 and 30.5% respectively); lukewarm ($M = 3.12$ and 41.7%, respectively) and support ($M = 4.38$ and 27.8%, respectively).

Figure 70 Three attitude groupings: Attitudes toward CSG development and feelings scores



As shown in Figure 71, those rejecting CSG development had very high concerns with CSG ($M = 4.55$ out of 5). They also rated most other drivers of trust in the industry and social acceptance of the CSG development very lowly (often less than 2 out of 5). The opposite was mostly true of those who supported CSG development. Their concerns with CSG development were low on average ($M = 2.19$ out of 5) and the other drivers were all perceived positively (all over 3 out of 5, where 3 is the scale midpoint). Interestingly, both those rejecting and supporting CSG development were moderately confident in their level of knowledge about the local CSG industry. The lukewarm group were less confident in their level of knowledge and had more neutral attitudes toward other drivers of trust and social acceptance, though they were still concerned about potential impacts and future issues associated with CSG development in the shire.

Figure 71 Underlying drivers of trust and acceptance of CSG development by three attitude groupings



Note: The higher the perception score the more favourable the perception except for *perceived impacts* where the higher the score the greater the level of concern; a score of 3 represents the midline

8 Demographic differences

A range of demographic characteristics were analysed to determine differences in perceptions of community wellbeing, resilient responses, and expected future community wellbeing. In addition analyses were undertaken to identify differences in attitudes and perceptions of CSG and the sector based on demographics. The demographic characteristics analysed included the following:

- Subregions (Narrabri and surrounds / rest of shire)
- Subregion towns (Narrabri and surrounds / Boggabri and surrounds / Wee Waa and surrounds)
- Location (In-town / Out-of-town)
- Gender (Male / Female)
- Income level
- Indigenous identification (Yes / No)
- Farm ownership

Many of these differences have been reported throughout the body of the report with each section reporting on differences in subregions and living in-town and out of town. All demographic differences listed above are reported in Tables in Appendix H with significant differences identified.

In addition, comparisons between residents in the Narrabri Shire with residents in two regions of the Queensland gasfields, Western Downs and Eastern Maranoa, are included in Appendix H. The Western Downs region includes the towns and surrounds of Dalby, Chinchilla, Tara, and Miles / Wandoan, which are areas that have experienced CSG development since approximately 2010. The Eastern Maranoa is a subsample of the Maranoa region and includes the town and surrounds of Roma, which has experienced gas extraction for many years.

A brief summary of differences is outlined below

Subregions

There were two significant differences in community wellbeing dimensions based on geographic location. Residents of Narrabri and surrounds were significantly less satisfied with their town's appearance than both Boggabri and Wee Waa subregions. In addition, residents of Boggabri and surrounds reported significantly less satisfaction with environmental quality than residents from Narrabri and surrounds.

However there were a number of differences in perceptions and attitudes towards CSG development based on subregions. Residents of the town and surrounds of Wee Waa were significantly less positive compared to Narrabri and surrounds in their perceptions of informal and formal governance, relationship quality with CSG companies, and trust in government and CSG companies. Residents of Boggabri and surrounds were significantly less positive in their attitudes and feelings towards CSG than Narrabri and surrounds. Both Wee Waa and Boggabri were also less confident about the knowledge of the local CSG industry. See Table 23 and Table 24.

Living In town and Out of town

People living out of town had significantly more favourable evaluations of personal safety and environmental quality. However, in relation to CSG development they had significantly lower perceptions of the shire's ability to adapt well to possible changes associated with CSG (community resilience). In addition people living out of town were significantly more negative in their perceptions of possible benefits, procedural fairness, quality of relationships with CSG companies, perceptions of informal and formal governance, trust in governing bodies, trust in CSG companies, and overall attitude and feelings towards CSG development. See Table 25. Though perceptions of all impacts were not significantly different there were differences in concerns about future issues (a subset of all impacts). People who lived out of town were significantly more concerned about future issues such as a change in the CSG operator, the

integrity of CSG wells over time, and the potential introduction of fracking than those residents who lived in town. People out-of-town also had more confidence in their knowledge about the local CSG industry.

Gender

Women reported significantly lower perceptions of personal safety, environmental quality, and economic opportunities dimensions of community wellbeing. Men indicated significantly lower perceptions of roads and were less satisfied with their community participation and social interaction than women. Attitudes and perceptions towards CSG also differed based on gender. Women reported significantly higher levels of concern about possible CSG impacts and more negative attitudes and feelings towards CSG development, though were less confident of their knowledge about the CSG industry than men. See Table 26.

Income

Some community wellbeing dimensions varied by household income. Those on higher household incomes (\$80,000 or more per year) were significantly less satisfied with services and facilities, town appearance, citizen voice, and place attachment than residents on lower incomes (less than \$40,000). However, they were significantly more satisfied with their income sufficiency. Regarding personal safety, those on household incomes between \$40,000 and 80,000 felt safest, significantly more so than those in lower income households.

By contrast, household income was not related to differences in perceptions and attitudes towards CSG development in the shire except for trust in governing bodies and confidence in their knowledge of the local CSG industry. Those with higher household incomes of \$80,000 or more had significantly more trust than those with lower household incomes of less than \$40,000 and significantly more confidence in their knowledge. See Table 27.

Indigenous identification

There were no significant differences between indigenous and non-indigenous people other than perceptions of the condition, safety and amount of traffic on the roads. Indigenous people reported lower levels of satisfaction with the roads in the shire. See Table 28.

Owning a farm or not

Community wellbeing for those owning a farm was similar to those not owning a farm, except that those owning farms had significantly higher perceptions of personal safety. However, farm owners had significantly lower perceptions of community resilience to a CSG development. They also had significantly more negative attitudes and perceptions of the CSG sector for perceived benefits, fairness, relationship quality, governance, trust, and overall attitudes and feelings, and they were confident in their knowledge about the local CSG industry. Farm owners also had high average concerns about potential impacts and future issues associated with CSG development, though not significantly higher than those not owning farms. See Table 29.

Comparison with Queensland Gas fields.

There were a number of significant differences between the Narrabri Shire, the Western Downs region of Queensland, and the Eastern Maranoa region (Roma and surrounds) of Queensland. Residents of Narrabri and surrounds reported significantly higher perceptions of personal safety, income sufficiency, health, town appearance, roads, environmental management, economic opportunities, community cohesion, local trust, community participation, community spirit, , social interaction, overall community wellbeing, and place attachment compared to the Western Downs but similar to the Eastern Maranoa. On three aspects they indicated significantly lower perceptions than Eastern Maranoa – level of services and facilities, local decision making and citizen voice processes, and community resilience actions (the ability to respond well to changes from possible CSG development). On these aspects the Narrabri shire was similar to the Western Downs region with both regions significantly lower than the Eastern Maranoa. See Table 30.

Next Steps – feeding back results

In the next research phase of this project we will feedback our results to community, industry and government stakeholders. We will also seek feedback from these stakeholders to support the interpretations of our results for the final report. Finally, we will aim to identify with these stakeholders possible collaborative actions that could help develop and support community wellbeing.

References

- ABS (2011). Australian Bureau of Statistics. *Community Profiles* from <http://www.abs.gov.au/census>
- ABS (2016). Australian Bureau of Statistics. *Community Profiles* from <http://www.abs.gov.au/census>
- Brown, K., & Westaway, E. (2011). Agency, capacity, and resilience to environmental change: lessons from human development, well-being, and disasters. *Annual review of environment and resources*, 36.
- Christakopoulou, S., Dawson, J., & Gari, A. (2001). The community well-being questionnaire: Theoretical context and initial assessment of its reliability and validity. *Social Indicators Research*, 56(3), 319-349.
- Forjaz, M. J., Prieto-Flores, M. E., Ayala, A., Rodriguez-Blazquez, C., Fernandez-Mayoralas, G., Rojo-Perez, F., & Martinez-Martin, P. (2011). Measurement properties of the Community Wellbeing Index in older adults. *Quality of Life Research*, 20(5), 733-743.
- Gunningham, N., Kagan, R. A., & Thornton, D. (2004). Social license and environmental protection: why businesses go beyond compliance. *Law & Social Inquiry*, 29(2), 307-341.
- Leonard, R., McCrea, R., & Walton, A. (2016). Perceptions of community responses to the unconventional gas industry: The importance of community agency. *Journal of Rural Studies*, 48, 11-21.
- McCrea, R., Walton, A., & Leonard, R. (2014). A conceptual framework for investigating community wellbeing and resilience. *Rural Society*, 23(3), 270-282. doi: 10.1080/10371656.2014.11082070
- McCrea, R., Walton, A., & Leonard, R. (2016). Developing a model of community wellbeing and resilience in response to change. *Social Indicators Research*, 29(1), 195-214. doi: DOI 10.1007/s11205-015-1099-y
- Measham, T. G., & Fleming, D. A. (2014). Impacts of unconventional gas development on rural community decline. *Journal of Rural Studies*, 36, 376-385.
- Moffat, K., & Zhang, A. (2014). The paths to social licence to operate: An integrative model explaining community acceptance of mining. *Resources Policy*, 39, 61-70.
- Moffat, K., Zhang, A., & Boughen, N. (2014). *Australian attitudes toward mining: Citizen survey - 2014 results*. Brisbane: CSIRO Retrieved from <http://www.csiro.au/en/Research/MRF/Areas/Community-and-environment/Resources-in-the-community/Attitudes-to-mining-survey>.
- Morton, A., & Edwards, L. (2013). *Community Wellbeing Indicators: Measures for Local Government*. Sydney: Australian Centre of Excellence for Local Government, University of Technology, Sydney.
- Narrabri Shire Council (2017). *Our Community Strategic Plan*. Narrabri Shire Community Strategic Plan 2017 – 2027. Accessed Narrabri Shire Council website: <http://www.narrabri.nsw.gov.au/files/uploaded/file/Planning%20and%20Development/Strategic%20Documents/Community%20Strategic%20Plan%202027.pdf>
- NSW government (2017). *Narrabri Gas Project*. NSW Department Planning and Environment website: http://majorprojects.planning.nsw.gov.au/page/development-categories/mining--petroleum---extractive-industries/petroleum/?action=view_job&job_id=6456
- Onyx, J., & Leonard, R. (2010). The conversion of social capital into community development: an intervention in Australia's outback. *International journal of urban and regional research*, 34(2), 381-397.
- Sirgy, M. J., Widgery, R. N., Lee, D. J., & Grace, B. Y. (2010). Developing a measure of community well-being based on perceptions of impact in various life domains. *Social Indicators Research*, 96(2), 295-311.
- Walton, A., McCrea, R., Leonard, R., & Williams, R. (2013). Resilience in a changing community landscape of coal seam gas: Chinchilla in southern Queensland. *Journal of Economic and Social Policy - Special Edition: The Economic and Social Policy Implications of Coal Seam Gas Mining (CSG) in Australia*, 15(3), 1-23.
- Walton, A., McCrea, R., Taylor, B., & Jeanneret, T. (2017). *Understanding local community expectations and perceptions of the CSG sector. Social baseline assessment: Narrabri project*. CSIRO report. Australia: CSIRO.
- Williams, R., & Walton, A. (2014). *Community Expectations and Coal Seam Gas Development: A report to the Gas Industry Social and Environmental Research Alliance (GISERA)*. Australia: CSIRO Retrieved GISERA website: <https://gisera.org.au/wp-content/uploads/2016/04/socioeco-proj-5-community-expectations.pdf>

Appendix A: Scenario used in the survey

“Moving on to community attitudes around coal seam gas, imagine that the NSW Government approves CSG development for up to 850 wells in the Narrabri Shire. In this scenario the CSG company does not plan to hydraulically fracture these wells and most wells will occur in the Pilliga State Forest. Also imagine that the remaining wells will be located on about 40 private farms over the 20 or so years of the project, and that these farms are mixed grazing and cropping farms rather than irrigated cotton farms or strategic agricultural land.

With this scenario in mind, please answer the following questions ...”

Appendix B: Sample profile

Table 12 Sample profile: Education status

Education	Number	Percent
Less than Year 12 (or senior high school)	141	35.25 %
Completed Year 12 (or senior high school)	64	16.00 %
Certificate, diploma, or trade qualification	124	31.00 %
Bachelor degree or higher	71	17.75 %
TOTAL	400	100 %

Table 13 Sample profile: Household income

Household income	Number	Percent
Less than \$40,000	121	30.25 %
Between \$40,000 and \$80,000	101	25.25 %
Between \$80,000 and \$120,000	76	19.00 %
More than \$120,000	64	16.00 %
Refused	38	9.50 %
TOTAL	400	100.00 %

Table 14 Sample profile: Home ownership

Own or rent	Number.	Percent
Rent	49	12.2 %5
Own	342	85.5 %
Other arrangement	9	2.25 %
TOTAL	400	100 %

Table 15 Sample profile: Length of residency in the region

Years living in region	Number	Percent
5 years or less	15	3.75 %
6 to 10 years	24	6 %
11 to 20 years	44	11 %
21 to 40 years	98	24.5 %
More than 40 years	219	54.75 %
TOTAL	400	100 %

Table 16 Sample profile: Farm ownership

Own farm of 40 hectares or more	Number.	Percent
No	308	77 %
Yes	92	23 %
TOTAL	400	100 %

Appendix C: Scale development and reliability of scale items

Separate scales were developed for the various measures associated with community wellbeing and perceptions of the CSG sector by averaging the score of the items within the respective scale. All multi-item measures were tested for ‘internal consistency’ or reliability using the Spearman-Brown Rho correlation for two-item measures and Cronbachs’ alpha for measures with three or more items. See Table 17.

The reliability of all multi-item measures (scales) usually exceeded .80, with the lowest being .76 (reliability over .90 is considered very good, over .80 is considered good, and .70 can be considered adequate for scale development).

Table 17 Measuring community wellbeing and perceptions of the CSG sector

Community wellbeing and resilience	No. of items	Scale type and reliability ¹	Examples for scale items
Personal safety	3	Agreement .76	It is safe to be alone at home during the; safe to walk alone outside at night
Income sufficiency	3	Agreement .89	Your income is enough for household expenses; for the lifestyle you enjoy
Health	5	Satisfaction .81	Satisfaction with diet and eating habits; exercise habits; physical; and mental health
Services and facilities	8	Satisfaction .86	Satisfaction with local schools; sports and leisure facilities; medical and health services
Town appearance	3	Satisfaction .86	Satisfaction with cleanliness in the town; greenery and parks in the town
Roads	4	Agreement .83	Condition of the roads; safety on the roads; amount of traffic on roads
Environmental quality	4	Satisfaction .88	Satisfaction with level of dust; noise; and quality of the air
Environmental management	4	Satisfaction .88	Satisfaction with underground water; nature reserves; and local farming land for the future
Citizen voice	5	Agreement .90	Local council informs residents; opportunities to be heard; local council can be trusted
Economic opportunities	3	Agreement .86	There are good job opportunities; local businesses are doing well
Community cohesion	4	Agreement .89	Community is welcoming of newcomers; is tolerant of people with different views
Local trust	2	Agreement .84	People that you see around [local area] can generally be trusted; overall, I am satisfied with levels of trust in my local area
Community participation	3	Agreement .88	Attended several community events in the past year; very active member of a local group
Community spirit	4	Agreement .89	People can rely upon one another for help; there is good community spirit around here.
Social interaction	4	Agreement .78	Regularly visit someone’s home; go out together socially

Overall community wellbeing	5	Agreement .83	This community is suitable for young children; teenagers; seniors; offers a good quality of life
Expected future wellbeing	2	Agreement .88	In 3 years time, I will be happy living in this local area; it will offer a good quality of life
Place attachment	3	Agreement .86	I feel that I belong to this area; I am pleased to come back to the area, if I go away
Community resilience	10	Agreement .94	Proactive planning; adequate leadership; access to information; sharing resources; key people to get things done; perseverance

Notes: ¹ The Spearman-Brown Rho correlation was used for two item measures and Cronbach's alpha for other measures

Perceptions and attitudes about CSG and the sector	No. of items	Scale type and reliability ¹	Examples for scale items
All concerns	19	Concern .94	Water contamination; health impacts; the natural environment; community division; fracking; csg extending into other areas
All benefits	10	Agreement .96	Local employment; Local business opportunities; Corporate support for local community activities; energy supply in NSW
Distributional fairness	4	Agreement .94	You consider it fair to live near this CSG development if compensated fairly; if local council were compensated; community would receive a fair share of the benefits
Procedural fairness	4	Agreement .93	CSG company would listen to and respect community opinions; be prepared to change its practices in response; inform residents of important developments regarding the site
Relationship quality	4	Agreement .95	CSG company would be accessible; open, honest and transparent; engage in genuine two way dialogue; respond to issues in a timely manner
Governance overall	12	Agreement .96	See items for sub-scales:
Informal governance	4	Agreement .92	The shire council would listen to and advocate for local communities; the EPA would listen to and respond to any community concerns.
Formal governance	4	Agreement .94	A CSG company would comply with regulations; legislation could be counted upon
Trust in governing bodies	3	Agreement .96	Trust state govern bodies, such as EPA, to act responsibly; in local community's best interest's; trust their capability
Trust in CSG company	3	Agreement .96	Trust company to act responsibly; in local community's best interest's; trust their capability
Community attitudes and feelings toward CSG	5	Agreement .92	Attitude: reject it to embrace it. Feelings: pleased; optimistic; angry; worried

Notes: ¹ The Spearman-Brown Rho correlation was used for two item measures and Cronbach's alpha for other measures

Appendix D: Statistics for each survey item

Table 18 Survey item statistics Narrabri Shire, subregions and out-of-town residents (weighted data)

	Narrabri Shire			Subregion		Out-of-town	
	No.	Mean	SD ¹	Narrabri	Rest of shire	In-town	Out-of-town
Community wellbeing questions							
<i>Q9 Thinking about [NAME] and surrounds, how much do you agree with the following statements on a scale from 1 = strongly disagree to 5 = strongly agree</i>							
a) I feel that I belong to this area	400	4.45	0.88	4.38	4.61	4.49	4.39
b) I am pleased to come back to the area, if I go away	400	4.37	1.04	4.28	4.55	4.42	4.27
c) I feel proud to live in this community (*RWB survey)	400	4.40	0.96	4.33	4.56	4.45	4.32
d) Overall, I feel very attached to this local area	400	4.43	0.94	4.40	4.51	4.45	4.41
<i>Q10 Now a few questions about personal safety. On a scale from 1 to 5, how much do you agree that:</i>							
a) It is safe to be alone at home during the night	400	4.36	0.91	4.39	4.29	4.28	4.49
b) It is safe to walk alone outside at night	400	3.71	1.30	3.64	3.84	3.41	4.25
c) Overall, I feel safe living in the area	400	4.40	0.83	4.41	4.38	4.33	4.54
<i>Q11 Thinking about your household income, how much do you agree that:</i>							
a) your income is enough for household expenses	400	3.93	1.14	3.99	3.80	3.82	4.13
b) your income is enough for the lifestyle you enjoy	400	3.82	1.24	3.87	3.73	3.75	3.95
c) Overall, you are satisfied that your income covers living expenses	400	4.04	1.13	4.07	3.97	4.00	4.12
<i>Q12 Now on a scale from 1 = very dissatisfied to 5 = very satisfied and thinking about your health and wellbeing, how satisfied are you with</i>							
a) your diet and eating habits	399	3.92	0.92	3.88	4.01	3.92	3.93
b) your exercise habits	397	3.36	1.15	3.34	3.40	3.37	3.33
c) your physical health	399	3.85	0.89	3.86	3.85	3.86	3.84
d) your mental health	399	4.27	0.82	4.21	4.41	4.24	4.34
e) Overall, how satisfied are you with your health and wellbeing	400	4.07	0.77	4.06	4.08	4.08	4.06
<i>Q13 Thinking of services and facilities for your local area, how satisfied are you with</i>							
a) local schools	351	3.72	1.12	3.58	4.03	3.77	3.63
b) childcare facilities	293	3.48	1.16	3.60	3.18	3.54	3.36
c) sports and leisure facilities	383	3.72	1.09	3.91	3.31	3.78	3.62
d) cultural facilities	376	3.33	1.09	3.43	3.12	3.29	3.39
e) shopping (other than food and everyday items)	397	2.79	1.08	2.82	2.73	2.68	2.99
f) medical and health services	400	3.36	1.22	3.23	3.64	3.45	3.20
g) community support services (e.g. meals on wheels, youth workers)	360	3.86	0.93	3.82	3.93	3.88	3.81
h) Overall, how satisfied are you with the services and facilities in your local area	398	3.65	0.93	3.65	3.66	3.71	3.56

	Narrabri Shire			Subregion		Out-of-town	
	No.	Mean	SD ¹	Narrabri	Rest of shire	In-town	Out-of-town
Q14 Thinking about [NAME]'s general appearance, how satisfied are you with the following:							
a) Cleanliness in the town	400	3.80	0.87	3.69	4.04	3.81	3.80
b) Greenery and Parks in the town	400	3.76	1.03	3.58	4.13	3.74	3.79
c) Overall, how satisfied are you with the general appearance of the town	400	3.68	0.96	3.51	4.04	3.66	3.72
Q15 Thinking about the roads outside of [NAME], how satisfied are you with the							
a) Condition of the roads	398	2.97	1.03	3.00	2.90	3.07	2.78
b) Safety on the roads	397	3.28	0.99	3.32	3.20	3.43	3.03
c) Amount of traffic on roads	396	3.48	0.95	3.51	3.40	3.54	3.36
d) The roads overall	399	3.18	0.96	3.21	3.11	3.29	2.98
Q16 Thinking about pollution in the general environment, how satisfied are you with the							
a) Level of dust	398	3.52	1.16	3.56	3.44	3.45	3.65
b) Level of noise	398	4.03	0.93	4.10	3.89	3.90	4.27
c) Quality of the air	399	4.07	1.00	4.12	3.98	3.96	4.27
d) overall quality of the general environment around [NAME]	398	3.96	0.84	3.98	3.93	3.91	4.05
Q17 Now thinking about the natural environment around [NAME], how satisfied are you with the management of the:							
a) quality of underground water for the future	370	3.17	1.28	3.10	3.30	3.13	3.24
b) nature reserves for the future	367	3.37	1.14	3.45	3.20	3.40	3.32
c) sustainability of local farming land for the future	384	3.40	1.18	3.37	3.47	3.41	3.39
d) Overall, the management of the natural environment for the future	384	3.32	1.11	3.28	3.39	3.32	3.31
Q18 Thinking about how decisions are made affecting [NAME] and surrounds, how much do you agree that:							
a) The local council informs residents of important developments	400	2.86	1.12	2.79	3.00	2.93	2.73
b) There are opportunities for your voice to be heard on issues that are important to you	400	3.04	1.15	3.02	3.08	3.13	2.87
c) Overall, I am satisfied with how decisions are made that affect [NAME]	400	2.79	1.13	2.74	2.90	2.90	2.60
Q19 Regarding employment and business opportunities in the local area, how much do you agree that:							
a) there are good job opportunities	400	3.13	1.14	3.16	3.05	3.08	3.20
b) local businesses are doing well	400	2.96	1.08	2.91	3.07	2.92	3.04
c) Overall, I am satisfied with employment and business opportunities in your local area	400	3.13	1.03	3.18	3.03	3.13	3.14
Q20 Thinking about community spirit in your local area, how much do you agree that:							
a) People can rely upon one another for help	400	4.25	0.83	4.19	4.36	4.24	4.26
b) People have friendly relationships	400	4.28	0.81	4.23	4.36	4.25	4.33
c) There is good community spirit around here (*RWB survey)	400	4.28	0.79	4.23	4.38	4.25	4.32
d) Overall, I am satisfied with community spirit in the area	400	4.27	0.83	4.22	4.37	4.23	4.32
Q21 Thinking about how inclusive your local community is, how much do you agree that							
a) Your community is welcoming of newcomers	400	3.98	0.90	3.92	4.12	3.99	3.98
b) Your community is tolerant of people with different views	400	3.45	1.03	3.37	3.64	3.44	3.48

	Narrabri Shire			Subregion		Out-of-town	
	No.	Mean	SD ¹	Narrabri	Rest of shire	In-town	Out-of-town
c) Your local community is welcoming of people of different cultures	400	3.71	1.01	3.65	3.84	3.71	3.71
d) Overall, your community includes everyone no matter who they are.	400	3.78	1.02	3.69	3.96	3.79	3.77
Q22 Thinking about levels of trust in your local area, how much do you agree that:							
a) There are local community leaders you can trust	400	3.40	0.92	3.33	3.56	3.45	3.33
b) Your local council can be trusted	400	2.93	1.15	2.88	3.04	3.01	2.79
c) People that you see around [NAME] can generally be trusted	400	3.68	0.79	3.70	3.64	3.78	3.50
d) Overall, I am satisfied with levels of trust in my local area	400	3.70	0.83	3.66	3.78	3.73	3.63
Q23 Thinking now about participating in local community groups around [NAME] (like school, sport and service groups), how much do you agree that:							
a) You have attended several community events in the past year	400	3.53	1.34	3.58	3.43	3.63	3.36
b) You are a very active member of a local group or club	400	3.35	1.50	3.33	3.38	3.51	3.06
c) Overall, you participate regularly in a variety of community activities	400	3.32	1.37	3.36	3.24	3.40	3.18
Q24 Now we have some questions about everyday interactions with people, other than those you may live with. How much do you agree that you do the following with others regularly around [NAME]							
a) Visit someone's home	400	3.47	1.25	3.55	3.30	3.57	3.29
b) Go out together socially	400	3.31	1.27	3.33	3.28	3.47	3.02
c) Speak or text on the phone	400	3.86	1.25	3.89	3.82	3.88	3.83
d) Overall, I am satisfied with the amount of my social interaction in the local area	400	3.99	0.96	4.02	3.94	4.01	3.97
Q25 Thinking about overall community wellbeing around [NAME] and surrounds , how much do you agree that:							
a) This community is suitable for young children	400	4.04	1.01	4.08	3.94	4.08	3.96
b) This community is suitable for teenagers	400	3.29	1.09	3.32	3.21	3.25	3.35
c) This community is suitable for seniors	400	4.07	0.87	4.03	4.15	4.08	4.05
d) Overall, this local area offers a good quality of life	400	4.18	0.78	4.17	4.22	4.16	4.23
e) Overall, I am happy living in this local area	400	4.24	0.97	4.24	4.25	4.24	4.26
f) This community is a great place to live (*RWB survey)	400	4.33	0.86	4.27	4.45	4.33	4.33
g) This community has a bright future (*RWB survey)	400	3.66	1.10	3.74	3.50	3.67	3.64
Q26 Imagining what it might be like in 3 years time, how much do you agree that:							
a) Overall, I will be happy living in this local area	400	3.76	1.14	3.72	3.84	3.80	3.68
b) Overall, this local area will offer a good quality of life	400	3.85	1.02	3.83	3.90	3.88	3.81
Q27 Over the next 3 years, do you think community wellbeing will							
a) Decline	88	23.7%		21.0%	29.1%	20.6%	29.2%
b) Stay about the same	220	53.2%		53.2%	53.2%	57.4%	45.7%
c) Improve	92	23.2%		25.8%	17.7%	22.0%	25.2%
Total	400	100.0%		100.0%	100.0%	100.0%	100.0%

	Narrabri Shire			Subregion		Out-of-town	
	No.	Mean	SD ¹	Narrabri	Rest of shire	In-town	Out-of-town
Q28 What is your main reason for thinking this (open-ended text question)	400	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Community attitudes around coal seam gas development and responding to change

Q29 How concerned would you be about the following potential impacts:

a) farm property values	400	3.48	1.46	3.36	3.74	3.28	3.84
b) risk of fire	400	3.18	1.46	3.03	3.49	3.14	3.25
c) depletion of underground water	400	3.74	1.49	3.61	4.01	3.64	3.92
d) water contamination	400	3.75	1.46	3.62	4.02	3.67	3.91
e) air contamination	400	3.28	1.46	3.12	3.60	3.22	3.38
f) the natural environment of the Pilliga State Forest	400	3.51	1.51	3.42	3.71	3.49	3.57
g) disposal of salt and brine	400	3.61	1.42	3.51	3.81	3.55	3.72
h) dust, noise, and light pollution	400	3.17	1.45	3.02	3.48	3.13	3.24
i) traffic on the roads	400	2.98	1.42	2.84	3.25	2.95	3.03
j) health impacts	400	3.35	1.48	3.23	3.60	3.31	3.42
k) home rental prices	400	3.36	1.44	3.38	3.33	3.45	3.21
l) community division over CSG development	400	3.63	1.27	3.59	3.69	3.60	3.67
m) pressure on services and facilities	400	3.13	1.34	3.06	3.29	3.11	3.18
n) Overall, how concerned are you about potential negative impacts	400	3.51	1.49	3.40	3.76	3.44	3.65

Q30 Thinking about possible future issues, how concerned would you be about

a) a change in CSG operator, say in 10 years' time	400	3.60	1.34	3.51	3.79	3.46	3.85
b) fracking being introduced over time	400	4.02	1.32	4.05	3.96	3.89	4.25
c) CSG well integrity over time	400	3.71	1.40	3.64	3.86	3.58	3.95
d) CSG development extending into other farming areas around the shire	400	3.76	1.38	3.61	4.05	3.66	3.93
e) Overall, how concerned would you be about possible future issues with CSG	400	3.68	1.40	3.61	3.82	3.62	3.78

Q31 How much do you agree that any risks to underground water from CSG activities

a) are understood by science	400	3.16	1.35	3.16	3.18	3.25	3.01
b) are understood by the community	400	2.68	1.27	2.56	2.93	2.70	2.63
c) are manageable	400	2.86	1.33	2.93	2.72	2.95	2.69
d) are potentially catastrophic	400	3.65	1.41	3.58	3.78	3.58	3.76

Q32 How much do you agree that CSG development would provide significant local benefits for

a) local employment	400	3.40	1.42	3.45	3.29	3.55	3.11
b) opportunities for young people to stay in the region	400	3.35	1.36	3.40	3.23	3.54	3.01
c) local business opportunities	400	3.34	1.36	3.31	3.40	3.49	3.07
d) corporate support for local community activities (e.g. a CSG company sponsoring local clubs)	400	3.74	1.18	3.89	3.42	3.81	3.61
e) additional local services and facilities	400	3.33	1.22	3.40	3.20	3.43	3.16

	Narrabri Shire			Subregion		Out-of-town	
	No.	Mean	SD ¹	Narrabri	Rest of shire	In-town	Out-of-town
f) Overall, how much do you agree that this CSG development would bring significant benefits to the local community	400	3.17	1.43	3.22	3.06	3.33	2.88
<i>Q33 How much do you agree that CSG extraction in Narrabri would provide wider societal benefits</i>							
a) as a transition fuel between coal and renewable energy sources	400	3.05	1.28	3.07	3.01	3.18	2.84
b) for energy supply in NSW	400	3.20	1.32	3.20	3.19	3.35	2.92
c) for the wider Australian economy	400	3.21	1.28	3.26	3.11	3.33	3.01
d) Overall, CSG extraction in Narrabri shire would provide significant benefits for wider society	400	3.17	1.26	3.21	3.10	3.28	2.99
<i>Q34 How much do you agree that?</i>							
a) You would consider it fair to live near this CSG development if you were compensated accordingly	400	2.84	1.49	2.84	2.86	2.90	2.74
b) You would consider it fair to live near this CSG development if your local council were compensated accordingly	400	2.64	1.47	2.68	2.57	2.74	2.46
c) If there were good arguments for this CSG development in the Narrabri Shire rather than other regions, you would be accepting	400	3.08	1.49	3.18	2.87	3.27	2.74
d) Your community would receive a fair share of the benefits from the CSG development	400	2.93	1.38	3.08	2.62	3.05	2.72
<i>Q35 Thinking about how decisions might be made about this CSG development, how much do you agree that a CSG company:</i>							
a) would listen to and respect the community's opinions	400	2.61	1.31	2.72	2.40	2.80	2.28
b) would inform residents of important developments regarding the site	400	2.87	1.33	2.92	2.77	3.01	2.62
c) would give opportunities for people in your community to participate in the decisions made by the company	400	2.59	1.26	2.64	2.50	2.68	2.43
d) would be prepared to change its practices in response to community sentiment	400	2.66	1.23	2.73	2.52	2.75	2.49
<i>Q36 How confident are you that a CSG company would</i>							
a) respond to concerns and issues in a timely manner	400	2.70	1.32	2.80	2.50	2.90	2.35
b) be accessible or easy to contact	400	2.94	1.28	3.11	2.60	3.13	2.60
c) be open, honest and transparent	400	2.64	1.30	2.71	2.50	2.76	2.42
d) engage in genuine two way dialogue	400	2.75	1.28	2.82	2.61	2.90	2.48
<i>Q37 Thinking about how a CSG company would be governed, how much do you agree that:</i>							
a) Legislation and regulation could be counted upon to ensure that it did the right thing	400	2.88	1.33	2.95	2.71	3.02	2.61
b) The Environmental and Protection Authority (EPA) would be able to hold it accountable for any breaches	400	3.16	1.42	3.31	2.85	3.30	2.91
c) A CSG company would comply with regulations, permits and licences.	400	3.24	1.27	3.40	2.92	3.37	3.02
d) A CSG company would comply with land access agreements	400	3.28	1.27	3.40	3.04	3.43	3.01

	Narrabri Shire			Subregion		Out-of-town	
	No.	Mean	SD ¹	Narrabri	Rest of shire	In-town	Out-of-town
Q38 Thinking about other government responses to this CSG development, how much do you agree that							
a) The shire council would listen to and advocate for local communities on issues around this CSG development	400	2.82	1.18	2.89	2.68	3.01	2.49
b) The shire council would have good plans and strategic vision around this CSG development	400	2.75	1.19	2.75	2.75	2.90	2.48
c) The EPA would inform the local community of any issues with CSG activities as they arise	400	3.17	1.22	3.33	2.84	3.26	3.00
d) The EPA would listen to and respond to any community concerns	400	3.20	1.15	3.36	2.87	3.27	3.08
e) State government would listen to and respond to any community concerns	400	2.58	1.17	2.62	2.50	2.75	2.27
Q39 Thinking about how your local community would respond to this CSG development, how much do you agree that there would be:							
a) proactive planning for future changes	400	2.93	1.08	2.90	2.99	3.01	2.79
b) adequate leadership to deal with the changes	400	2.86	1.10	2.79	3.00	2.95	2.70
c) access to relevant information	400	3.06	1.12	3.10	2.98	3.15	2.90
d) sharing of resources, information, and learnings	400	3.06	1.07	3.09	3.01	3.18	2.85
e) key people to help get things done	400	3.03	1.04	3.02	3.04	3.14	2.83
f) perseverance to find solutions	400	3.13	1.04	3.12	3.14	3.27	2.87
g) the community would get involved	400	3.48	1.01	3.46	3.53	3.51	3.43
h) Overall, the community would be able to manage the changes effectively	400	3.09	1.07	3.09	3.09	3.16	2.97
Q40 How much do you agree that local communities, a CSG company, local and state governments would be able to work together							
a) to address any problems with this CSG development	400	2.84	1.20	2.84	2.86	2.96	2.63
b) to maximise any benefits associated with this CSG development	400	2.96	1.08	2.98	2.93	3.09	2.74
Q41 Thinking about a company operating this CSG development, to what extent would you							
a) trust them to act in the local community's best interests	400	2.62	1.29	2.68	2.50	2.80	2.30
b) trust them to act responsibly	400	2.86	1.29	2.92	2.73	3.08	2.47
c) trust their capability	400	2.99	1.25	3.08	2.81	3.16	2.68
Q42 Thinking about state government bodies involved in overseeing this CSG development, such as the Environment Protection Authority (EPA), to what extent would you							
a) trust them to act in the local community's best interests	400	3.09	1.15	3.20	2.86	3.21	2.87
b) trust them to act responsibly	400	3.18	1.21	3.29	2.95	3.36	2.87
c) trust their capability	400	3.11	1.20	3.22	2.89	3.28	2.82
Q43 Thinking about this CSG development, how accepting would you be of CSG wells and associated infrastructure and activities							
a) in the Narrabri Shire	400	2.85	1.41	3.00	2.54	3.01	2.55
b) in the Pilliga State Forest	400	2.94	1.48	3.10	2.60	3.10	2.65
c) on marginal farming land	400	2.63	1.37	2.74	2.40	2.75	2.40
d) on mixed crop and livestock farms	400	2.32	1.32	2.38	2.19	2.41	2.15

	Narrabri Shire			Subregion		Out-of-town	
	No.	Mean	SD ¹	Narrabri	Rest of shire	In-town	Out-of-town
Q44 Overall, which best describes your attitude toward this CSG development in the Narrabri shire. I would							
1. reject it	115	30.5%		27.9%	35.9%	25.6%	39.3%
2. tolerate it	111	27.0%		25.9%	29.2%	26.1%	28.5%
3. be OK with it	55	14.7%		14.2%	15.9%	17.4%	9.9%
4. approve of it	59	13.0%		14.9%	9.0%	16.0%	7.5%
5. embrace it	60	14.8%		17.1%	10.0%	14.8%	14.8%
Total	400	100.0%		100.0%	100.0%	100.0%	100.0%
Q45 On a scale of 1-5, how much would you feel							
a) pleased	400	2.72	1.43	2.87	2.40	2.87	2.46
b) optimistic	400	2.83	1.39	2.93	2.64	2.98	2.58
c) angry	400	2.31	1.36	2.18	2.57	2.24	2.43
d) worried	400	3.08	1.50	2.96	3.33	2.96	3.29
Q46 How much do you think you would be impacted by this development personally, from 1 very negatively to 5 very positively							
	400	2.87	1.18	2.92	2.75	2.90	2.80
Q47a How well do you think your local community							
a) would cope with this CSG development	400	3.15	1.12	3.20	3.04	3.21	3.04
b) would adapt to this CSG development	400	3.21	1.08	3.30	3.04	3.31	3.05
c) Generally copes pretty well when faced with challenges (*RWB survey)	400	3.62	1.04	3.66	3.54	3.73	3.44
Q47b Which of the following best describes how [NAME] would deal with this CSG development							
1. resist	62	16.5%		16.8%	15.9%	14.5%	20.0%
2. not cope	31	6.9%		4.5%	11.8%	5.9%	8.6%
3. only just cope	98	23.0%		19.1%	31.0%	21.8%	25.2%
4. adapt to the changes	188	47.8%		54.1%	34.9%	51.4%	41.4%
5. change into something different but better	21	5.8%		5.5%	6.4%	6.3%	4.9%
Total	400	100.0%		100.0%	100.0%	100.0%	100.0%
Q48 Answering yes or no, have you sought information about the local CSG industry from							
a) government sources	400	31.6%		34.2%	26.1%	28.2%	37.7%
b) research organisations	400	32.3%		33.9%	28.8%	28.5%	38.9%
c) anti-CSG groups	400	34.2%		36.1%	30.5%	29.5%	42.7%
d) pro-CSG groups	400	34.4%		37.2%	28.7%	28.6%	44.8%
e) industry sources	400	42.1%		45.4%	35.4%	41.8%	42.8%
f) by going on a site visit of Santos's wells and facilities	400	26.8%		26.0%	28.5%	25.1%	29.9%
Q49 How much do you feel you know about the local coal seam gas industry?							
	400	2.91	1.15	3.03	2.67	2.79	3.12
Q50 Have you had any experience working for							
a) the CSG industry (either directly or on a contract)	400	7.6%		8.2%	6.4%	6.2%	10.2%

	Narrabri Shire			Subregion		Out-of-town	
	No.	Mean	SD ¹	Narrabri	Rest of shire	In-town	Out-of-town
b) with other mining industries (either directly or on a contract)	400	12.2%		10.2%	16.4%	10.2%	15.9%
c) have friends and family that have worked with CSG or other mining industries (either directly or on a contract)	400	55.1%		57.4%	50.5%	54.0%	57.2%

Note: bold font indicates significant differences in scores. ¹ SD = standard deviation which may be thought of as a standard distance from the mean. Approximately two thirds of responses normally fall within one SD of the mean.

Appendix E: Sample weighting

Each resident sampled between 18 and 35 years represented 81 other young residents in the shire; each resident between 35 to 54 years represented 32 others in the shire; and each resident age 55+ represented 14 others in the shire. See Table 19. Age was not significantly associated with attitudes toward CSG development. The weighting calculations were based on the shire age distribution in 2011 (ABS, 2011). The 2016 census statistics were not available at the time of analysis.

Table 19 Sample weighting calculations

Age	Actual Sample	2011 Census	Weighting.	2016 Census
18 to 35 years	28	2,261	81	2,292
35 to 54 years	110	3,498	32	3,290
55+ years	262	3,645	14	4,087
TOTAL	400	9,404	24	9,669

Note: 2016 Census statistics were not yet available at the time of performing analyses

Appendix F: Statistical results for models

Multiple regression predicting community wellbeing

Multiple regression analysis were undertaken to help determine which dimensions were the most important. This analysis predicted satisfaction with overall community wellbeing very well, explaining 62% of overall community wellbeing ($R^2 = .62$). Beta coefficients indicate the importance of each dimension in contributing to overall community wellbeing. Table 20 displays beta coefficients for each predictor variable and the significant predictors ($p < .05$) are indicated in bold font.

Table 20 Explaining overall community wellbeing from wellbeing dimensions: Multiple regression analysis

Community wellbeing dimension	Beta coefficient
Services and facilities	0.29
Social interaction	0.19
Local trust	0.14
Town appearance	0.14
Community cohesion	0.11
Environmental quality	0.11
Community participation	0.08
Income sufficiency	0.08
Personal safety	0.07
Roads	-0.04
Community spirit	0.04
Economic opportunities	0.03
Health	-0.02
Environmental management	0.02

Note: Beta is the standardised coefficient, it is scale free and used to compare predictors; Bold face indicates the most important dimensions for community wellbeing ($p < .05$).

Discriminant analysis identifying indicators of high community functioning

A discriminant analysis was conducted to understand which aspects of community resilience actions and dimensions of community wellbeing were most important in explaining the way residents in the Narrabri shire thought their community may adapt to a proposed CSG development (resisting, not coping, only just coping, adapting or transforming). A discriminant analysis identifies ‘functions’ or broad factors which combine measures to best explain different categories of the five responses. This discriminant analysis identified one main function, which was called ‘community functioning’.

Table 21 shows the correlations of the various community resilience actions and dimensions of community wellbeing with community functioning. The three aspects of community resilience correlates most highly with community functioning (.57 or over). The dimensions of community wellbeing which most correlated with community functioning are environmental management, environmental pollution, roads, local decisions and citizen voice, and community participation (all over .30).

Table 21 Correlations of community resilience actions and dimensions of community wellbeing with community functioning

Community functioning correlation	Community resilience actions and dimensions of community wellbeing
	<u>Community resilience actions</u>
0.76	Working together
0.60	Working strategically
0.57	Working committedly
	<u>Community wellbeing dimensions</u>
0.52	Environmental management
0.41	Environmental pollution
0.39	Roads
0.35	Local decisions and citizen voice
0.32	Community participation
0.27	Social interaction
0.22	Local trust
0.22	Community spirit
0.18	Community wellbeing
0.18	Community cohesion
0.11	Place attachment
0.10	Services and facilities
0.05	Health
0.04	Income sufficiency
0.01	General appearance
0.00	Personal safety

Note: correlations over .30 are bolded

Multiple regression predicting expected future wellbeing

Table 22 shows the relative importance of various predictors of expected future community wellbeing. These predictors explained over half the variation in expected future community wellbeing ($R^2 = .54$). Present community wellbeing, place attachment, and community resilience associated with a proposed CSG development were all significant predictors, though attitude and feelings toward CSG was not significant.

Table 22 Explaining expected future community wellbeing: Multiple regression analysis

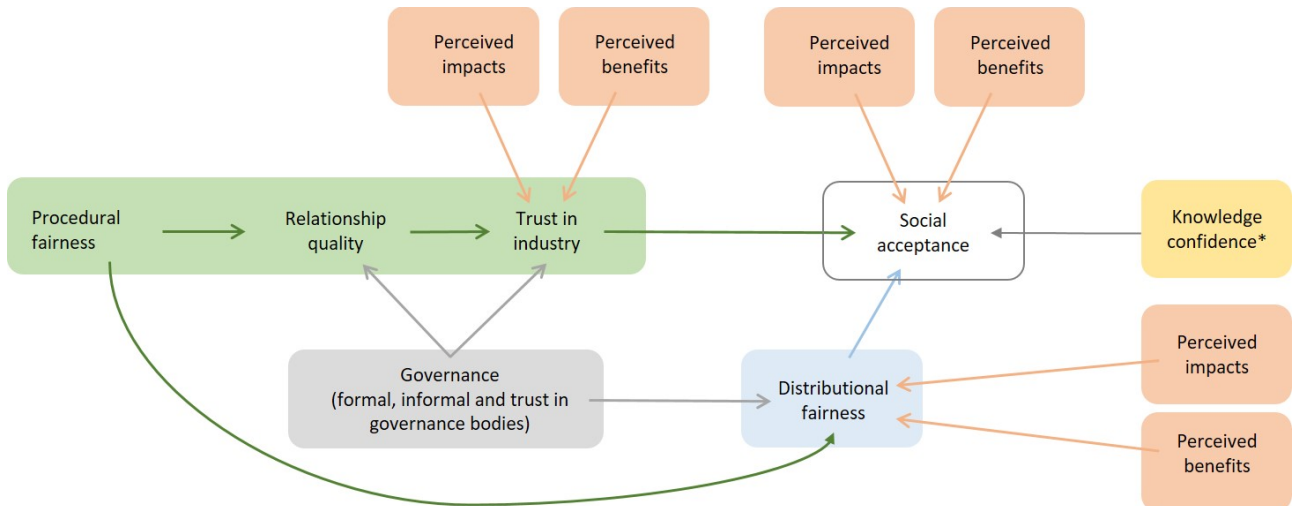
Predictors	Beta
Community wellbeing	0.51
Place attachment	0.20
Community resilience	0.15
Attitudes and feelings towards CSG	0.08

Note: Beta is the standardised coefficient, it is scale free and used to compare predictors;
Bold face indicates significant dimensions for predicting expected future community wellbeing ($p < .05$).

Model of social acceptance and trust

A path analysis modelled eight underlying drivers to explain trust in the CSG industry and social acceptance of CSG development. The model explained a very high proportion of the variation in social acceptance and a separate scientific paper is being written by the authors detailing this model. Figure 72 shows the relationships among the drivers of trust and social acceptance.

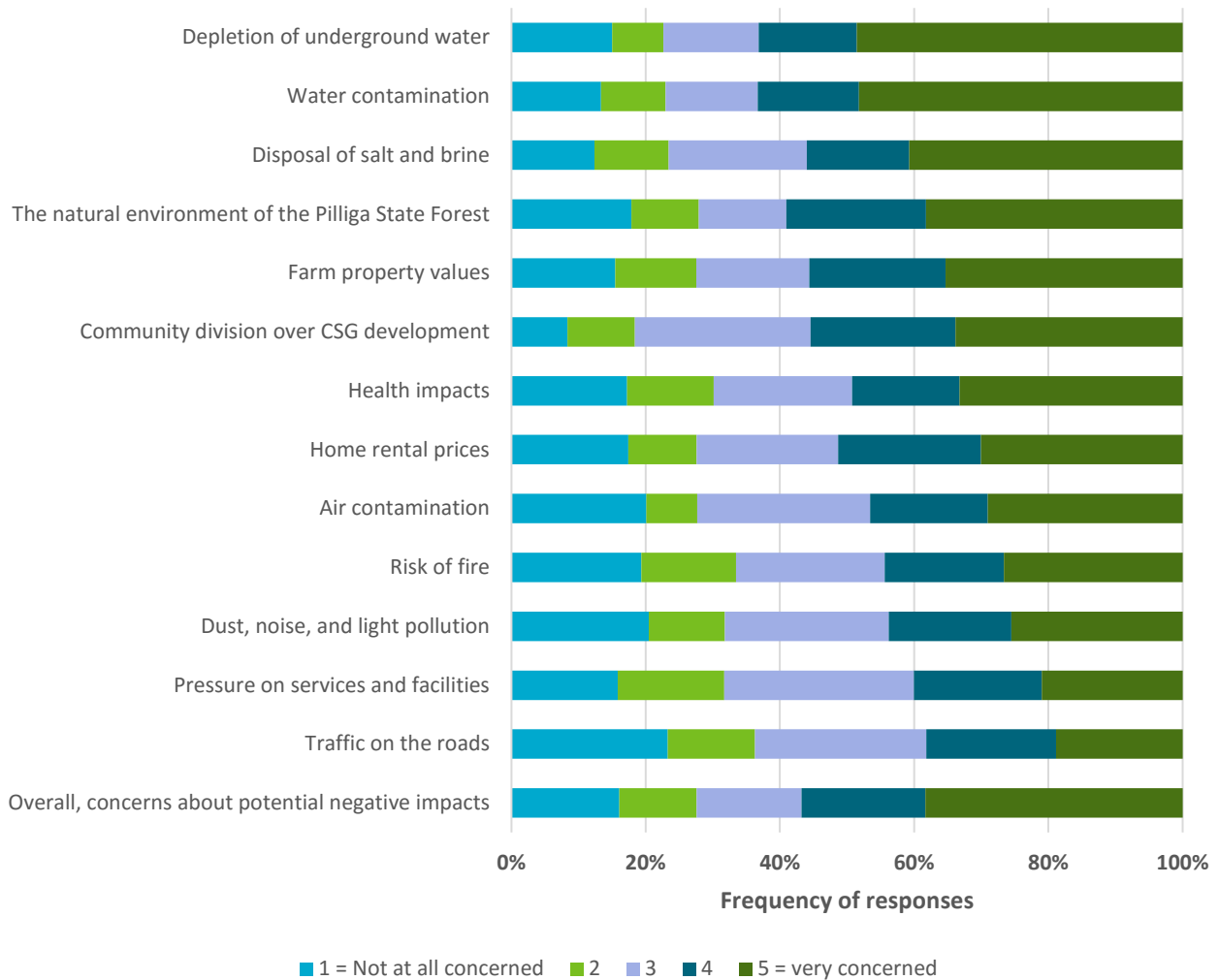
Figure 72 A path model of trust in industry and social acceptance of CSG development



Note: * this path was curvilinear

Appendix G: Frequency distribution of perceived impacts

Figure 73 Perceptions of potential impacts: Frequencies of responses



Appendix H: Tables of demographic differences

Subregions

Table 23 Demographic differences: Mean scores based on Subregions

Community wellbeing dimensions	Narrabri and surrounds	Rest of shire	Narrabri shire
Personal safety	4.15	4.17	4.16
Income sufficiency	3.98	3.83	3.93
Health	3.87	3.95	3.90
Services and facilities	3.50	3.44	3.48
Town appearance	3.59^L	4.07^H	3.75
Roads	3.26	3.16	3.23
Environmental quality	3.94	3.81	3.90
Environmental management	3.27	3.37	3.31
Citizen voice	2.95	3.12	3.00
Economic opportunities	3.08	3.05	3.07
Community cohesion	3.66	3.89	3.73
Local trust	3.68	3.71	3.69
Community participation	3.42	3.35	3.40
Community spirit	4.21	4.36	4.26
Social interaction	3.70	3.58	3.66
Overall community wellbeing	3.97	3.96	3.96
Expected future wellbeing	3.78	3.87	3.81
Place attachment	4.35	4.56	4.42
Community resilience	3.04	3.06	3.04

Note: Bold font indicates a significant difference; Means with different superscript letters are significantly different (L = lower; H=higher)

Perceptions and attitudes about CSG and the sector	Narrabri and surrounds	Rest of shire	Narrabri shire
All concerns	3.40^L	3.70^H	3.50
All benefits	3.34	3.20	3.30
Distributional fairness	2.95	2.73	2.87
Procedural fairness	2.75	2.55	2.68
Relationship quality	2.86^H	2.55^L	2.76
Governance overall	3.14^H	2.82^L	3.04
Informal governance	2.99^H	2.73^L	2.90
Formal governance	3.26^H	2.88^L	3.14
Trust in governing bodies	3.24^H	2.90^L	3.13
Trust in CSG company	2.89	2.68	2.82
Knowledge confidence	3.03^H	2.67^L	2.91
Community attitudes and feelings toward CSG	2.92^H	2.53^L	2.79

Note: Bold font indicates a significant difference; Means with different superscript letters are significantly different (L = lower; H=higher)

Subregion towns

Table 24 Demographic differences: Mean scores based on Subregion towns

Community wellbeing dimensions	Narrabri and surrounds	Boggabri and surrounds	Wee Waa and surrounds	Narrabri shire
Personal safety	4.15	4.21	4.14	4.16
Income sufficiency	3.98	3.79	3.86	3.93
Health	3.87	3.99	3.93	3.90
Services and facilities	3.50	3.46	3.42	3.48
Town appearance	3.59^L	4.15^H	4.02^H	3.75
Roads	3.26	3.25	3.10	3.23
Environmental quality	3.94^H	3.48^L	4.02	3.90
Environmental management	3.27	3.23	3.46	3.31
Citizen voice	2.95	3.12	3.11	3.00
Economic opportunities	3.08	2.99	3.09	3.07
Community cohesion	3.66	3.93	3.86	3.73
Local trust	3.68	3.79	3.66	3.69
Community participation	3.42	3.64	3.16	3.40
Community spirit	4.21	4.28	4.42	4.26
Social interaction	3.70	3.64	3.55	3.66
Overall community wellbeing	3.97	3.97	3.95	3.96
Expected future wellbeing	3.78	3.76	3.93	3.81
Place attachment	4.35	4.50	4.59	4.42
Community resilience	3.04	3.22	2.95	3.04

Note: Bold font indicates a significant difference; Means with different superscript letters are significantly different (L = lower; H=higher)

Perceptions and attitudes about CSG and the sector	Narrabri and surrounds	Boggabri and surrounds	Wee Waa and surrounds	Narrabri shire
All concerns	3.40	3.77	3.66	3.50
All benefits	3.34	3.26	3.16	3.30
Distributional fairness	2.95	2.75	2.72	2.87
Procedural fairness	2.75	2.71	2.45	2.68
Relationship quality	2.86^H	2.67	2.48^L	2.76
Governance overall	3.14^H	2.93	2.75^L	3.04
Informal governance	2.99^H	2.78	2.69^L	2.90
Formal governance	3.26^H	3.08	2.76^L	3.14
Trust in governing bodies	3.24^H	2.99	2.84^L	3.13
Trust in CSG company	2.89^H	2.79	2.61^L	2.82
Knowledge confidence	3.03^H	2.62^L	2.69^L	2.91
Community attitudes and feelings toward CSG	2.92^H	2.40^L	2.62	2.79

Note: Bold font indicates a significant difference; Means with different superscript letters are significantly different (L = lower; H=higher)

In-town and Out-of-town

Table 25 Demographic differences: Mean scores based on living In-town and Out-of-town

Community wellbeing dimensions	In-town	Out-of-town	Narrabri shire
Personal safety	4.00^L	4.43^H	4.16
Income sufficiency	3.85	4.07	3.93
Health	3.89	3.90	3.90
Services and facilities	3.51	3.43	3.48
Town appearance	3.74	3.77	3.75
Roads	3.33^H	3.04^L	3.23
Environmental quality	3.81^L	4.06^H	3.90
Environmental management	3.31	3.30	3.31
Citizen voice	3.08	2.86	3.00
Economic opportunities	3.04	3.13	3.07
Community cohesion	3.73	3.73	3.73
Local trust	3.76	3.57	3.69
Community participation	3.51	3.20	3.40
Community spirit	4.24	4.31	4.26
Social interaction	3.73	3.53	3.66
Overall community wellbeing	3.96	3.97	3.96
Expected future wellbeing	3.84	3.74	3.81
Place attachment	4.45	4.35	4.42
Community resilience	3.14^H	2.87^L	3.04

Note: Bold font indicates a significant difference; Means with different superscript letters are significantly different (L = lower; H=higher)

Perceptions and attitudes about CSG and the sector	In-town	Out-of-town	Narrabri shire
All concerns	3.43	3.62	3.50
All benefits	3.43^H	3.06^L	3.30
Distributional fairness	2.99	2.66	2.87
Procedural fairness	2.81^H	2.45^L	2.68
Relationship quality	2.92^H	2.46^L	2.76
Governance overall	3.18^H	2.78^L	3.04
Informal governance	3.04^H	2.66^L	2.90
Formal governance	3.28^H	2.89^L	3.14
Trust in governing bodies	3.28^H	2.85^L	3.13
Trust in CSG company	3.01^H	2.48^L	2.82
Knowledge confidence	2.79^L	3.12^H	2.91
Community attitudes and feelings toward CSG	2.92^H	2.56^L	2.79

Note: Bold font indicates a significant difference; Means with different superscript letters are significantly different (L = lower; H=higher)

Gender

Table 26 Demographic differences: Mean scores based on Gender

Community wellbeing dimensions	Male	Female	Narrabri shire
Personal safety	4.33^H	3.99^L	4.16
Income sufficiency	3.99	3.87	3.93
Health	3.93	3.86	3.90
Services and facilities	3.51	3.45	3.48
Town appearance	3.74	3.76	3.75
Roads	3.11^L	3.33^H	3.23
Environmental quality	4.04^H	3.77^L	3.90
Environmental management	3.43	3.19	3.31
Citizen voice	2.98	3.02	3.00
Economic opportunities	3.27^H	2.88^L	3.07
Community cohesion	3.67	3.79	3.73
Local trust	3.67	3.71	3.69
Community participation	3.23^L	3.56^H	3.40
Community spirit	4.24	4.28	4.26
Social interaction	3.51^L	3.80^H	3.66
Overall community wellbeing	3.98	3.95	3.96
Expected future wellbeing	3.90	3.72	3.81
Place attachment	4.49	4.35	4.42
Community resilience	3.08	3.01	3.04

Note: Bold font indicates a significant difference; Means with different superscript letters are significantly different (L = lower; H=higher)

Perceptions and attitudes about CSG and the sector	Male	Female	Narrabri shire
All concerns	3.28^L	3.70^H	3.50
All benefits	3.39	3.21	3.30
Distributional fairness	3.04	2.72	2.87
Procedural fairness	2.77	2.60	2.68
Relationship quality	2.88	2.64	2.76
Governance overall	3.12	2.96	3.04
Informal governance	2.98	2.83	2.90
Formal governance	3.27	3.02	3.14
Trust in governing bodies	3.16	3.09	3.13
Trust in CSG company	2.94	2.71	2.82
Knowledge confidence	3.09^H	2.74^L	2.91
Community attitudes and feelings toward CSG	2.97^H	2.63^L	2.79

Note: Bold font indicates a significant difference; Means with different superscript letters are significantly different (L = lower; H=higher)

Income level

Table 27 Demographic differences: Mean scores based on household income

Community wellbeing dimensions	Less than \$40,00	Between \$40,000 and \$80,000	\$80,000 or more	Total
Personal safety	4.02^L	4.27^H	4.18	4.17
Income sufficiency	3.56^L	3.74^L	4.31^H	3.97
Health	3.98	3.87	3.86	3.89
Services and facilities	3.65^H	3.57^H	3.30^L	3.46
Town appearance	3.95^H	3.82	3.55^L	3.72
Roads	3.19	3.23	3.17	3.19
Environmental quality	3.73	3.92	3.92	3.87
Environmental management	3.33	3.38	3.23	3.30
Citizen voice	3.14^H	3.14	2.83^L	2.99
Economic opportunities	2.90	3.15	3.11	3.07
Community cohesion	3.84	3.87	3.58	3.73
Local trust	3.75	3.78	3.62	3.69
Community participation	3.30	3.33	3.56	3.43
Community spirit	4.17	4.31	4.27	4.26
Social interaction	3.47	3.57	3.81	3.66
Overall community wellbeing	4.02	3.92	3.95	3.96
Expected future wellbeing	3.94	3.83	3.78	3.83
Place attachment	4.60^H	4.41	4.35^L	4.42
Community resilience	3.14	3.05	3.02	3.06

Note: 9.5% of respondents declined to answer this question about household income; Bold font indicates a significant difference; Means with different superscript letters are significantly different (L = lower; H=higher)

Perceptions and attitudes about CSG and the sector	Less than \$40,00	Between \$40,000 and \$80,000	\$80,000 or more	Total
All concerns	3.51	3.62	3.41	3.49
All benefits	3.21	3.21	3.37	3.29
Distributional fairness	2.91	2.75	2.92	2.87
Procedural fairness	2.71	2.59	2.70	2.67
Relationship quality	2.65	2.75	2.81	2.75
Governance overall	2.96	3.02	3.13	3.06
Informal governance	2.89	2.87	2.96	2.92
Formal governance	3.04	3.14	3.21	3.15
Trust in governing bodies	2.99^L	3.10	3.31^H	3.17
Trust in CSG company	2.85	2.87	2.75	2.81
Knowledge confidence	2.76^L	2.74^L	3.12^H	2.91
Community attitudes and feelings toward CSG	2.77	2.72	2.86	2.80

Note: 9.5% of respondents declined to answer this question about household income; Bold font indicates a significant difference; Means with different superscript letters are significantly different (L = lower; H=higher)

Indigenous identification

Table 28 Demographic differences: Mean scores based on Indigenous identification

Community wellbeing dimensions	No	Yes	Narrabri shire
Personal safety	4.19	3.84	4.16
Income sufficiency	3.94	3.86	3.93
Health	3.88	4.05	3.90
Services and facilities	3.47	3.58	3.48
Town appearance	3.76	3.65	3.75
Roads	3.28^H	2.71^L	3.23
Environmental quality	3.89	3.93	3.90
Environmental management	3.30	3.37	3.31
Citizen voice	3.02	2.91	3.00
Economic opportunities	3.09	2.95	3.07
Community cohesion	3.73	3.76	3.73
Local trust	3.70	3.60	3.69
Community participation	3.41	3.35	3.40
Community spirit	4.24	4.45	4.26
Social interaction	3.67	3.56	3.66
Overall community wellbeing	3.97	3.90	3.96
Expected future wellbeing	3.83	3.56	3.81
Place attachment	4.42	4.43	4.42
Community resilience	3.04	3.08	3.04

Note: only 35 indigenous respondents in the sample; Bold font indicates a significant difference; Means with different superscript letters are significantly different (L = lower; H=higher)

Perceptions and attitudes about CSG and the sector	No	Yes	Narrabri shire
All concerns	3.45	3.94	3.50
All benefits	3.31	3.18	3.30
Distributional fairness	2.87	2.95	2.87
Procedural fairness	2.69	2.59	2.68
Relationship quality	2.78	2.58	2.76
Governance overall	3.05	2.90	3.04
Informal governance	2.91	2.84	2.90
Formal governance	3.18	2.83	3.14
Trust in governing bodies	3.13	3.11	3.13
Trust in CSG company	2.85	2.60	2.82
Knowledge confidence	2.93	2.75	2.91
Community attitudes and feelings toward CSG	2.81	2.67	2.79

Note: only 35 indigenous respondents in the sample

Farm ownership

Table 29 Demographic differences: Mean scores based on farm ownership

Community wellbeing dimensions	Farmer owner - Yes	No	Narrabri shire
Personal safety	4.50^H	4.06^L	4.16
Income sufficiency	4.12	3.88	3.93
Health	3.97	3.88	3.90
Services and facilities	3.39	3.51	3.48
Town appearance	3.91	3.71	3.75
Roads	3.11	3.26	3.23
Environmental quality	3.99	3.87	3.90
Environmental management	3.29	3.31	3.31
Citizen voice	2.94	3.02	3.00
Economic opportunities	3.20	3.04	3.07
Community cohesion	3.77	3.72	3.73
Local trust	3.64	3.70	3.69
Community participation	3.20	3.46	3.40
Community spirit	4.18	4.29	4.26
Social interaction	3.56	3.69	3.66
Overall community wellbeing	3.99	3.96	3.96
Expected future wellbeing	3.86	3.79	3.81
Place attachment	4.49	4.40	4.42
Community resilience	2.83^L	3.11^H	3.04

Note: Bold font indicates a significant difference; Means with different superscript letters are significantly different (L = lower; H=higher)

Perceptions and attitudes about CSG and the sector	Farmer owner - Yes	No	Narrabri shire
All concerns	3.67	3.45	3.50
All benefits	3.03^L	3.37^H	3.30
Distributional fairness	2.53^L	2.97^H	2.87
Procedural fairness	2.32^L	2.79^H	2.68
Relationship quality	2.30^L	2.89^H	2.76
Governance overall	2.60^L	3.16^H	3.04
Informal governance	2.52^L	3.01^H	2.90
Formal governance	2.66^L	3.28^H	3.14
Trust in governing bodies	2.63^L	3.27^H	3.13
Trust in CSG company	2.40^L	2.94^H	2.82
Knowledge confidence	2.99	2.89	2.91
Community attitudes and feelings toward CSG	2.47^L	2.89^H	2.79

Note: Bold font indicates a significant difference; Means with different superscript letters are significantly different (L = lower; H=higher)

Comparisons with QLD Gas fields

Table 30 Comparisons with QLD Gas Fields: Mean scores comparing Western Downs region, Eastern Maranoa, and Narrabri shire

Community wellbeing dimensions	Western Downs region QLD (n = 400)	Eastern Maranoa QLD (n = 400)	Narrabri shire NSW (n = 400)
Personal safety	3.85^L	4.28^H	4.16^H
Income sufficiency	3.72^L	3.87	3.93^H
Health	3.75^L	3.85	3.90^H
Services and facilities	3.42^L	3.65^H	3.48^L
Town appearance	3.60^L	3.60	3.75^H
Roads	2.76^L	3.09^H	3.23^H
Environmental quality	3.88	4.02	3.90
Environmental management	2.95^L	3.14	3.31^H
Citizen voice	2.95^L	3.25^H	3.00^L
Economic opportunities	2.22^L	2.66^M	3.07^H
Community cohesion	3.45^L	3.91^H	3.73^H
Local trust	3.30^L	3.64^H	3.69^H
Community participation	3.20^L	3.28	3.40^H
Community spirit	3.92^L	4.20^H	4.26^H
Social interaction	3.40^L	3.62^H	3.66^H
Overall community wellbeing	3.84^L	4.12^H	3.96^H
Expected future wellbeing	3.69^L	4.02^H	3.81
Place attachment	4.16^L	4.52^H	4.42^H
Community resilience	3.15^L	3.49^H	3.04^L
Community attitudes and feelings towards CSG ¹	2.74^L	3.00^H	2.79

Note: ¹ Qld averages have been adjusted for comparison purposes (see measures section).

Bold font indicates a significant difference; Means with different superscript letters are significantly different (L = lower; M = Middle; H=higher)

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