

Lessons from developments of resource extraction industries in rural areas: a literature review

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Glossary

Economic demonstrable resources (EDR) – This term is employed to differentiate resources that can be feasibly extracted given current market and technology conditions, from resources that exist (or potentially exist), but where current costs and technology make them prohibitive or unfeasible to extract.

Mining employment, mining labour – Following the principles used by the Australian Bureau of Statistics, mining employment and mining labour refer to all forms of resource extraction including mineral, oil and gas extraction.

Non-tradable or local goods sector – Refers to all industry related to goods that are neither exported nor imported to local communities such as housing, local services, etc.

state (all lower case) – Generalised set of institutions which has the authority to make rules to govern society.

State (capital s) – A particular set of institutions which has authority to make rules to govern in a particular context (e.g. The State of Queensland).

Statistical local areas (SLAs) – Refers to a type of geographic unit that the Australian Bureau of Statistics uses to capture and deliver Census aggregated data. In Queensland, there were 475 SLAs in 2011.

Tradable or non-local goods sector – Refers to all industry related to the production of goods that can be traded between local communities and other markets such as consumption goods, food, etc.



Executive summary

At any given point in time, regions may appear static. Their populations, economies and identities may give the appearance that this is how they always were. However, even a cursory glance at history shows that they have changed substantially over time. Usually, when change is driven by mineral and energy resource extraction, the pace of change has been fast – gold rushes are a prime example. Understanding the nature of change is the focus of this report and the research project that builds upon it. Considering this, we start in section 1 by providing a brief discussion on the nature of rural change.

In section 2 of this report we summarise some relevant studies that have analysed how different resource developments, especially ones related to the extraction of energy resources, have affected local areas in different countries. From the literature reviewed and referring to economic theory, we categorise the potential socioeconomic consequences that are likely to emerge after resource extraction developments in three levels: initial, direct and indirect effects. The initial effect is given by the increased demand for labour generated by resource extraction projects, a phenomenon likely to happen across cases. Direct effects relate to three main economic outcomes: (1) increased income in local areas (coming from higher wages paid by the resources sector), (2) increased demand for local goods (triggered by higher levels of income in the local economy), and (3) movement of labour from the tradable goods sector to the resources sector. All three effects are direct consequences of increased demand for labour generated by resource expansions. Indirect effects transpire via a range of socioeconomic changes likely to occur as consequence of the described income and demand effects. Among important indirect effects identified in the literature are changes in income inequality, migration, housing affordability and construction employment, among others. In section 3 we also summarise the types of governance changes that can occur as a result of the rapid development of resource extraction industries.

Lessons for responding to challenges are presented in section 3. In particular, we consider the importance of dialogue, which plays an important role in how regions respond to changes brought about through extractive industries. Case studies identify the risk of regions developing dependence on subsidies and financial support associated with corporate social responsibility. For this reason, an alternative way of viewing the relationship between regional communities and resource extraction projects involves creating shared value, such as through supply chain decisions. Moreover, the cross-sectoral effects of resource extraction projects are key determinants of how regions experience resource extraction projects, and how benefits of resource extraction are distributed. A key sector here is non-tradable goods, such as restaurants and other hospitality services.

Finally, in section 4 the report considers the implications of the literature review's main findings for the coal seam gas industry in Queensland. The literature review draws attention to the importance of context – the nature of the population and labour market prior to the development of coal seam gas (CSG). Furthermore, it emphasises that headline indicators such as employment and income are important, but should not overshadow indirect effects which may in the long run play a greater influence in determining how rural transition is experienced by the region.

1 Background: conceptualisation of rural transitions

1.1 General discussion on rural change

The history of rural Australia is a history of change which spans all sectors of the economy (Cocklin and Dibden 2005). In agriculture we can observe major social and economic changes flowing from state subsidised agricultural expansion, and conversely from deregulation of agricultural markets in subsequent years (Lawrence 1987). More recently, the services sector has been affected by ex-urbanites attracted to rural regions for 'tree change' and 'sea change' migrations (Curry et al. 2001). The resources sector has long been involved in rural change. In the past, gold rushes brought massive changes to rural regions, on a scale which is difficult to appreciate a century later when sentimental reflection and cultural tourism are more common. The gold rush years had a significant impact not only on the towns themselves but on the wider population. For instance, in the state of Victoria, gold rushes in the 1850s and 1860s resulted in the development of towns such as Ballarat and Bendigo and multiplier effects accruing to Melbourne, such that the total population of the state increased sevenfold in only ten years: from 76,000 people in 1850 to 538,000 in 1860 (La Croix 1992). These towns continued to evolve after the gold ran out, with the effect that towns such as Ballarat and Bendigo take great pride in their gold rush legacy.

Making sense of the processes of change has been a strong focus of social research (Tonts et al. 2012). When attempting to understand rural transition, many researchers have considered the issue of multifunctionality and post-productivist landscapes (Holmes 2006). Namely, that in many countries, rural regions previously had a single function – usually the production of food and fibre – and that this role has been replaced or supplemented with multiple roles. Due to the origin of this concept in Europe, much of the focus of multifunctionality has been on symbolic and cultural roles associated with lands which were purely productive. Where this is associated with additional economic activity, generally the economic activity has been focused on consuming the countryside, in the form of rural tourism such as farm stays and second home ownership (Wilson 2001).

Holmes (2002; 2006) has argued that the direction, complexity and pace of rural change in Western societies can be seen as a multifunctional transition leading to greater complexity at all scales. In Australia, the extensive supply of land and sparse investment in agriculture have facilitated local transitions towards enhanced consumption and protection values. Examples of the former are reflected in shifts in land use to encompass residential development, recreation and tourism. Protection values are apparent in an increasing emphasis on preserving biodiversity and on indigenous land rights. Seven types of rural land occupancy can be identified nationally: productivist agricultural; rural amenity; small farm (or pluriactive); peri-metropolitan; marginalised agricultural; conservation; and indigenous (Holmes 2006). However, these modes tend to be spatially discrete, and rarely do we see two modes of occupancy sharing the same land parcels in a country as large and sparsely populated as Australia. In Australia, much attention has been on 'amenity-led' migration – the relocation of urban residents to attractive rural landscapes with recreational appeal (Argent et al. 2007; 2010).

Considering this context, the development of the coal seam gas (CSG) industry in regional Australia represents another step in the history of regional transitions in Australia. To some extent, it reflects the development of multifunctional regions, as posited by Holmes (2006), albeit with one significant difference. Mostly when we look at examples of multifunctionality, we see different types of functions reflecting different sectors: a productive function in the form of agriculture and a symbolic function in the form of tourism. Rarely do we see regions transforming into multiple productive functions, which is exactly what has happened with CSG. The productive



functions associated with agriculture and energy extraction share the same space. The closest we have seen to this in Australia is the development of wind farms on grazing land (Gross 2007).

Though wind energy and CSG are different in many ways, they are both the subject of concerns over visual impacts and questions about equity in terms of procedural justice around how decisions are made and fairness of outcomes in terms of local benefits (Gross 2007; Devine-Wright 2005; Wolsink 2007).

2 Local changes induced by the resource extraction industry: lessons from the literature

2.1 Economic change: employment, direct and indirect impact

The main initial economic impact of resource expansions in particular regions is the increase in labour demand associated with the resources industry. Focusing on energy resources such as coal, gas and oil, several studies have investigated the impact of this type of extraction on local employment. In particular, one important branch of empirical studies emerged after the study of Black et al. (2005), who investigated employment growth in local economies of areas where coal mines were operating in the US between 1970 and 2000. These authors found that employment increased in counties hosting the coal industry while the boom lasted.

Following the work of Black et al. (2005), many studies have investigated employment effects in areas affected by some type of resources boom. Among the studies that followed Black et al. (2005) and that focus on energy resources extraction, it is worth mentioning the following:

- Marchand (2012) observed the employment changes that emerged during the natural gas and coal boom and bust in Canada during the 1990s. One of its main findings is that employment increased during the boom.
- Weber (2012) analysed the employment effect of the natural gas boom in the US states of Wyoming, Texas and Colorado, during 1998–2008. The findings showed that for every million dollars worth of gas extracted in these areas, 2.35 more jobs were created in the average county hosting the gas industry.
- Caselli and Michaels (2013) examined data from Brazil and analysed the effect of the expansion of petroleum extraction in western areas of the country on employment and other factors, finding a positive link between oil extraction and employment.

The increase in labour demand that a resources boom produces over local economies can be considered as the initial economic consequence that the resource extraction industry is likely to produce across communities. From demand in mining employment, three additional direct economic effects are likely to emerge in local areas: (1) local wages will increase as more labour is demanded, (2) an increase in the demand for services and non-tradable goods (such as housing) is likely to happen as people will have more disposable income, and (3) a movement of labour from manufacturing and/or agriculture (tradable goods sectors) to the resources sector is likely to occur as the manufacturing and agricultural sectors, in general, cannot compete with the wages offered by the resource extraction industry.

Subsequently, from the three direct effects mentioned, additional short and long term effects are also likely to occur. These additional effects can be considered as local indirect consequences of resource expansion. Table 2.1 describes some of the potential indirect effects that resource development can cause over local economies as consequence of the direct economic effects that increased mining labour demand generates in a local economy.

Table 2.1: Direct and potential indirect effects associated with resource extraction

| Direct effects | Indirect effects | Other indirect effects |
|--|---|---|
| (1) Local wages increase | <ul style="list-style-type: none"> • Immigration • Counter migration • Reduced commuting time • Poverty reduction | <ul style="list-style-type: none"> • Saturation of original infrastructure • Increase of men/women population ratio • Income inequality may increase, especially among women |
| (2) Increase in demand for services and non-tradable goods | <ul style="list-style-type: none"> • Housing affordability • Increase in employment in local goods sector • Increase in demand of public services | <ul style="list-style-type: none"> • Increase in employment in construction • Outmigration of low income families |
| (3) Movement of labour from manufacturing and/or agriculture to the resources sector | <ul style="list-style-type: none"> • Manufacturing firms closure • Reduction of agricultural outputs • Increase of imports • Food prices increase | <ul style="list-style-type: none"> • More employment volatility • Less demand for non-resource extraction training/education • Less entrepreneurship |

Whether all, some or none of these indirect effects will take place in a specific community will depend, of course, on many characteristics of the respective local economy. Specifically, among the communities' characteristics that are very likely to affect the extent of the direct and indirect impacts generated by resource windfalls, we can outline the following:

- *Mining history*: a community that has historically had resource extraction as a main component of its economic structure is likely to experience less impact from resource extraction expansion than a community with no history of resource extraction.
- *Labour force skills*: the skills that local workers possess are crucial in filling new jobs produced by resource sector expansions. In this regard, the role of initial skills, training opportunities and labour migration combine to determine how much local labour is used.
- *Weight of manufacturing*: manufacturing is generally one of the industries most affected by resource windfalls due to currency exchange rate increases and increased demand for labour. In this way, a local economy that relied heavily on manufacturing before the expansion of the resource extraction industry can be negatively affected by potential firms' closures. On the other hand, if manufacturing was not important before resource development, fewer impacts are likely to be observed.
- *Integration of the local economy into the region/country economy*: the more a local economy is integrated to the regional economy, the less likely the local economy will be to suffer negative consequences from future resources sector reduction or closures. Thus, distance and other factors are important to consider as more isolated communities will be less likely to cope with resource volatility.
- *Multifunctional economies*: this also relates to the previous point, given that the higher the diversification of a local economy, the less likely it will be (positively or negatively) affected by resource extraction development.

- *Housing market*: if the local economy has a dynamic housing market, the increasing housing demand generated by resource development will be rapidly fulfilled with supply. However, if the housing market does not respond adequately to new demand, housing affordability is likely to become an important issue in the community.

Table 2.2 summarises some evidence found in the literature related to some of the described direct and indirect economic effects of resource extraction in local economies, across different regions of the world – including Australia. The lessons shown in this table highlight how different impacts are likely to occur across cases, but others are not necessarily a problem.

Table 2.2: Resources sector development link to local development, evidence from the literature

| Potential positive effects | Potential negative effects | Regions/areas analysed | Reference |
|---|--|------------------------------------|---------------------------|
| Employment increase | | Provinces, Spain | Domenech 2008 |
| Income increase | | | |
| Better communication access | | | |
| Educational levels increase | Housing affordability an issue | Local councils, Australia | Hajkowicz et al. 2011 |
| Employment increase | | | |
| Resources sector increases income for both <i>current</i> and <i>future</i> generations | | USA (all States) | James & James 2011 |
| | Lower total employment growth | | |
| Per capita income increase | Reduction in non-basic employment growth | Counties, USA | Kilkenny & Partridge 2009 |
| | Population growth reduction | | |
| Regional growth only in non-corrupt bureaucracies | | Regions, Russia | Libman 2013 |
| Resources sector and manufacturing employment increase | | | |
| Per capita income increase | | USA (eight southern states) | Michaels 2011 |
| Population increase | | | |
| More infrastructure | | | |
| | More income inequality among women | Statistical local areas, Australia | Reeson et al. 2012 |

2.2 Changes to governance and service delivery

A change in economic activity may require a change in local or regional governance. This is more likely to be an issue in remote locations with small, sparse populations with minimal pre-existing infrastructure and services transitioning into larger, more concentrated populations needing more infrastructure and services (usually close to intensive resource extraction sites). However the rapid construction of infrastructure and provision of services cannot easily be achieved by local government agencies. More generally, governance itself has changed since the late 20th century. Policies have increasingly focused on shaping the context in which management occurs, such as defining regulatory standards or policy targets, while leaving actual implementation decisions and actions to individuals or third parties including private companies (Higgins and Lockie 2002; Summerville et al. 2008). Activities which may previously have been conducted solely by the state have increasingly been managed through partnerships or other forms of alliance between governments and other actors. These other actors can include private companies, small scale community-based organisations or larger not-for profit organisations. This type of transition, which has occurred in a wide range of developed countries, is not restricted to the resources sector. It is generally referred to as a change from *government* to *governance* (Cheshire 2010; Rhodes 1996).

Early experience of shifting from *government* to *governance* provided pitfalls when sharing the process of governing. In particular, useful insights can be gained from considering changes in the role of the state in governing resource extraction in Africa. In many African countries, following high levels of deregulation to attract foreign investment in the 1980s, the last decade of the 20th century brought increasing recognition of the need to manage environmental impacts, initially through self-regulation – which turned out to be ineffective. From the start of the 21st century, driven by increased levels of resource extraction, African countries have taken an increasing role in facilitating mine development while overseeing the regulation of impacts and working with local authorities to define which social, economic and environmental impacts to focus on (Campbell 2004).

An important lesson from African studies is to avoid the simple transfer of state responsibilities to other governance actors (e.g. private companies). This is difficult to avoid in locations with very minimal service provision prior to new mines commencing production, when private resource companies may need to provide public services, such as health, education, and road maintenance, as the only effective way to deliver these services under the circumstances. The risk here is that resource extraction companies may be reluctantly forced into the role of ‘surrogate governments’ (MMSD 2002; Cheshire 2010). Fortunately, in more densely settled rural areas such as the Surat basin there is little risk of this occurring. Resource companies may share the process of infrastructure development and service provision (for example, in relation to housing or roads), but there is less risk of becoming surrogate governments by working in close partnership with the established government presence in the region.

3 Lessons for responding to challenges at the regional scale

3.1 The importance of dialogue

Not many regions prepare for the arrival of extractive industries. Most regions are overwhelmed by the substantial and often rapid changes associated with the resources sector, and make little or no effort to prepare for these changes (Schandl and Darbas 2008). Some communities focus their energy on resisting the resources sector with efforts which are usually not effective in the long run. Those communities which have prepared for the establishment or expansion of extractive



industries have made effective use of dialogue to derive benefits for local communities. Specifically, they have engaged in tripartite (three-way) dialogue between local governments, resource companies and State governments (Schandl and Darbas 2008). Principles for successfully conducting participatory tripartite dialogue include:

- an inclusive approach to dialogue initiation
- providing adequate timeframes to take into account differing capacities of participants
- no single actor should own access to the process
- initial intent and scope of the process must be agreed by all parties
- the process cannot succeed if one party attempts to prematurely claim high ground in the public and policy debate
- any financial resources contributed to the process should not affect the relationships within the process (MMSD 2002).

The difficulties of conducting this dialogue process should not be underestimated (Measham et al. 2012). When studying one such dialogue process in Gunnedah, Australia, Measham et al. (2010) found that even despite differences in the goals of participants, each party had their own reasons for persisting with the dialogue process. From the outset, companies valued the 'early warning system' that the group presented in terms of being able to foresee and address community concerns. Local governments saw benefit in being able to predict local infrastructure needs and consider avenues to fund these. State government representatives saw immediate benefit in having advance notice of likely future needs for service provision in terms of education and health. Subsequently, members of the group started to learn about how their counterparts functioned: the timeframes for achieving different types of outcomes and where the power to make decisions sits.

Over time, dialogue can deliver a wide range of advantages, beyond those expected at the beginning of the process. In the Gunnedah case study, parties were able to openly discuss hypothetical propositions of how the resource extraction might change in the future, e.g. if production were to increase or decrease, if labour forces were to be housed locally or at a distance and so on. Initially each party was reluctant to discuss such issues, for fear of inadvertently giving away confidential information or providing potential ammunition to another party. But over time participants can build trust, and become able to explore these types of issues and discuss ways that other parties may contribute towards deriving local benefits for a region (Measham and Schandl 2013).

Two important factors contribute substantially to the success of dialogue processes. The first is that discussion is moderated by a skilled facilitator who has no financial interest in the outcome of the dialogue. The second is that groups consider themselves as discussion or 'working' groups rather than decision making groups, to openly explore ways of managing rural transition rather than serving political agendas within the discussion group. In the Gunnedah example, the group only discussed the implications of existing and potential developments with a view toward how they would affect shared value for all parties (Measham et al. 2010).

The 'working group' approach described above, focusing on tripartite dialogue between local communities, private companies and state authorities, depends on each party committing to generating shared value from resource extraction. For this mechanism to be effective, those parties with more power and resources (e.g. private companies) must feel that it is in their interest to collaborate with those with less power (e.g. local communities). Tripartite arrangements are increasingly seen as a means to effectively govern local and community outcomes from resource extraction and help companies to establish a social licence to operate (Williams and Walton 2013).

3.2 Focus on creating shared value

As noted in discussing changes to governance and service delivery, resource companies may take on several roles which would otherwise be the role of the state in any given context. The main risk in this situation is one of dependency: that communities may come to rely too heavily on resource companies and are at risk of service delivery failure following sectoral downturn (Cheshire 2010). Potentially, this risk can be extended more generally to acts of corporate responsibility, whereby society expects handouts from businesses as compensation for the social costs of corporate profits (Porter and Kramer 2011). An alternative way of looking at the relationship between resource companies and regional communities is to focus on creating shared value. According to Porter and Kramer (2011), a focus on profit and compensation will reinforce dependency in communities and place more blame on companies for society's failures. By contrast they argue that focusing on creating shared value will help to drive new innovation and economic growth beyond the individual company involved. Shared value is developed not through subsidies but through supply chain decisions and by enabling local economic development clusters (Azapagic 2004; Feser and Bergman 2000).

3.3 Actively considering cross-sectoral effects

As suggested by economic theory and evidenced by the literature, different economic sectors can see different outcomes from the expansion of the resource extraction industry.

The economic sector that can benefit from a resource boom is the so-called 'non-tradable or local goods' sector. As the resources sector employs more people in 'local' communities (or communities neighbouring mines), the demand for services is likely to increase. This means that rural towns will have opportunities to expand services such as restaurants, mechanics and construction. In the same regard, the local housing market is also likely to have a boom, as more income becomes available in the community and potential immigration of people to work in nearby resource companies increases demand for housing (Haslam McKenzie and Rowley 2013). Although this is a positive effect for some local residents (specially house owners and local rental agencies), the higher cost of housing can negatively affect residents who do not own properties (renters) or local shops that do not make enough revenue to cover increasing commercial rents.

The economic sector that can be negatively affected by the resource extraction industry is the so-called 'tradable or non-local goods' sector. This sector, characterised mainly by manufacturing and agricultural firms, generally does not have the capacity to compete with the resource extraction industry to retain labour. As the resource extraction industry expands in certain regions, labour demand generated is likely to be covered by employers in these types of sectors, as the commodities these firms produce can easily be imported from other regions – it is economically more efficient to import goods than labour – with the potential consequence of manufacturing closures or agricultural productivity decline.

4 Implications for research for the coal seam gas development case in Queensland

Based on the reviewed literature, several issues are clearly relevant to the nature of transition that occurs through resource industry expansion. When focusing on the coal seam gas (CSG) case in Australia, it is important to contextualise how this development is taking place, which provides insights about impacts from this development.

As a consequence of high international prices and better technologies, commencing in the mid 1990s the CSG industry started operating across the state, but especially in the Surat and Bowen basins (see Figure 4.1). The Surat basin encompasses more than 60 per cent, and the Bowen basin around 35 per cent, of Australia's total CSG EDR known by 2008 (GA and ABARE 2010). This CSG development meant the creation of over 4,000 wells in Queensland by 2011, covering only a small fraction of the reservoir to date (GA and ABARE 2010).

One important consideration when focusing on the effect of CSG in Queensland is the distribution of CSG wells, potentially affecting multiple local communities in different ways. The distribution of the statistical local areas (SLAs) of the state is shown in Figure 4.1. SLAs are potential units of analysis given that a range of socioeconomic indicators measured with National Census data are available at this scale. As mentioned in section 2.1, when evaluating the economic impacts of resource expansion it is important to consider the characteristics of the particular local area. In CSG development, the previous history that local communities across Surat and Bowen basins have had with the resources industry is particularly relevant. Consideration should be focused on the differences between the Surat basin and the Bowen basin in terms of mining history, where the latter has been involved in mining (especially with the development of coal mines) for much longer than the Surat basin. Not all the lessons from locally intensive coal mining in the Bowen basin may apply to the more extensive, diversified CSG industry, so it will be important to determine which impacts are similar and which are different.

In terms of future research, an important next step will be to analyse the effects that the CSG industry may be having on employment and income effects, in both the Surat and Bowen basins. As outlined in the literature reviewed in this report, employment and income effects are major initial impacts which are likely to trigger other direct and indirect consequences. Therefore, to better understand the way that the Surat and Bowen basin regions experience CSG expansion we should first investigate employment and income effects and then examine the wider indirect set of socioeconomic effects likely to be associated with the CSG industry development, namely: non-mining employment, housing affordability, migration and income distribution.

This report has clear linkages to the sibling projects in the GISERA Social and economic portfolio. Rural transition has implications for services and for developing effective governance to deliver changing service needs, which is fundamental to GISERA Social and economic project 3. The way in which regional transition manifests is likely to have particular impacts on community functioning and wellbeing, so the outputs of this project will be highly relevant for GISERA Social and economic project 2. The ways in which communities respond to change will be influenced by their approach to resource companies, expressed in part through the extent to which they seek compensation through corporate social responsibility initiatives or create shared value, with implications for the ways residents seek to invest community funds (as considered in the GISERA Social and economic project 4). Finally, the experience of change is strongly affected by community aspirations, which are being explored through GISERA Social and economic project 5 (Williams and Walton 2013).

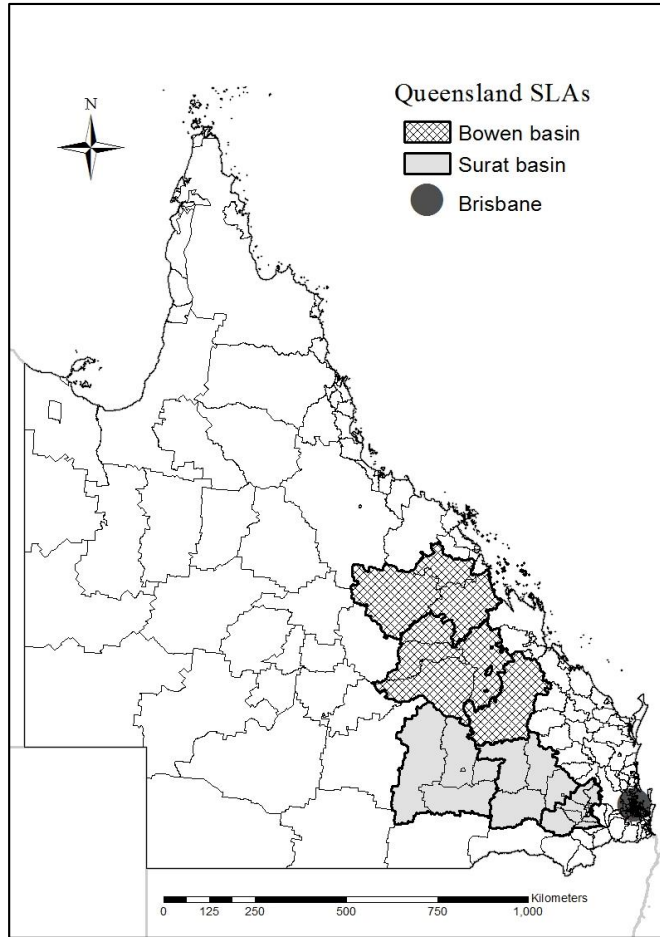


Figure 4.1: Surat and Bowen basins in Queensland. (Note: grey borders correspond to statistical local areas (SLAs))

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