

Social and Economic Issues Associated with the Bowen Basin Coal Industry: Community Engagement to Reduce Conflict Over Mine Operations

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ABSTRACT

A major project is being undertaken in the Bowen Basin coal mining region of Queensland, Australia, to assess how economic and social impacts of mining should be assessed and negotiated with regional communities. Coal mining has a major impact on regional communities in generating regional incomes and employment. At the same time, the industry is reliant on communities for the supply of labour and business services. While the mining industry and communities have common interests, often it is difficult for them to work together. The focus of this paper is to identify the strengths and weaknesses of traditional social and economic impact assessment tools, to identify a range of other mechanisms that are appropriate for engagement purposes; and to outline the potential use of some of these approaches. These include predictive mechanisms such as input-output analysis, assessment mechanisms such as choice modelling and experimental workshops, and engagement mechanisms such as extended stakeholder analysis.

Introduction

Coal mining is a major industry for Queensland, and an important contributor to the economy and social fabric of many regional communities. Economic activity and growth can foster improvements in social conditions in a number of ways. These include the direct creation of jobs, with corresponding flows of income and wealth accumulation. Economic growth also allows more resources to be used for social services such as health, education and welfare, both through private and public spending.

The mining industry is a key part of the state's economy, accounting for over 10% of the Gross State Product (ACIL Consulting 2002). It employs nearly as many people as agricultural industries, but tends to pay much higher wage levels. Most mining activities are in regional areas, and require capital spending on infrastructure requirements. As a result of spending on wages, infrastructure and operating costs, mines provide direct injections of economic stimulus into regional areas. They also help to maintain regional employment and population growth.

At a broad level, the impacts of the mining industry on the state's economy and social capital are clear and substantial. At the regional and local level though, the impacts are not so easily defined, particularly for a single mine. This is for two key reasons. Firstly, it is not transparent what the economic and social impacts of mining are on a particular region or local area as compared to other industries and the provision of public services. Secondly, there is some diversity in the operations and supply of labour to mines, making it harder to identify the impacts of a particular operation on economic and social factors.

Hence, the role of the coal mining industry in regional communities is both profound and poorly understood, particularly in relation to the ways in which the role and impacts of mining change throughout the life cycle of mining operations. At the same time, the social and economic effects (whether real or perceived) of coal mining operations on nearby com-

munities often are the focus for considerable conflict and misunderstanding. While genuine conflicts of interest may exist, lack of active engagement between mine proponents or operators and relevant communities exacerbates that conflict and limits opportunities to capture benefits and limit negative impacts. This is especially the case in relation to mine closures.

The social and economic impacts of mining on communities can be summarised into three broad areas:

- Impacts on local communities;
- Impacts on the wider region (particularly where shiftwork patterns allow families to be located away from the local centre); and
- Impacts on individual families and the decisions they make about whether to locate in local or regional centres.

Impacts that are experienced positively in one of these areas may be experienced negatively in another. There is often a lack of clarity over the exact magnitude of positive and negative impacts, and over procedurally just ways of allocating resources to manage them. This has led to considerable confusion and conflict over questions such as the extent to which individual mine operators should take responsibility for the provision of infrastructure in nearby communities affected by other mines, other industries, and the policies of multiple levels of government.

The standard approach to dealing with economic and social impacts of mining operations has been to conduct impact assessments as part of the Environmental Impact Assessment process which underlies the approval process for many new mines. While this remains an important part of the assessment process, there are a number of potential weaknesses with relying solely on this methodology to address adverse impacts. These can be summarised as:

- Impact assessments are typically only conducted for major new projects, and subsequent changes or expansions of existing projects are not covered;
- Impact assessments are only conducted at the beginning of a project, and there are currently no mechanisms to conduct follow-up assessments;
- There are no follow-up evaluations or assessments to test the accuracy of predictions or modelling contained in an impact assessment; and
- There are a number of other variables influencing economic and social impacts (eg changes in demographics, technology, commodity prices and employment relations) that can impact on local and regional communities, and which are not covered in an impact assessment process.

International literature on best-practice in social and economic impact assessment suggests that: (1) where mining companies actively seek the views of the community and other stakeholders on proposed mine development, mine operation and mine closure, there is significant potential to reduce conflict and maximise the local capture of benefits from coal mining (Families Youth and Community Care 2000, Burdge and Vanclay 1995 and Inter organisational Committee 2003); (2) engagement of the community and government in planning over the length of a mining cycle can lead to more efficient provision of infrastructure in regions (Mining, Minerals and Sustainable Development 2002); (3) the social and economic sciences offer a range of tools to ensure that community engagement goes beyond traditional processes of consultation and communication; and (4) the social and economic sciences also offer a range of tools to ensure that negotiations between mine operators and other stakeholders are based on accurate and rigorously collected information (Lockie 2001).

Existing literature on natural resource planning and management now takes it as given that broad consultation and participation reduces conflict and improves the quality of decision-making. In relation to large resource development projects, public involvement is seen as something that should occur early in the life of a proposal in order to ensure that:

- impact assessment processes incorporate local knowledge about social conditions, processes and likely impacts;
- attitudes and perceptions towards proposed change can be identified;
- subjective and cultural impacts may be identified;
- appropriate mechanisms to involve different groups in the decision-making process may be identified;
- the views of the public may be incorporated at the stage of project design and used to maximise benefits rather than simply to compensate the losers following implementation;
- a range of alternative mitigation and development options may be identified and adequately assessed; and,
- conflict over projects may be minimised by ensuring that as many interests as possible are considered in decisions and appropriate mitigation strategies are put in place (Lockie et al 1999).

In this paper, the strengths and weaknesses of traditional social and economic impact assessment tools are assessed. A range of other mechanisms are nominated that might be more appropriate for engagement purposes (e.g. input-output analysis, annual social and environmental statements, choice modelling and experimental workshops, and extended stakeholder analysis). The potential use and design of some of these approaches is outlined in the paper.

The coal mining industry in the Bowen Basin

Industry overview

There are a number of coal mines in the Bowen Basin. The basin extends from Collinsville in the north to Moura in the south (see Figure 1), and produced \$2.76 billion of coal in 1999/2000. This was 34% of Queensland's total mineral production (Department of Local Government and Planning 2002). Mining activities tend to be carried out by larger scale firms. There were 45 coal mines operating in Queensland during 2003–04. Of these, 34 were open-cut mines and 11 were underground (Natural Resource Management 2005a). About 85% of the state's coal is produced from mines in the Bowen Basin and the remainder comes from mines in the Moreton, Tarong, Callide and Surat basins.

A number of new developments and changes to mine operations have occurred since 2001. Mines which commenced production during 2003-04 include the Hail Creek mine in the northern Bowen Basin, plus an extension of the Moura Mine south into the Theodore coal deposit. Development work commenced or continued at new underground mines at Grasstree (German Creek), Newlands Northern, and Broadmeadow (Goonyella), and new open-cut mines at Eaglefield (North Goonyella), Theodore (Moura) and Rolleston, all in the Bowen Basin.

Feasibility and development work continued on a number of other projects, and further new mines development are under investigation. Other summary statistics are:

- Queensland exported a total of 129.2 million tones of coal in 2002-2003; an increase of 5% on the previous year.
- Queensland exports coal to 35 countries worldwide. The largest purchasers of Queensland coal in 2002-2003 were Japan (40% of total exports), Korea (15%), and India (10%) (Natural Resource Management 2005b).

Coal mining firms directly employed approximately 16,400 people in Queensland, and paid them almost \$1000 million in salaries (ACIL Consulting 2002). A further 15 – 20% of jobs and salary payments would have been sourced through payments to contractors, and a further \$2,200 million paid to firms that provided goods and services to the mining industry (ACIL Consulting 2002). It is estimated that there are up to 60,000 full-time and part-time jobs involved in the provision of goods and services to the mining industry.

The importance of mining to regional economies is amplified by the high incomes of employees in the mining sector. Average weekly earnings in the mining sector in Australia are higher than any other industry, and were \$1,424/week for a full-time employee in August 2001. Wage levels are approximately double weekly earnings in the retail trade and tourism industries (ACIL Consulting 2002).



Source: Bowen Basin website (*Bowen Basin Area Map* 2003)

Some social and economic trends in the Bowen Basin

Within the coal industry, there are a number of important trends that have an impact on social and economic factors. Some of these are summarised here.

(a) Commodity cycles

Typical of many resource industries, the coal industry is affected by major commodity cycles. In the late 1990s, the industry contracted its workforce in the Bowen Basin, partly as a consequence of relatively low returns from coal production. In more recent times, the industry has enjoyed a major resurgence. The price of coal has trended upwards since March 2004 as China and India entered the market as major purchasers and oil prices have tracked higher. While production has trended upwards in response to the increased prices, there are a number of major developments occurring that will lift production further in coming years. These developments will impact on the regional economy.

The Queensland Government has predicted that there will be a growth rate of 7% per annum in the coal industry from 2005 – 2010 (McGrady 2004). The amount of coal transported by rail is expected to increase from 143 Mt in 2003/04 to 202 Mt in 2009/10. There are a number of current and potential developments across the Bowen Basin as producers respond to the increased demand for coal.

(b) Operational changes

There have been changes in employment patterns within the coal industry over the past few years, with downstream impacts on social and demographic changes. First, there is increasing emphasis on the use of contractors to perform some or most of the mining operations. This change has been driven by searches for efficiencies in production. Second, there is increased usage of variations on fly-in/fly-out operations⁷, where mining companies no longer build mining towns or take full responsibility of employees outside of working hours. There have also been changes in industrial relations agreements and shift work patterns at many mines across the Bowen Basin.

One effect of the changes is that employees now have more choice about where they are located. Many employees now live in the larger centres or coastal cities and stay in company accommodation when they are completing a shift. Another effect is that there has been some turnover of people across mining towns as many mining companies have shed staff. Most of the mining towns have maintained population with increased employment by contractors and service industries.

(c) Social and demographic changes

These changes have to be viewed in the context of other demographic influences on regional Queensland. There have been population losses in many regional areas as increased efficiencies in agriculture and service industries mean that fewer people are employed in those sectors. In many cases, the population movements are from rural areas and smaller towns to larger centres within regions. Better transport and communication facilities, increased

⁷ Workers fly-in to a work site for extended periods before flying back home to their families for time off. The shift can vary, e.g. 7 days on and 7 days off.

emphasis on service industries and the increased scale of firms and enterprises are among some of the economic reasons why larger centres have grown at the expense of smaller ones.

There are also a number of social reasons why there have been population movements to larger centres. These include better employment opportunities (especially for partners), better education and health services, increased recreation opportunities, and quality of lifestyle factors. Currently, there are a variety of employment patterns at the different mines across the Bowen Basin, ranging from the traditional company town close to the mine site option to the more recent fly-in/fly-out operations. This means that there is some opportunity for employees to “vote with their feet”, and shift to the mining operation that suits their personal preferences.

The intersection of the current boom in the mining industry and the demographic shift away from regional areas is creating acute shortages of skilled labour in some areas. It is becoming increasingly difficult to source skilled labour in the region. Reasons for this include:

- a limited pool of specialist skills,
- limited training opportunities/graduates in some fields (eg mining engineering)
- difficulties in attracting skilled employees to move to regional areas.

These factors mean that it is important that regional communities remain attractive residential locations, both to retain existing skilled professionals, and to attract further ones. However, the attributes of communities that are important for current and prospective residents are complex. They include issues such as social capital, service provision, social infrastructure, economic services and infrastructure, access to major centres, and entertainment and recreation opportunities. The research undertaken in this project in the Bowen Basin explores some of these issues.

Tools of economic and social research

With relation to the coal mining industry, economic and social impact analysis can be applied to the following special cases of the generic impact analysis application.

- Impacts of an existing mine in a region.
- Impacts of developing a new mine in a region.
- Impacts of expanding existing mines in a region.
- Impacts of closure of mines in a region.
- Impacts of policy or regulatory changes affecting mining output.

There is a broad range of economic and social research techniques that potentially can be applied to issues of local and regional impacts resulting from coal mining activities. The focus has typically been on the use of various categories of impact assessment techniques, although other economic tools are normally employed to make funding and investment decisions. Here, a brief description of those tools is provided (Table 1).

Social, economic and demographic overview

Both economic and social impact assessment techniques share a common first stage where demographic and other background information about the case study of interest is collected. This can involve a situational analysis of the local and regional areas affected, a description of the project proposal, and some modelling about employment, population and other factors.

Economic analysis

Economic impact assessment

Economic impact assessment is used to identify where policy options may impact on different groups in society, without making any judgement about whether the policy options create net benefits. For example, the use of economic assessment in particular case studies could be used to identify the financial impacts of mining activities on households and industry.

Economic impacts of expenditure into a regional economy can be generated by estimating

- the size of the direct impacts (the amount of expenditure injected) and
- the multiplier effect.

An economic assessment can be done using different types of assessment techniques, e.g. expert opinions; technical estimates (e.g. results transferred from other research); economic base multipliers, (Keynesian-type multipliers); and more sophisticated methods: (e.g. input-output methods and general equilibrium models). The choice of the method depends largely on the expertise of the practitioner, the data available, the nature and the scope of the project and the required accuracy of the information. While expert opinions and simplistic approaches are useful for demonstration purposes, they are not the most accurate ways of estimating economic impacts. For that purpose, mathematical models termed input-output models or general equilibrium models are used, which help to estimate the size of ‘ripple’ effects of changes in income, expenditure and employment.

There is often interest in predicting changes in economic activity that might occur at a sub-regional level, particularly when these relate to the impact of industry development such as the expansion of the existing coal mining industry or the development of a new coal mine in the region. An advantage of input-output analysis is that the impact assessment can be done simultaneously. It also tends to be more detailed and accurate than simpler estimation techniques, but requires substantial data and effort to apply it properly (Ivanova and Rolfe 2005). The smaller the region, the more specialised the required knowledge of the regional economy to adjust the input output table.

It is possible to use survey methods to provide data for constructing an input-output table for a smaller region when little useful official statistics are available. The economic analysis of coal mining expansion impacts on sub-regions and local communities may need to be accompanied by a sensitivity analysis to adjust input-output models to a more realistic framework. The results should be treated with caution due to limitations of the input-output method, data used and assumptions made. However, they provide some guide as to the size of distribution of impacts from the current coal mining expansion (Ivanova and Rolfe 2005).

While the economic impact assessment traditionally had been focused on monetary values, more recent trends are to include values that have no explicit market value and therefore can not be assessed using traditional economic tools. There are two main methods that can be used to assess the impact of a project on some non-monetary values: the contingent valuation and choice modelling methods. While the contingent valuation method is somewhat limited in scope, choice modelling offers a number of benefits in evaluating how people may make choices between different tradeoffs.

The focus of economic impact assessment can be similar to social impact assessment, where a key focus is to identify groups that may be disadvantaged so that remedial or compensatory strategies can be developed. Different economic techniques are needed to determine if a project or particular proposal has net benefits, and these are detailed below (after social impact assessment has been described).

Economic evaluation techniques

While economic impact assessment tends to be focused only on identifying and predicting the types and distributions of impacts, many other economic techniques are focused on evaluating whether the net outcomes of various impacts are worthwhile. The most commonly employed tool is cost-benefit analysis, which offers a methodology to evaluate the overall benefit of a program to society. The idea behind cost-benefit analysis is relatively simple, in that it tries to assess the overall outcomes of a project or projected change in environmental assets by adding up all the benefits and all the costs associated with the change. If the net result is positive, then the implication is that the proposed change produces more benefits than costs and, therefore, appears worthwhile.

To be able to perform a cost-benefit analysis, there are three very important steps to perform. The first of these is to identify all the different outcomes (positive and negative) that might arise from the proposed change. The second step is to value these in a common measuring unit so that they can be compared, and money is generally used for this purpose. The third step is to discount all the impacts back to a common time period, so that the amounts can be summed. The final step in the process is to add up the benefits and costs so that an estimate of net benefits or costs can be made.

The advantages of a cost-benefit study are that it attempts to be inclusive in terms of measuring all the outcomes of a proposed action, explicitly values the different impacts and outcomes, and provides a framework where very different outcomes may be assessed against each other.

One of the disadvantages associated with cost-benefit analysis studies is that they can be expensive and time consuming to do properly. As a result, many studies in the past have concentrated on financial costs and benefits, ignoring or setting aside the environmental and social impacts of projects. Another disadvantage is that some project impacts, such as on environmental and social factors, are not reflected in markets, and specialised valuation techniques have to be employed to assess them.

While it is normal for proponents of major resource projects to employ a financial cost benefit analysis in making a decision to proceed, a more encompassing study to include social costs and benefits is rarely performed.⁸ However, some implicit or explicit assessment of costs and benefits are normally undertaken in evaluating whether or not to provide additional services or infrastructure to communities, and in addressing particular impacts that a project might impose on communities. In some cases, other evaluation techniques such as replacement cost, averted cost or cost efficiency approaches may also be used.

Queensland Treasury (1997) recommends the use of the cost benefit or cost effectiveness analysis in an economic impact assessment. While cost benefit analysis is widely used where the costs and benefits from a project can be expressed in monetary terms, cost effectiveness analysis, on the other hand, can be used where such values are hard to estimate and the costs of meeting alternative environmental outcome can be compared,.

Social impact assessment

There are two broad schools of thought on the basic purpose of social impact assessment (SIA). The first focuses on using SIA to make predictions about social change while the second focuses on using SIA as a tool to facilitate public involvement in decision-making. According to the US Interorganisational Committee on Guidelines and Principles for SIA:

⁸ Some assessment of social costs and benefits is often included in a broad EIS process, but the process remains a impact assessment rather than a complete cost benefit analysis.

Social impact assessment can be defined as the process of assessing or estimating in advance the social consequences that are likely to follow from specific policy actions or project development ... (Burdge and Vanclay 1995).

There is a general consensus within the SIA profession that assessing potential impacts accurately and achieving positive development outcomes is dependent on widespread stakeholder participation in the impact assessment and planning process (Burdge and Robertson 1998; Coakes 1999; Vanclay 2000). Further, they consider it necessary to begin participation/social assessment as early in the life of a project as possible in order to ensure that:

- the impact assessment process incorporates local knowledge about social conditions, processes and likely impacts
- attitudes and perceptions towards proposed change can be identified
- subjective and cultural impacts such as how people perceive change in their local environment may be identified
- appropriate mechanisms to involve different groups in the decision-making process may be identified
- the outcomes of the SIA and the views of the public may be incorporated at the stage of project design and used to maximise benefits rather than simply to compensate the losers following implementation
- potential alternatives may be identified and adequately assessed, and
- conflict over projects may be minimised by ensuring that as many interests as possible are considered in decisions and appropriate mitigation strategies are put in place (see Burdge *et al* 1995; Bisset 2000; Burdge and Robertson 1998; Dale *et al*, 1997; SIAU 2000).

Guidelines provided by the Queensland Treasury (1997) provide some indication of the appropriate issues to cover in a social impact assessment. These include:

- Communities;
- Effects on employment—trade, private sector, or government;
- Analysis of any disproportionate disadvantage to a particular sector;
- Analysis of any appreciable community concerns;
- Any changes in government policy;
- Assessment (qualitative and quantitative) of social impacts—comparison of costs and benefits; and
- Extent of impact and acceptability of identified social issues on the projects and evaluation of key strategies and options to deal with these issues.

Decision assessment frameworks

The discussion of the various assessment and evaluation techniques available demonstrates that there is no consistent mechanism by which results feed into a decision making framework. It is possible that simple economic and social impact assessment data is fed back to communities and decision makers so that they have better information for subsequent evaluation and negotiation processes. Here, social and economic impact assessment remains relatively limited. While this is useful, it is unlikely to resolve disagreements because there is no process for evaluating the information, and no process for coordinating agreed positions.

More advanced stages of economic and social analysis address these issues to differing degrees, with neither being fully satisfactory. Economic evaluation techniques, such as cost-benefit analysis, have strengths in terms of providing overall net assessments of impacts. This can help policy makers to judge if projects should proceed even if social costs are involved. However, because communities may not be directly involved or understand the evaluation process, they may be reluctant to accept the results. In contrast, negotiated social impact assessment has strengths in helping communities to reach agreements about resource

conflicts, but with little certainty that all social and economic consequences have been considered. As a consequence, policy makers (and project proponents) may be reluctant to accept these negotiated outcomes. This information is summarised in the table below.

Table 1 Decision assessment frameworks

Data type	Method of Collection	Techniques/methods	Usefulness/acceptance by communities	Usefulness to decision makers
Background data for the region (Jensen and West 2002)				
- demographic data	ABS or other published and unpublished data, e.g. population, age, labour force, unemployment rate, migration, income	Descriptive, e.g. regional economic growth, structure and change, shift-share analysis, location quotients, coefficient of specialisation, labour market, local market analysis	Useful but is not a direct help in evaluating options	Useful but is not a direct help in evaluating options
- economic data	Various published and unpublished data, e.g. regional production, consumption, trade, prices, costs, investments			
- social data	ABS or other published and unpublished data e.g. education, housing, social security, health, access to services, community	Descriptive		
-environmental data	Various published and unpublished data, e.g. national parks and reserves, deforestation, soil loss, various pollution, environmental movements	Descriptive		
Economic				
- impact assessment data (market and non-market)	ABS or other published and unpublished data Expert opinion Survey data Industry data	Multipliers and Economic Modelling analysis (Jensen and West 2002): Informed opinions Estimates (simplistic, e.g. economic base/Keynesian multipliers, IO method, complex methods, e.g. CGE)	Useful in estimating actual impacts, but is difficult to perform at a community level and does not give overall	Useful but is not a direct help in evaluating options – decision makers still have to evaluate net impact. Can be difficult to do.
- value analysis data	Production models,	Cost Benefit analysis, including inputs from CGE	More policy relevant but often	More policy relevant. Lack of

(market and non-market)	Revealed preferences techniques, Stated preferences techniques	modelling, analysis of consumer surpluses, analysis of producer surpluses	not accepted by communities because of their limited involvement.	acceptance by communities can be a barrier to its use. Often costly and time consuming.
- behavioural models for policy evaluation	Economic workshops Survey data Market data Expert opinion	Range of relationships can be developed, especially demand and supply models Other (e.g. ad hoc assessment; viability (impact on local economy, resources viability, cost-recovering); feasibility (more detailed than viability, market and financial analysis); comparative cost advantage; cost-effectiveness analysis; threshold analysis, planning balance sheet, multicriteria analysis (Jensen and West 2002)).	More policy relevant and can be more accepted by communities if includes all the outcomes of the project	More policy relevant but some methods that are more detailed can be expensive and time-consuming to perform.
Social				
- simple impact assessment data	All social-demographic data Personal interviews with stakeholders and community	Viability (impact on community in terms of employment and income; community acceptance of the project)	Useful and welcomed by communities – but communities still have to evaluate net impact	Useful because it predicts where disagreements may exist – but decision makers still have to evaluate net impact
- negotiated impact assessment	All social-demographic data Personal interviews with stakeholders and community	Extended stakeholder analysis Advisory groups Community forums Workshops with stakeholders Citizen jury	Useful and welcomed by communities and leads to negotiated outcomes. However, results often don't include full consideration of economic aspects	Useful because it represents negotiated positions and reduces conflict. However, problems if economic aspects not recognised or if negotiation positions become entrenched.

Potential mechanisms for engagement purposes

The standard approach to economic and social impact assessment have been to perform an input-output analysis and to hold a community information and engagement process. Both approaches have limitations. Input-output analysis can be difficult to perform at a local and community levels, and rarely involves much consultation with a community. An engagement process can involve limited information transfer and exclude real participation in decision making. In both cases, there can be too much emphasis on the identification of impacts rather than on the net benefits of a project and potential mitigation strategies. To develop more sophisticated approaches to impact assessment it is necessary to view communities and economic developments in more dynamic frameworks as compared to assessing impacts in a static situation.

There are two key elements required in transforming impact assessment into a dynamic framework. These are:

- Individuals and communities need to be given choices over development options, and
- There need to be feedback loops so that choices can be performed on a more informed basis.

The challenge in transforming impact assessment through to a more dynamic setting is to develop assessment mechanisms that can simultaneously engage and evaluate policy impacts.

Here, three key alternatives for engagement mechanisms are described briefly.

(a) Extended Stakeholder Analysis

Stakeholder Analysis utilises standard social scientific methods (structured interviews and surveys) to systematically investigate the values, interests, attitudes and aspirations of those involved in, or affected by, particular decision-making processes. This data is then made available to stakeholders in order to provide a more robust platform for research, planning and decision-making. In an extended framework, specific information about economic impacts and tradeoffs might also be presented to stakeholders. Stakeholder Analysis improves the understanding of who is affected by decisions and helps to avoid conflict based on misunderstanding, stereotypes and histories of prior conflict. It ensures that the perspectives of those groups without the resources for active participation in decision-making are not ignored and identifies opportunities to capitalise on stakeholder capacity and aspirations.

(b) Choice Modelling

Choice Modelling is an economic assessment technique where stakeholders are asked to evaluate a series of options in a survey format (Bennett and Blamey 2001). Each option is described by a small number of attributes, and can include a mixture of both economic and social factors. The options typically involve tradeoffs within and between the social and economic factors, and the analysis of choices made describes the underlying preferences of a community.

The key advantages of the technique is that it is relatively easy for stakeholder to register their opinions (the choice tasks are easy to complete), and that the subsequent analysis reveals in a quantitative manner how respondents might trade off different attributes of the choice sets. It is also possible to adapt Choice Modelling to a wide variety of situations. For example, it could be used to assess preferences of both current and prospective community members about the desirable attributes of the community of interest.

There are already a number of cases where Choice Modelling has been applied to the analysis of social and economic tradeoffs. However it has rarely been used to help communities develop a shared vision about how a community should develop. The challenge is to adapt

Choice Modelling into a format that gives it more ability to deal with negotiation issues. This might occur by giving communities input into the design of the Choice Modelling instrument, and having a following feedback mechanism where communities can discuss the results.

(c) Experimental Economics

Experimental economics is a growing branch of economics that has emerged internationally as a methodology for developing an understanding of strategic behaviour and its policy implications. Experiments involve the observations of real people in controlled environments. This might occur in community workshops where participants have to engage in choosing options for their community development.

Participants of the economic workshops (subjects) have to be motivated to perform on economic grounds, e.g. receive economic reward according to their performance. The performance can be personal or group performance depending on the aims of the experiment.

Experimental economic workshops (providing that the participants are a good representation of the population) can be used to assess

- the appropriate level of regulation and government control over mining operations,
- the appropriate level/type of involvement of mining companies in community activities,
- the appropriate contributions of mining companies towards community infrastructure and other services.

An advantage of experimental economics is to have the control over the variables that are difficult to measure in the field (e.g., preferences, and information). This, together with the ability to repeat experiments, means that it is possible to better understand how a single variable or institutional rule will influence people's choices. A disadvantage can be to set the structure of the experiment and the incentives to the participants in a way that clearly depict the scenario under investigation and send appropriate signals to participants.

Summary

Mining activities create important economic and social impacts on regional communities. These impacts can be both positive and negative, depending on the activity, the stage in the mining cycle, the type of community and other factors. While there is increased emphasis on community involvement and negotiation in forward planning for communities, it has been difficult to move beyond the provision of better information and communication. This has meant that issues of economic and social impacts remain contentious in some areas.

For some communities the issues relate to potential declines as mines reach the end of their economic life, or changed workforce arrangements mean not all labour is sourced locally. The current growth in the mining industry means that many topical issues are centred around the impacts of expansion on communities, both existing mining communities and others not traditionally involved in the mining sector.

There is a range of economic and social mechanisms that can help the mining industry engage with communities. The challenge in the use of assessment processes is to move from static assessment techniques to more dynamic ones that engage with communities. The following three broad approaches might help to fill the gap: modelling techniques (Input-output modelling, Choice Modelling, Experimental Economics), engagement processes (Extended stakeholder analysis), and improvements to Environmental Impact Assessment processes. Further research is required to explore the potential use of these techniques in relation to the mining industry and regional communities.

Acknowledgements

The research reported in this paper has been funded by a grant from the Australian Coal Association Research Program (ACARP).

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